

# *Appendix A*

*Title: Different transmission routes and the risk of advanced HIV  
disease: A systematic review and network meta-analysis of  
observational studies*

*Author: Qiaosen Chen, Ding Zeng, Yangyang She, Yuhan Lyu,  
Xiao Gong, Matthew J. Feinstein, Yi Yang, Hongbo Jiang*

*Date:2019.09.30*

# Contents

<i>Appendix A1 (Abbreviations and the criterion of rounding off for numerical values)</i> .....	1
<i>Appendix A2 (Search algorithms)</i> .....	2
<i>Appendix A3 (Characteristic of included studies)</i> .....	4
3.1 <i>Table 1: Characteristics of included studies in this review</i> .....	4
3.2 <i>Table 2: Methodological quality assessment for cross-sectional/surveillance studies</i> ....	9
3.3 <i>Table 3: Methodological quality assessment for cohort studies</i> .....	13
<i>Appendix A4 (Assessment of data convergence)</i> .....	15
4.1 <i>Figure 1: Trace plot and density plot</i> .....	15
4.2 <i>Figure 2: Gelman-Rubin-Brooks plot</i> .....	16
<i>Appendix A5 (Network plot, heterogeneity and sensitivity analyses including high-quality studies)</i> .....	17
5.1 <i>Figure 1: Network plot and Bayesian network meta-analysis estimates<sup>a</sup></i> .....	17
5.2 <i>Table 1: Assessment of heterogeneity including all the study</i> .....	18
5.3 <i>Figure 2: Network plot and Bayesian network meta-analysis estimates including high-quality studies<sup>a</sup></i> .....	19
<i>Appendix A6 (Funnel plot to assess the publication bias)</i> .....	20
6.1 <i>Figure 1: Conventional funnel plot with Y-axis of standard error</i> .....	20
6.2 <i>Figure 2: Conventional funnel plot with Y-axis of inverse of standard error</i> .....	21
6.3 <i>Figure 3: Contour-enhanced funnel plot with Y-axis of standard error</i> .....	22
6.4 <i>Figure 4: Contour-enhanced funnel plot with Y-axis of inverse of standard error</i> .....	23
6.5 <i>Explanation of conventional/contour-enhanced funnel plot</i> .....	24
<i>Appendix A7 (SUCRA)</i> .....	25
7.1 <i>Figure 1: The surface under the cumulative ranking curve (SUCRA)</i> .....	25
<i>Appendix A8 (Subgroup analysis of network meta-analysis)</i> .....	26
8.1 <i>Continent results</i> .....	26

8.2	<i>PPP<sup>a</sup> 2009 Adjusted by International \$</i> .....	31
8.3	<i>Study method</i> .....	33
8.4	<i>Time lag</i> .....	36
8.5	<i>Prevalence of AHD</i> .....	38
<i>Appendix A9 (Assessment of AHD risk among PLHIV via HC under different sex work policies)</i> .....		40
9.1	<i>Table 1: Characteristic of the studies for ecological regression to assess the AHD risk among PLHIV via HC under different sex work policies</i> .....	40
9.2	<i>Table 2: Sensitivity analysis regarding the relation between sex work policies and the AHD among PLHIV through HC</i> .....	41
<i>Appendix A10 (Assessment of AHD risk among PLHIV via IDU under different types of law towards CCC)</i> .....		42
10.1	<i>Table 1: Characteristic of the studies for ecological regression to assess the AHD risk among PLHIV via IDU under different types of law towards CCC</i> .....	42
10.2	<i>Table 2: Sensitivity analysis regarding the relationship between criminal justice legislation towards CCC and AHD among PLHIV through IDU using different ecological regression models</i> .....	43
<i>Appendix A11 (PPP tendency regarding included studies in the review)</i> .....		44
11.1	<i>Figure 1: PPP tendency during the period from 1990 to 2018</i> .....	44
11.2	<i>Table 1: Detailed PPP in 15 of 28 regions incorporated in ecological analysis during the period from 1990 to 2018</i> .....	45
11.3	<i>Table 2: Detailed PPP in 13 of 28 regions incorporated in ecological analysis during the period from 1990 to 2018</i> .....	46
<i>Appendix A12 (References included in this review)</i> .....		47

***Appendix A1 (Abbreviations and the criterion of rounding off for numerical values)***

MSM: men who have sex with men  
IDU: injection drug use/injection drug user  
HC: heterosexual contact  
HIV: human immunodeficiency virus  
UK: the United Kingdom  
USA: the United States of America  
AHD: advanced HIV disease  
PLHIV: people living with HIV  
NA: not available  
OR: odds ratio  
CrI: credible interval  
CI: confidence interval  
SUCRA<sup>a</sup>: The surface under the cumulative ranking curve  
GDP: gross domestic product  
PPP: GDP per capita (current international \$)  
CCC: compulsory commitment to the care of substance misusers  
C: criminal  
S: special/social  
M: mental health  
Ref.: Reference group  
China (ML): China (Mainland)  
China (HK): China (Hong Kong)

In this review, the banker's rounding was adopted.

a: SUCRA exhibits the mean rank regarding the risk of AHD among PLHIV via different transmission routes (MSM, IDU and HC). The higher the value, the higher the risk of AHD.

## ***Appendix A2 (Search algorithms)***

### **EMBASE:**

#1 'late testers' AND hiv OR ('late presentation' AND hiv) OR ('late diagnosis' AND hiv) OR 'advanced hiv disease' OR ('late presenters' AND hiv) OR 'late hiv diagnosis' OR ('delayed diagnosis' AND hiv) OR ('hiv testing' AND late) OR 'CD4 cell count less than 200' OR 'CD4 cell count below 200' OR "CD4 less than 200" OR "CD4 below 200" OR "CD4 T cell count less than 200" OR 'CD4 T cell count below 200' OR 'CD4 T lymphocytes less than 200' OR 'CD4 T lymphocytes below 200' OR 'AIDS-related disease' OR 'AIDS-related illness' OR 'AIDS-defining illness' OR 'AIDS-defining disease'

#2 transmission OR 'transmission mode' OR 'transmission route' OR 'men who have sex with men' OR 'men who have sex with men and woman' OR heterosexual OR 'heterosexual contact' OR 'injection drug user' OR 'people who inject drug' OR 'intravenous drug abuse' OR 'intravenous drug use' OR transgender

1# AND 2#

### **PubMed:**

("AIDS-defining disease"[All Fields] OR "AIDS-defining illness"[All Fields] OR "AIDS-related disease"[All Fields] OR "AIDS-related illness"[All Fields] OR "CD4 cell count less than 200"[All Fields] OR "CD4 cell count below 200"[All Fields] OR "CD4 < 200"[All Fields] OR "CD4 cell count < 200"[All Fields] OR "CD4 T cell count < 200"[All Fields] OR "CD4 T lymphocytes less than 200"[All Fields] OR "CD4 T lymphocytes below 200"[All Fields] OR "CD4 T lymphocytes < 200"[All Fields] OR ("HIV testing"[All Fields] AND late[All Fields]) OR ("delayed diagnosis"[All Fields] AND ("hiv"[MeSH Terms] OR "hiv"[All Fields])) OR "late HIV diagnosis"[All Fields] OR ("late presenters"[All Fields] AND ("hiv"[MeSH Terms] OR "hiv"[All Fields])) OR "advanced HIV disease"[All Fields] OR ("late diagnosis"[All Fields] AND ("hiv"[MeSH Terms] OR "hiv"[All Fields])) OR ("late presentation"[All Fields] AND ("hiv"[MeSH Terms] OR "hiv"[All Fields])) OR ("late testers"[All Fields] AND ("hiv"[MeSH Terms] OR "hiv"[All Fields])) AND (("transmission"[Subheading] OR "transmission"[All Fields]) OR (("transmission"[Subheading] OR "transmission"[All Fields]) AND mode[All Fields]) OR (("transmission"[Subheading] OR "transmission"[All Fields]) AND ("drug administration routes"[MeSH Terms] OR "drug"[All Fields] AND "administration"[All Fields] AND "routes"[All Fields]) OR "drug administration routes"[All Fields] OR "route"[All Fields])) OR ("sexual and gender minorities"[MeSH Terms] OR ("sexual"[All Fields] AND "gender"[All Fields] AND "minorities"[All Fields]) OR "sexual and gender minorities"[All Fields] OR ("men"[All Fields] AND "who"[All Fields] AND "sex"[All Fields] AND "men"[All Fields]) OR "men who have sex with men"[All Fields]) OR ("sexual and gender minorities"[MeSH Terms] OR ("sexual"[All Fields] AND "gender"[All Fields] AND "minorities"[All Fields]) OR "sexual and gender minorities"[All Fields] OR ("men"[All Fields] AND "who"[All Fields] AND "sex"[All Fields] AND "men"[All Fields]) OR "men who have sex with men"[All Fields]) AND ("women"[MeSH Terms] OR "women"[All Fields] OR "woman"[All Fields])) OR ("heterosexuality"[MeSH Terms] OR "heterosexuality"[All Fields] OR "heterosexual"[All Fields]) OR ("heterosexuality"[MeSH Terms] OR "heterosexuality"[All Fields] OR "heterosexual"[All Fields])

Fields]) AND ("Contact"[Journal] OR "Contact"[Journal] OR "Contact (Thousand Oaks)"[Journal] OR "contact"[All Fields])) OR (("injections"[MeSH Terms] OR "injections"[All Fields] OR "injection"[All Fields]) AND ("drug users"[MeSH Terms] OR ("drug"[All Fields] AND "users"[All Fields]) OR "drug users"[All Fields] OR ("drug"[All Fields] AND "user"[All Fields]) OR "drug user"[All Fields])) OR (("persons"[MeSH Terms] OR "persons"[All Fields] OR "people"[All Fields]) AND who[All Fields] AND inject[All Fields] AND drug[All Fields]) OR ("substance abuse, intravenous"[MeSH Terms] OR ("substance"[All Fields] AND "abuse"[All Fields] AND "intravenous"[All Fields]) OR "intravenous substance abuse"[All Fields] OR ("intravenous"[All Fields] AND "drug"[All Fields] AND "abuse"[All Fields]) OR "intravenous drug abuse"[All Fields]) OR (intravenous[All Fields] AND drug[All Fields]) OR ("transgender persons"[MeSH Terms] OR ("transgender"[All Fields] AND "persons"[All Fields]) OR "transgender persons"[All Fields] OR "transgender"[All Fields]))))

### **Web of Science**

TS=(transmission OR "transmission mode" OR "transmission route" OR "men who have sex with men" OR "men who have sex with men and woman" OR heterosexual OR "heterosexual contact" OR "injection drug user" OR "people who inject drug" OR "intravenous drug abuse" OR "intravenous drug use" OR transgender) AND TS=(("HIV testing" AND late) OR ("delayed diagnosis" AND HIV ) OR ("late HIV diagnosis") OR ("late presenters" AND HIV) OR ("advanced HIV disease") OR ("late diagnosis" AND HIV) OR ("late presentation" AND HIV) OR ("late testers" AND HIV) OR ("CD4 < 200") OR ("CD4 less than 200") OR ("CD4 below 200") OR ("CD4 cell count less than 200") OR ("CD4 cell count below 200") OR ("CD4 cell count < 200") OR ("CD4 T cell count < 200") OR ("CD4 T lymphocytes < 200") OR ("CD4 T lymphocytes less than 200") OR ("CD4 T lymphocytes below 200") OR ("AIDS-related disease") OR ("AIDS-related illness") OR ("AIDS-defining illness") OR ("AIDS-defining disease"))

Chinese databases were searched by similar algorithms.

**Appendix A3 (Characteristic of included studies)**

**3.1 Table 1: Characteristics of included studies in this review**

Study	Region	Continent	Study method	Time lag <sup>a</sup>	Study period	No. of AHD	No. of PLHIV	No. of Male	No. of Female	Age <sup>b</sup>
2003 Wong KH <sup>1</sup>	China (Hong Kong)	Asia	surveillance	3	1984-2000	365	1530	1269	261	NA
2006 McDonald EA <sup>2</sup>	Australia	Oceania	surveillance	3	1985-2005	52	319	275	44	NA
2010 Kivelä PS <sup>3</sup>	Finland	Europe	surveillance	3	1985-2005	211	934	719	215	33
2000 Girardi E <sup>4</sup>	Italy	Europe	surveillance	3	1986-1998	503	1967	1484	483	>18
2013 Spornraft-Ragaller P <sup>5</sup>	Germany	Europe	cohort	3	1986-2010	188	348	278	70	34-8
2009 Carnicer-Pont D <sup>6</sup>	Spain	Europe	surveillance	3	1987-2006	2713	6186	4984	1202	36
2002 Castilla J <sup>7</sup>	Spain	Europe	surveillance	1	1994-1996	7283	26580	21281	5299	>15
2009 Lemoh C <sup>8</sup>	Australia	Oceania	surveillance	3	1994-2006	627	2779	2530	249	37
2015 Jiang HB <sup>9</sup>	China (Mainland)	Asia	surveillance	1	1994-2012	289	980	803	177	36
2012 Helleberg M <sup>10</sup>	Denmark	Europe	cohort	NA	1995-2009	1039	3027	2286	741	37
2005 Longo B <sup>11</sup>	Italy	Europe	surveillance	6	1996-2002	6253	17007	12980	4027	>18
2006 Delpierre C <sup>12</sup>	France	Europe	cohort	NA	1996-2005	1718	4516	3116	1400	37
2012 Tey JSH. <sup>13</sup>	Singapore	Asia	surveillance	12	1996-2009	2012	3735	3358	377	>15
2016 Op De Coul ELM <sup>14</sup>	Netherlands	Europe	cohort	3	1996-2014	7331	20965	16877	4088	36
2007 Teira Cobo R <sup>15</sup>	Spain	Europe	cohort	1	1997-2002	506	2820	NA	NA	NA
2011 Ndiaye B <sup>16</sup>	France	Europe	surveillance	NA	1997-2007	570	1819	NA	NA	35
2018 Lee CY <sup>17</sup>	China (Taiwan)	Asia	cohort	3	1998-2012	4571	22665	21085	1580	32-74
2004 Manavi K <sup>18</sup>	UK	Europe	cross-section	1	1999-2003	65	189	145	44	NA
2016 Maquera-Afaray J <sup>19</sup>	Peru	South America	surveillance	0	1999-2012	1106	1714	1224	490	35
2015 Wright ST <sup>20</sup>	Australia	Oceania	cohort	6	1999-2012	245	1202	1118	84	NA
2009 Wohl AR <sup>21</sup>	USA	North America	cross-section	12	2000-2004	267	383	316	67	NA
2013 Rurangirwa J <sup>22</sup>	USA	North America	surveillance	6	2000-2004	3424	9031	NA	NA	>18
2011 Tang JJ <sup>23</sup>	USA	North America	surveillance	12	2000-2006	17364	28382	NA	NA	NA
2010 Lee JH <sup>24</sup>	South Korea	Asia	surveillance	6	2000-2007	858	2299	2108	191	>15

**Table 1: Characteristics of included studies in this review (continued)**

Study	Region	Continent	Study method	Time lag <sup>a</sup>	Study period	No. of AHD	No. of PLHIV	No. of Male	No. of Female	Age <sup>b</sup>
2010 Yang BR <sup>25</sup>	USA	North America	cross-section	3	2000-2007	3110	9964	7225	2739	≥13
2012 Saganic L <sup>26</sup>	USA	North America	surveillance	12	2000-2008	704	1904	1622	282	NA
2016 Tossas-Milligan KY <sup>27</sup>	Puerto Rico	North America	cohort	12	2000-2011	377	795	508	287	≥18
2013 Mocreft A <sup>28</sup>	35 European countries	Europe	cohort	6	2000-2011	28081	84524	NA	NA	NA
2009 Duffus WA <sup>29</sup>	USA	North America	cohort	12	2001-2005	1311	2564	1594	970	≥18
2018 Li X <sup>30</sup>	China (Mainland)	Asia	surveillance	NA	2001-2017	361	783	673	110	>50
2007 Delpierre C <sup>31</sup>	France	Europe	cross-section	NA	2002-2003	384	954	NA	NA	37
2016 Kundro MA <sup>32</sup>	Argentina	South America	surveillance	6	2002-2014	167	993	249	744	31
2011 Colucci A <sup>33</sup>	Italy	Europe	cross-section	6	2003-2005	127	245	201	43	42-3
2010 Oliva J <sup>34</sup>	Spain	Europe	cross-section	0	2003-2007	1177	3129	2497	632	NA
2011 Leutscher PDC <sup>35</sup>	Denmark	Europe	cohort	0	2003-2009	63	194	138	56	38
2016 Jeong SJ <sup>36</sup>	13 Asian countries	Asia	cohort	3	2003-2012	2681	3744	2691	1053	34
2009 Sobrino-Vegas P <sup>37</sup>	Spain	Europe	cohort	6	2004-2006	653	1749	1358	391	>13
2016 Sobrino-Vegas P <sup>38</sup>	Spain	Europe	cohort	6	2004-2013	2049	7165	5959	1206	34
2016 Liu ZQ <sup>39</sup>	China (Mainland)	Asia	surveillance	NA	2004-2015	1210	3447	3194	253	NA
2012 Dickson NP <sup>40</sup>	New Zealand	Oceania	surveillance	3	2005-2010	194	606	NA	NA	NA
2017 Sun L <sup>41</sup>	China (Mainland)	Asia	cross-section	NA	2005-2015	288	771	672	99	NA
2017 Zhang NN <sup>42</sup>	China (Mainland)	Asia	surveillance	NA	2005-2015	182	658	525	133	NA
2008 Kiertiburanakul S <sup>43</sup>	Thailand	Asia	surveillance	NA	2006-2006	68	141	79	62	35-5
2011 Lo YC <sup>44</sup>	China (Taiwan)	Asia	cohort	3	2006-2008	107	227	220	7	31
2017 Pyziak-Kowalska KA <sup>45</sup>	Poland	Europe	surveillance	NA	2006-2008	363	1132	911	221	31-3
2017 Mao LC <sup>46</sup>	China (Mainland)	Asia	surveillance	NA	2006-2015	174	589	56	533	NA
2014 Trepka MJ <sup>47</sup>	USA	North America	cohort	3	2007-2011	7060	25585	18533	7052	>12
2014 Oliva J <sup>48</sup>	Spain	Europe	surveillance	3	2007-2011	3356	11426	9278	2148	35
2012 Bai F <sup>49</sup>	Italy	Europe	cohort	1	2007-2011	79	275	225	50	31



**Table 1: Characteristics of included studies in this review (continued)**

Study	Region	Continent	Study method	Time lag <sup>a</sup>	Study period	No. of AHD	No. of PLHIV	No. of Male	No. of Female	Age <sup>b</sup>
2015 Valentini MB <sup>50</sup>	Brazil	South America	cross-section	12	2008-2010	193	520	NA	NA	NA
2012 Tang HL <sup>51</sup>	China (Mainland)	Asia	cross-section	NA	2009-2010	2496	3912	2414	1498	43-4
2015 Dai SY <sup>52</sup>	China (Mainland)	Asia	cross-section	12	2009-2010	653	899	608	291	>18
2013 Hall HI <sup>53</sup>	Australia	Oceania	surveillance	3	2010-2010	198	1051	896	150	NA
2013 Hall HI <sup>53</sup>	Canada	North America	surveillance	3	2010-2010	130	1472	1165	306	NA
2013 Hall HI <sup>53</sup>	France	Europe	surveillance	3	2010-2010	959	6265	4199	2066	NA
2013 Hall HI <sup>53</sup>	Italy	Europe	surveillance	3	2010-2010	557	3839	2889	943	NA
2013 Hall HI <sup>53</sup>	USA	North America	surveillance	3	2010-2010	12378	43130	33609	9521	NA
2016 Jin X <sup>54</sup>	China (Mainland)	Asia	surveillance	NA	2010-2014	151088	398573	NA	NA	NA
2016 Levy I <sup>55</sup>	Israel	Asia	cohort	0	2010-2015	57	356	300	56	NA
2017 Lin ZM <sup>56</sup>	China (Mainland)	Asia	surveillance	NA	2010-2016	19624	47343	38259	9084	44-49
2015 Qi Y <sup>57</sup>	China (Mainland)	Asia	surveillance	NA	2011-2014	148	411	348	63	39-34
2018 Jin L <sup>58</sup>	China (Mainland)	Asia	surveillance	NA	2011-2015	2949	7073	5696	1377	38-5
2017 Guo Y <sup>59</sup>	China (Mainland)	Asia	surveillance	NA	2011-2015	916	2922	2761	161	34-49
2018 Li JZ <sup>60</sup>	China (Mainland)	Asia	surveillance	NA	2011-2016	273	1365	1306	59	37-78
2018 Zhang HL <sup>61</sup>	China (Mainland)	Asia	surveillance	NA	2011-2017	2088	7427	6811	616	34
2014 Pan XH <sup>62</sup>	China (Mainland)	Asia	cross-section	1	2012-2012	500	1894	1511	383	36-4
2017 Senard O <sup>63</sup>	France	Europe	cohort	0	2012-2013	49	186	137	49	37-13
2017 Chkhartishvili N <sup>64</sup>	Georgia	Asia	cohort	6	2012-2015	870	1987	1478	509	37
2017 Li X <sup>65</sup>	China (Mainland)	Asia	surveillance	NA	2012-2016	931	3064	2850	214	NA
2018 Fakoya I <sup>66</sup>	9 European countries	Europe	cross-section	0	2013-2015	431	1812	1226	586	>18
2016 Meng Q <sup>67</sup>	China (Mainland)	Asia	surveillance	NA	2014-2014	4928	9526	6844	2682	NA
2017 Cuzin L <sup>68</sup>	France	Europe	cohort	3	2014-2015	363	1421	1098	323	37
2017 Chen ZB <sup>69</sup>	China (Mainland)	Asia	surveillance	12	2016-2016	109	300	187	113	36-2
2014 Wilson K <sup>70</sup>	France	Europe	cross-section	NA	1996-2011	308	1096	649	327	≥18

**Table 1: Characteristics of included studies in this review (continued)**

Study	Region	Continent	Study method	Time lag <sup>a</sup>	Study period	No. of AHD	No. of PLHIV	No. of Male	No. of Female	Age <sup>b</sup>
2012 Toure A <sup>71</sup>	France	Europe	cohort	0	1992-2006	1139	3570	2731	837	36-3
2019 Siwak E <sup>72</sup>	Poland	Europe	cross-section	0	2000-2015	1380	3869	3224	545	33
2006 Schwarcz S <sup>73</sup>	USA	North America	surveillance	12	2001-2006	830	2139	1894	174	≥13
2010 Mena M <sup>74</sup>	Italy	Europe	surveillance	1	2000-2008	76	156	124	32	41
2003 McDonald AM <sup>75</sup>	Australia	Oceania	surveillance	NA	1992-2001	1176	5097	4739	358	NA
2019 Lim CL <sup>76</sup>	Malaysia	Asia	cohort	0	2007-2016	3880	8757	7400	1357	34-8
2007 Lanoy E <sup>77</sup>	France	Europe	cohort	3	1997-2002	6687	18721	13145	5576	≥15
2019 Hu X <sup>78</sup>	China (Mainland)	Asia	cross-section	3	2012-2016	20325	45118	32028	13090	50.3
2001 de Munain JL <sup>79</sup>	Spain	Europe	surveillance	0	1998-2000	45	125	NA	NA	37-3
2009 Chen KT <sup>80</sup>	China (Taiwan)	Asia	surveillance	3	1990-2005	2389	9961	9104	857	32
2009 Shouse RL <sup>81</sup>	USA	North America	surveillance	12	1998-2005	107784	281421	200882	80539	NA
2006 Castilla J <sup>82</sup>	Spain	Europe	surveillance	NA	2000-2004	616	1407	1071	336	37
2016 Reinhardt S <sup>83</sup>	Guatemala	South America	cohort	0	2015-2015	931	3686	2133	1553	34-4
2005 Brannstrom J <sup>84</sup>	Sweden	Europe	surveillance	3	1996-2002	219	487	360	127	≥15
2019 Luo TF <sup>85</sup>	China (Mainland)	Asia	surveillance	NA	2005-2018	320	608	442	166	NA
2018 Chen LY <sup>86</sup>	China (Mainland)	Asia	surveillance	NA	2006-2017	549	2132	1254	878	≥18
2019 Zhang M <sup>87</sup>	China (Mainland)	Asia	surveillance	NA	2011-2017	592	1562	1038	524	46-75
2018 Liang HM <sup>88</sup>	China (Mainland)	Asia	surveillance	NA	2011-2016	1885	5213	4357	856	36-57
2018 Xie H <sup>89</sup>	China (Mainland)	Asia	surveillance	NA	2012-2016	679	1387	977	410	NA
2018 Tang H <sup>90</sup>	China (Mainland)	Asia	surveillance	NA	2012-2016	4508	11832	9679	2153	≥15
2019 Yang K <sup>91</sup>	China (Mainland)	Asia	surveillance	NA	2016-2017	1953	5826	4748	1078	43
2019 Xu Y <sup>92</sup>	China (Mainland)	Asia	surveillance	NA	2007-2017	187	628	532	96	37-56
2018 Huang YL <sup>93</sup>	China (Mainland)	Asia	surveillance	NA	2011-2017	901	2551	2071	480	NA
2019 Yang ZK <sup>94</sup>	China (Mainland)	Asia	surveillance	NA	2015-2017	202	776	626	150	39-32
2019 Duan ZR <sup>95</sup>	China (Mainland)	Asia	surveillance	NA	2012-2016	282	693	508	185	53

**Table 1: Characteristics of included studies in this review (continued)**

Study	Region	Continent	Study method	Time lag <sup>a</sup>	Study period	No. of AHD	No. of PLHIV	No. of Male	No. of Female	Age <sup>b</sup>
2018 Bing PF <sup>96</sup>	China (Mainland)	Asia	surveillance	NA	2012-2017	829	3605	3239	366	35·36
2018 Xu QS <sup>97</sup>	China (Mainland)	Asia	surveillance	12	2005-2016	33	210	168	42	30·32
2019 Zhang ZH <sup>98</sup>	China (Mainland)	Asia	surveillance	NA	2013-2017	253	714	627	87	36·2
2018 Ye L <sup>99</sup>	China (Mainland)	Asia	surveillance	NA	2010-2017	333	972	830	142	39
2019 Zhu Y <sup>100</sup>	China (Mainland)	Asia	surveillance	NA	2012-2017	442	931	667	264	56
2018 Huang SZ <sup>101</sup>	China (Mainland)	Asia	surveillance	NA	2012-2016	323	933	802	131	36·5

a: Time lag was defined as the time between the initial diagnosis of HIV and the development of AIDS. The time lag of 0 month represents a CD4 count < 200 cells/ $\mu$ L or AIDS at diagnosis

b: Mean/Median age or age of range

A more detailed information table is provided in *Appendix B Table 1: Detailed information of included studies in this review continued to Appendix A3 3.1 Table 1: Characteristics of included studies in this review.*

3.2 Table 2: Methodological quality assessment for cross-sectional/surveillance studies

Study	Selection			Ascertainment of transmission	Comparability based on design and analyses <sup>a</sup>	Outcome		Sum of scores
	Representativeness of the sample	Sample size	Non-respondents			Assessment of AHD	Statistical test	
2018 Jin L <sup>58</sup>	1	0	1	2	0	2	1	7
2012 Tang HL <sup>51</sup>	1	0	1	2	0	2	1	7
2011 Colucci A <sup>33</sup>	1	0	1	2	0	2	1	7
2014 Pan XH <sup>62</sup>	1	0	0	2	0	2	1	6
2008 Kiertiburanakul S <sup>43</sup>	1	0	0	2	0	2	0	5
2012 Saganic L <sup>26</sup>	1	0	0	2	0	2	1	6
2007 Delpierre C <sup>31</sup>	1	0	0	2	0	2	0	5
2010 Oliva J <sup>34</sup>	1	0	0	2	0	2	1	6
2009 Lemoh C <sup>8</sup>	1	0	1	2	0	2	1	7
2006 McDonald EA <sup>2</sup>	1	0	0	2	0	2	1	6
2010 Kivelä PS <sup>3</sup>	1	0	0	2	0	2	1	6
2012 Tey JSH <sup>13</sup>	1	0	1	2	0	2	1	7
2015 Valentini MB <sup>50</sup>	0	0	0	2	0	2	1	5
2009 Wohl AR <sup>21</sup>	1	0	0	2	0	2	1	6
2011 Ndiaye B <sup>16</sup>	1	0	1	2	0	2	1	7
2004 Manavi K <sup>18</sup>	1	0	1	2	0	2	1	7
2009 Carnicer-Pont D <sup>6</sup>	1	0	0	2	0	2	1	6
2018 Fakoya I <sup>66</sup>	1	1	0	2	0	2	1	7
2010 Lee JH <sup>24</sup>	1	0	0	2	0	2	1	6
2000 Girardi E <sup>4</sup>	1	0	1	2	0	2	1	7
2005 Longo B <sup>11</sup>	1	0	1	2	0	2	1	7
2016 Maquera-Afaray J <sup>19</sup>	1	0	0	2	0	2	1	6
2013 Hall HI <sup>53</sup>	1	0	1	2	0	2	0	6

**Table 2: Methodological quality assessment for surveillance and cross-sectional studies (continued)**

Study	Selection				Comparability based on design and analyses <sup>a</sup>	Outcome		Sum of scores
	Representativeness of the sample	Sample size	Non-respondents	Ascertainment of transmission		Assessment of AHD	Statistical test	
2013 Hall HI <sup>53</sup>	1	0	1	2	0	2	0	6
2013 Hall HI <sup>53</sup>	1	0	1	2	0	2	0	6
2013 Hall HI <sup>53</sup>	1	0	1	2	0	2	0	6
2013 Hall HI <sup>53</sup>	1	0	1	2	0	2	0	6
2016 Kundro MA <sup>32</sup>	1	0	0	2	0	2	1	6
2002 Castilla J <sup>7</sup>	1	0	0	2	0	2	1	6
2013 Rurangirwa J <sup>22</sup>	1	0	0	2	0	2	1	6
2010 Yang BR <sup>25</sup>	1	0	1	2	0	2	1	7
2012 Dickson NP <sup>40</sup>	1	0	0	2	0	2	1	6
2017 Pyziak-Kowalska KA <sup>45</sup>	1	0	0	2	0	2	1	6
2014 Oliva J <sup>48</sup>	1	0	0	2	0	2	1	6
2015 Dai SY <sup>52</sup>	1	0	0	2	0	2	0	5
2015 Jiang HB <sup>9</sup>	1	0	1	2	0	2	1	7
2003 Wong KH <sup>1</sup>	1	0	1	2	0	2	1	7
2011 Tang JJ <sup>23</sup>	1	0	1	2	0	2	1	7
2018 Li JZ <sup>60</sup>	1	0	1	2	0	2	1	7
2015 Qi Y <sup>57</sup>	1	0	1	2	0	2	1	7
2016 Jin X <sup>54</sup>	1	0	1	2	0	2	0	6
2016 Liu ZQ <sup>39</sup>	1	0	1	2	0	2	1	7
2016 Meng Q <sup>67</sup>	1	0	1	2	0	2	1	7
2017 Chen ZB <sup>69</sup>	1	0	0	2	0	2	1	6
2017 Guo Y <sup>59</sup>	1	0	1	2	0	2	1	7
2017 Li X <sup>65</sup>	1	0	1	2	0	2	1	7

**Table 2: Methodological quality assessment for surveillance and cross-sectional studies (continued)**

study	Selection			Ascertainment of transmission	Comparability based on design and analyses <sup>a</sup>	Outcome		Sum of scores
	Representativeness of the sample	Sample size	Non-respondents			Assessment of AHD	Statistical test	
2017 Lin ZM <sup>56</sup>	1	0	1	2	0	2	1	7
2017 Mao LC <sup>46</sup>	1	0	1	2	0	2	1	7
2017 Sun L <sup>41</sup>	1	0	0	2	0	2	1	6
2017 Zhang NN <sup>42</sup>	1	0	1	2	0	2	1	7
2018 Li X <sup>30</sup>	0	0	1	2	0	2	1	6
2018 Zhang HL <sup>61</sup>	1	0	1	2	0	2	1	7
2014 Wilson K <sup>70</sup>	1	0	0	2	0	2	0	5
2019 Siwak E <sup>72</sup>	1	0	1	2	0	2	1	7
2006 Schwarcz S <sup>73</sup>	1	0	1	2	0	2	1	7
2010 Mena M <sup>74</sup>	1	0	1	2	0	2	0	6
2003 McDonald AM <sup>75</sup>	1	0	1	2	0	2	1	7
2019 Hu X <sup>78</sup>	1	0	1	2	0	2	1	7
2001 de Munain JL <sup>79</sup>	0	0	1	2	0	2	0	5
2009 Chen KT <sup>80</sup>	1	0	1	2	0	2	0	6
2009 Shouse RL <sup>81</sup>	1	0	1	2	0	2	0	6
2006 Castilla J <sup>82</sup>	1	0	0	2	0	2	1	6
2005 Brannstrom J <sup>84</sup>	1	0	1	2	0	2	0	6
2019 Luo TF <sup>85</sup>	1	0	1	2	0	2	1	7
2018 Chen LY <sup>86</sup>	1	0	1	2	0	2	1	7
2019 Zhang M <sup>87</sup>	1	0	1	2	0	2	1	7
2018 Liang HM <sup>88</sup>	1	0	0	2	0	2	1	6
2018 Xie H <sup>89</sup>	1	0	1	2	0	2	1	7
2018 Tang H <sup>90</sup>	0	0	1	2	0	2	1	6

**Table 2: Methodological quality assessment for surveillance and cross-sectional studies (continued)**

study	Selection			Ascertainment of transmission	Comparability based on design and analyses <sup>a</sup>	Outcome		Sum of scores
	Representativeness of the sample	Sample size	Non-respondents			Assessment of AHD	Statistical test	
2019 Yang K <sup>91</sup>	1	0	0	2	0	2	1	6
2019 Xu Y <sup>92</sup>	1	0	1	2	0	2	1	7
2018 Huang YL <sup>93</sup>	1	0	0	2	0	2	1	6
2019 Yang ZK <sup>94</sup>	1	0	1	2	0	2	1	7
2019 Duan ZR <sup>95</sup>	1	0	1	2	0	2	1	7
2018 Bing PF <sup>96</sup>	1	0	0	2	0	2	1	6
2018 Xu QS <sup>97</sup>	1	0	1	2	0	2	1	7
2019 Zhang ZH <sup>98</sup>	1	0	1	2	0	2	1	7
2018 Ye L <sup>99</sup>	1	0	1	2	0	2	1	7
2019 Zhu Y <sup>100</sup>	1	0	1	2	0	2	1	7
2018 Huang SZ <sup>101</sup>	1	0	1	2	0	2	1	7

A total of 76 articles were included.

a: Because we extracted the crude data, the item, **Comparability based on design and analyses**, was scored as 0 for all the cross-sectional and surveillance study.

Methodological quality assessment scale:

Very Good Studies: 9-10 points

Good Studies: 7-8 points

Satisfactory Studies: 5-6 points

Unsatisfactory Studies: 0 to 4 points

3.3 Table 3: Methodological quality assessment for cohort studies

Study	Selection				Comparability <sup>b</sup>	Outcome			Sum of Score
	Representativeness of PLHIV	Selection of other transmission routes	Ascertainment of transmission	Outcome of interest was not present at start of study <sup>a</sup>		Assessment of AHD	Follow-up long enough for outcomes to occur <sup>c</sup>	Adequacy of follow-up of cohorts <sup>d</sup>	
2018 Lee CY <sup>17</sup>	1	1	1	0	0	1	0	0	4
2013 Spornraft-Ragaller P <sup>5</sup>	0	1	1	0	0	1	0	0	3
2009 Sobrino-Vegas P <sup>37</sup>	1	1	1	0	0	1	0	0	4
2007 Teira Cobo R <sup>15</sup>	1	1	1	0	0	1	0	0	4
2017 Senard O <sup>63</sup>	0	1	1	0	0	1	0	0	3
2016 Op De Coul ELM <sup>14</sup>	1	1	1	0	0	1	0	0	4
2006 Delpierre C <sup>12</sup>	1	1	1	0	0	1	0	0	4
2011 Leutscher PDC <sup>35</sup>	1	1	1	0	0	1	0	0	4
2016 Sobrino-Vegas P <sup>38</sup>	1	1	1	0	0	1	0	0	4
2011 Lo YC <sup>44</sup>	0	1	1	0	0	1	0	0	3
2014 Trepka MJ <sup>47</sup>	1	1	1	0	0	1	0	0	4
2016 Tossas-Milligan KY <sup>27</sup>	0	1	1	0	0	1	0	0	3
2016 Jeong SJ <sup>36</sup>	1	1	1	0	0	1	0	0	4
2017 Chkhartishvili N <sup>64</sup>	1	1	1	0	0	1	0	0	4
2012 Helleberg M <sup>10</sup>	1	1	1	0	0	1	0	0	4
2016 Levy I <sup>55</sup>	0	1	1	0	0	1	0	0	3
2017 Cuzin L <sup>68</sup>	1	1	1	0	0	1	0	0	4
2012 Bai F <sup>49</sup>	0	1	1	0	0	1	0	0	3
2013 Mcroft A <sup>28</sup>	1	1	1	0	0	1	0	0	4
2009 Duffus WA <sup>29</sup>	1	1	1	0	0	1	0	0	4
2015 Wright ST <sup>20</sup>	1	1	1	0	0	1	0	0	4



**Table 3: Methodological quality assessment for cohort studies (continued)**

Study	Selection			Outcome of interest was not present at start of study <sup>a</sup>	Comparability <sup>b</sup>	Outcome			Sum of Score
	Representativeness of PLHIV	Selection of other transmission routes	Ascertainment of transmission			Assessment of AHD	Follow-up long enough for outcomes to occur <sup>c</sup>	Adequacy of follow-up of cohorts <sup>d</sup>	
2012 Toure A <sup>71</sup>	1	1	1	0	0	1	0	0	4
2019 Lim CL <sup>76</sup>	1	1	1	0	0	1	0	0	4
2007 Lanoy E <sup>77</sup>	1	1	1	0	0	1	0	0	4
2016 Reinhardt S <sup>83</sup>	0	1	1	0	0	1	0	0	3

A total of 25 articles were included.

a, c, d: Because we extracted the baseline information of cohort studies, the items, ‘**Outcome of interest was not present at start of study**’, ‘**Follow-up long enough for outcomes to occur**’ and ‘**Adequacy of follow-up of cohorts**’ were scored as 0 for all the cohort study.

b: Because we extracted the crude data, the item, **Comparability**, was scored as 0 for all the cohort study.

Methodological quality assessment scale:

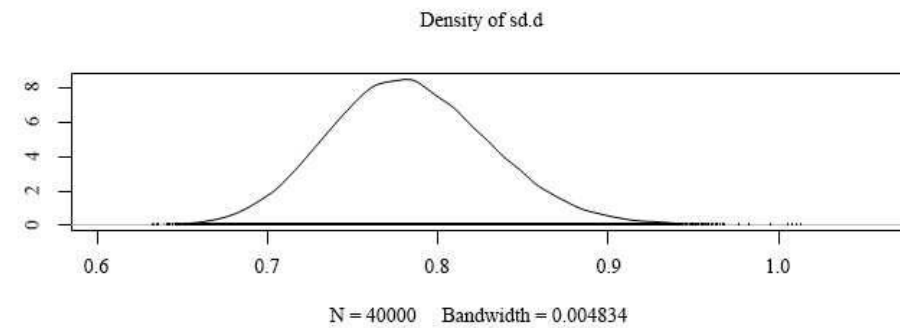
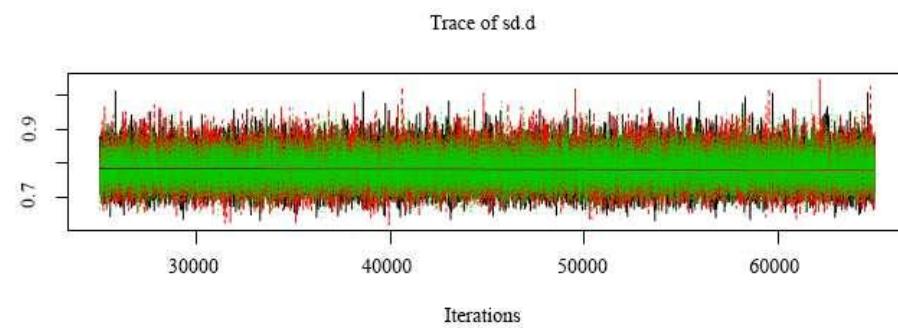
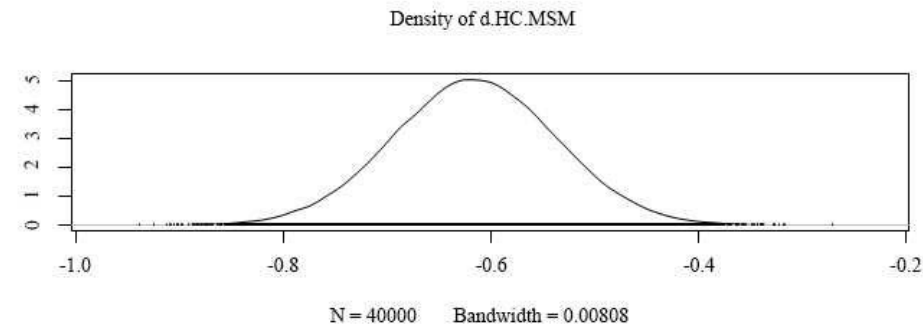
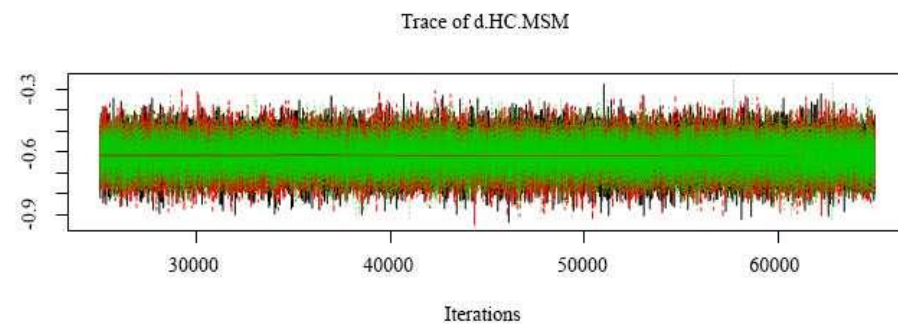
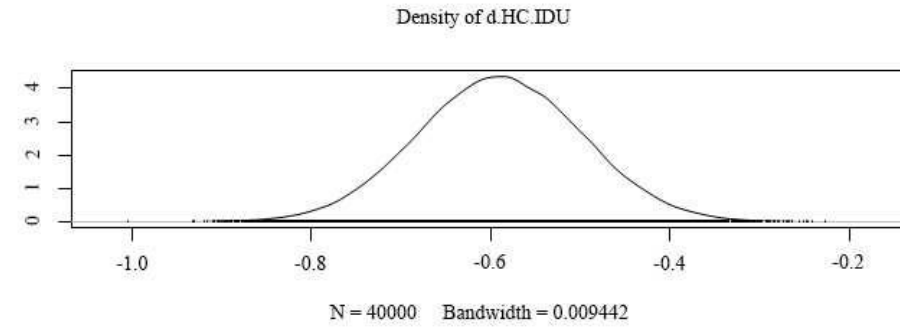
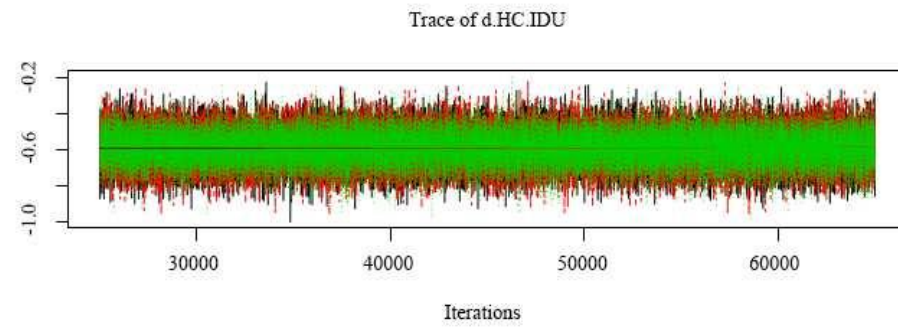
Good quality: 3 or 4 scores in selection domain AND 1 or 2 scores in comparability domain AND 2 or 3 scores in outcome domain

Fair quality: 2 scores in selection domain AND 1 or 2 scores in comparability domain AND 2 or 3 scores in outcome domain

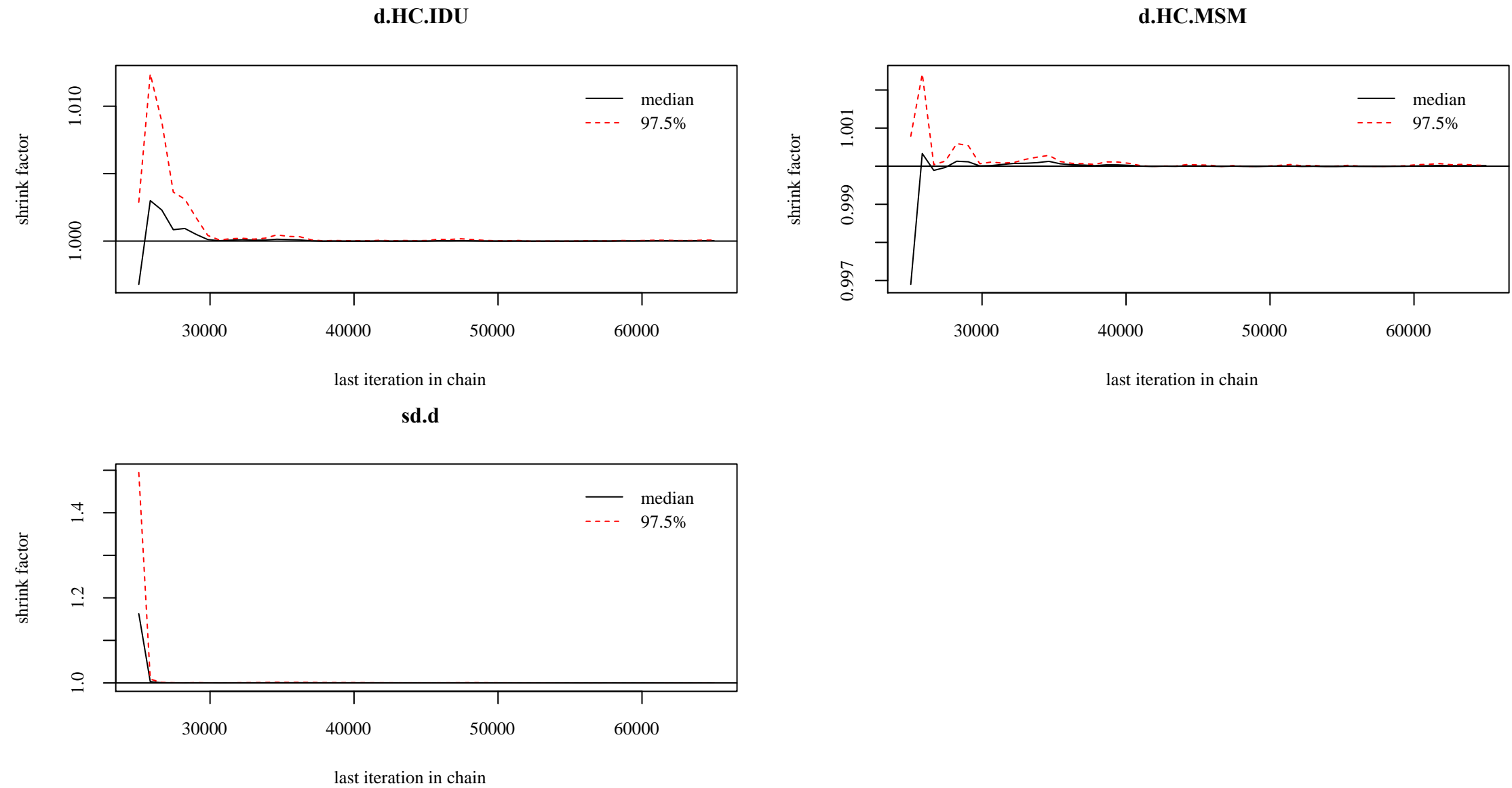
Poor quality: 0 or 1 score in selection domain OR 0 scores in comparability domain OR 0 or 1 score in outcome domain

**Appendix A4 (Assessment of data convergence)**

**4.1 Figure 1: Trace plot and density plot**

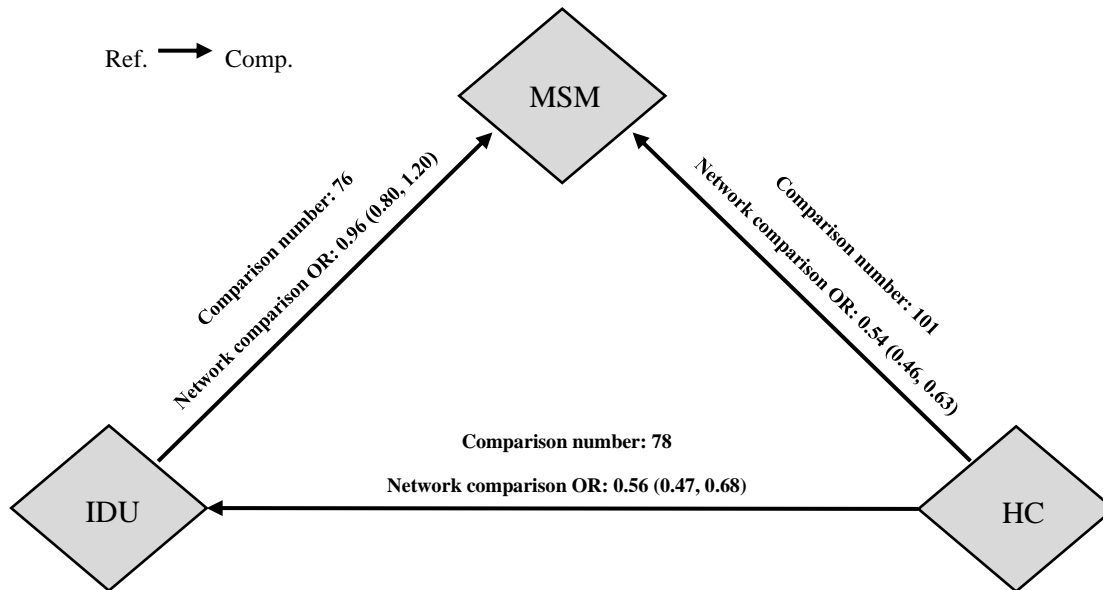


4.2 Figure 2: Gelman-Rubin-Brooks plot



**Appendix A5 (Network plot, heterogeneity and sensitivity analyses including high-quality studies)**

**5.1 Figure 1: Network plot and Bayesian network meta-analysis estimates<sup>a</sup>**



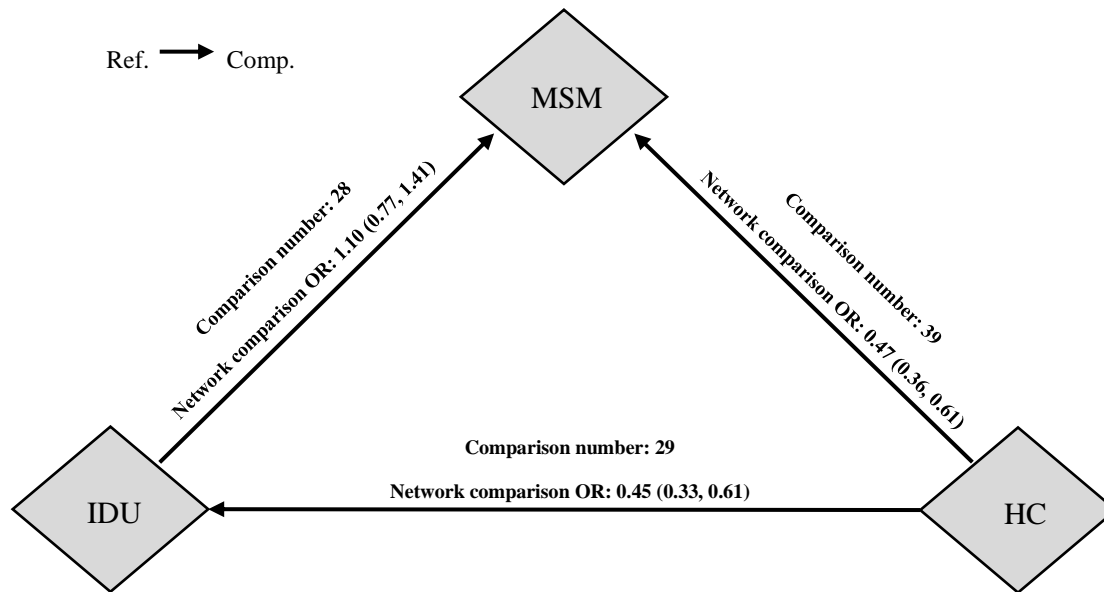
For each comparison, the arrowhead points from the reference group (ref.) to the comparison group (comp.). Summaries of odds ratio (OR) and its 95% credible interval (CrI) for advanced HIV disease in network comparison, as well as the number of comparisons, are demonstrated along with the arrows.

a: Network Meta-analysis including all the study.

**5.2 Table 1: Assessment of heterogeneity including all the study**

		Pair-wise I <sup>2</sup>	Network I <sup>2</sup>
IDU	HC	98.6%	98.5%
MSM	HC	98.6%	98.6%
MSM	IDU	98.3%	98.3%

5.3 Figure 2: Network plot and Bayesian network meta-analysis estimates including high-quality studies<sup>a</sup>

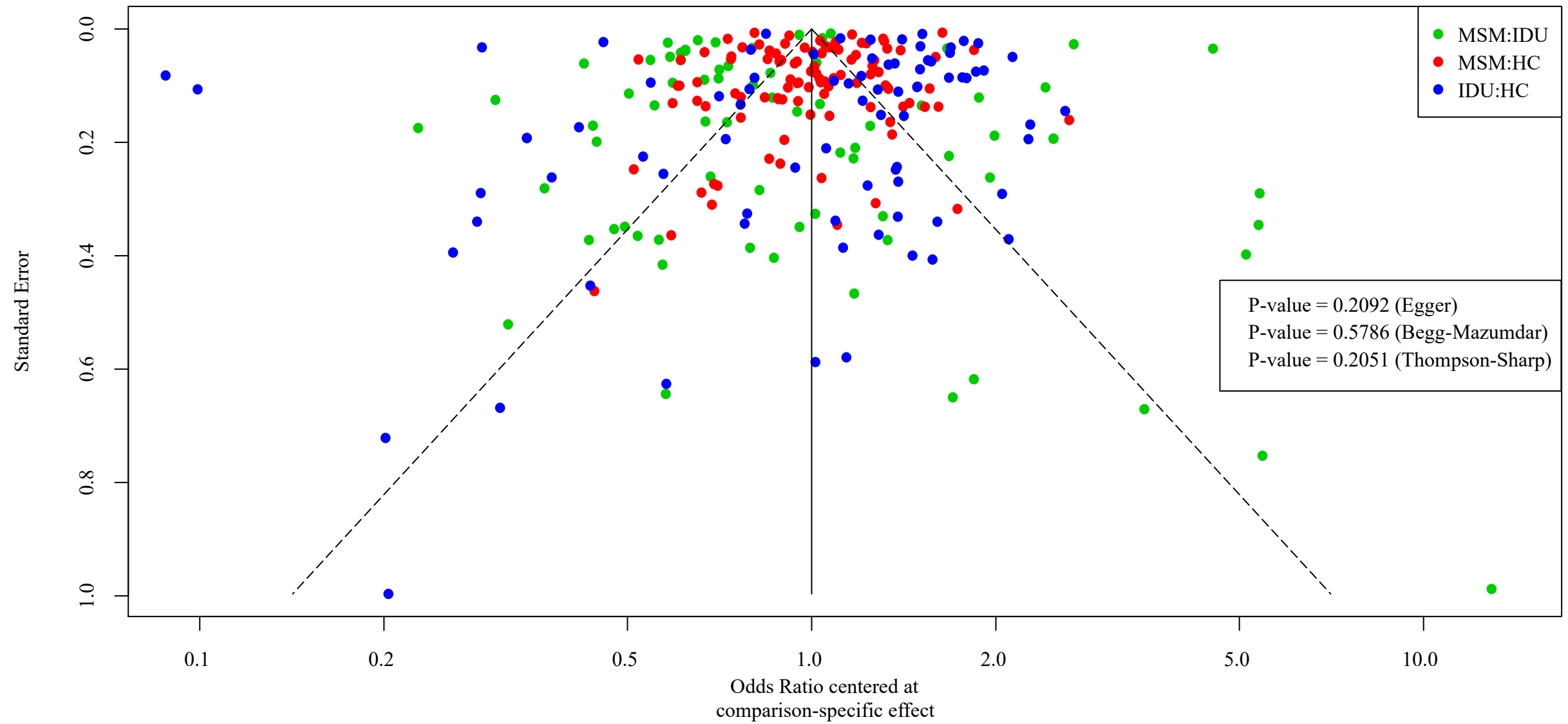


For each comparison, the arrowhead points from the reference group (ref.) to the comparison group (comp.). Summaries of odds ratio (OR) and its 95% credible interval (CrI) for advanced HIV disease network comparison, as well as the number of comparisons, are demonstrated along with the arrows

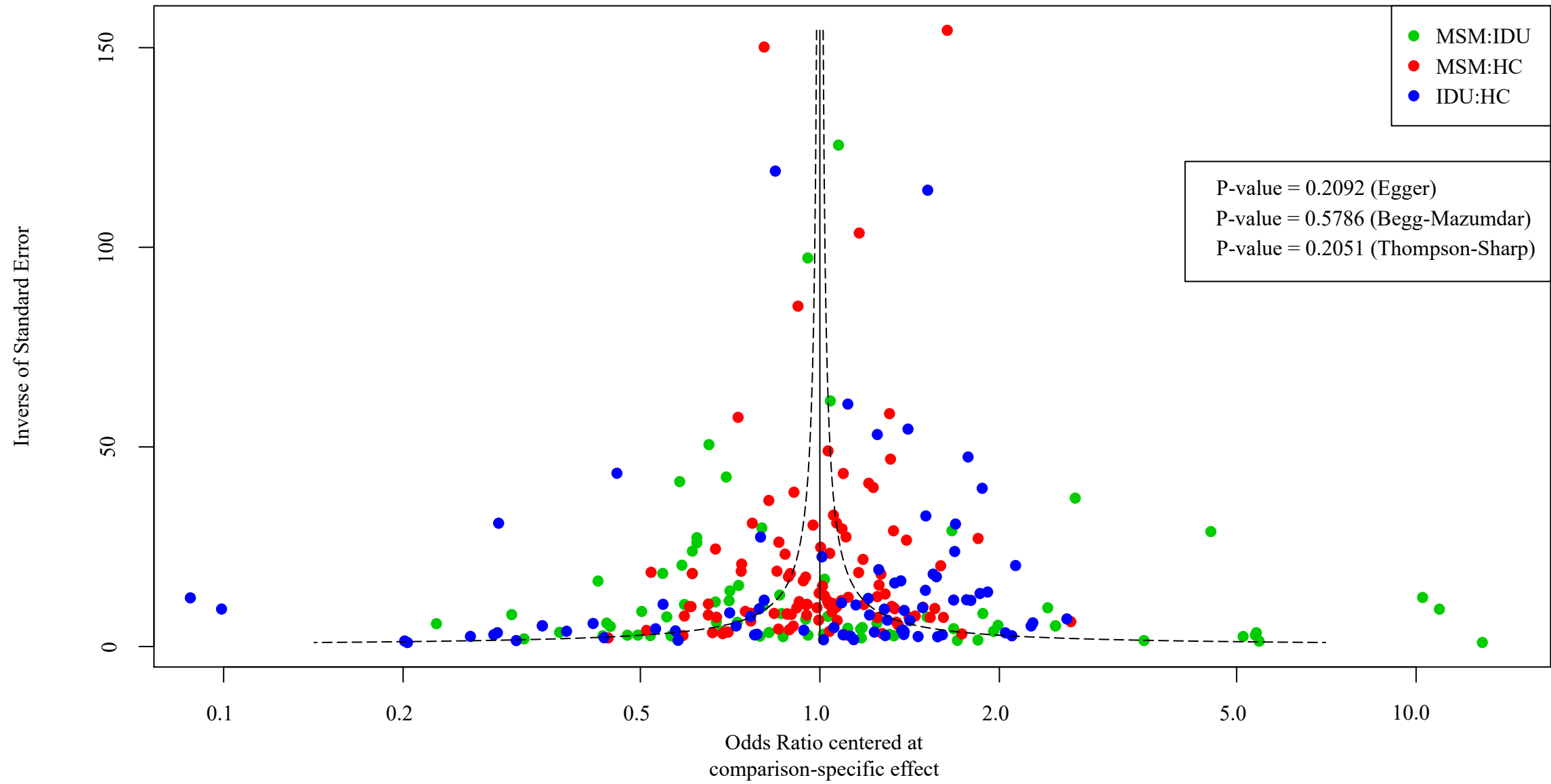
a: A total of 40 studies were included in the Network Meta-analyses covering cross-sectional studies assess as good or very good quality and cohort studies evaluated as good quality. However, no cohort study was evaluated as good quality.

Appendix A6 (Funnel plot to assess the publication bias)

6.1 Figure 1: Conventional funnel plot with Y-axis of standard error

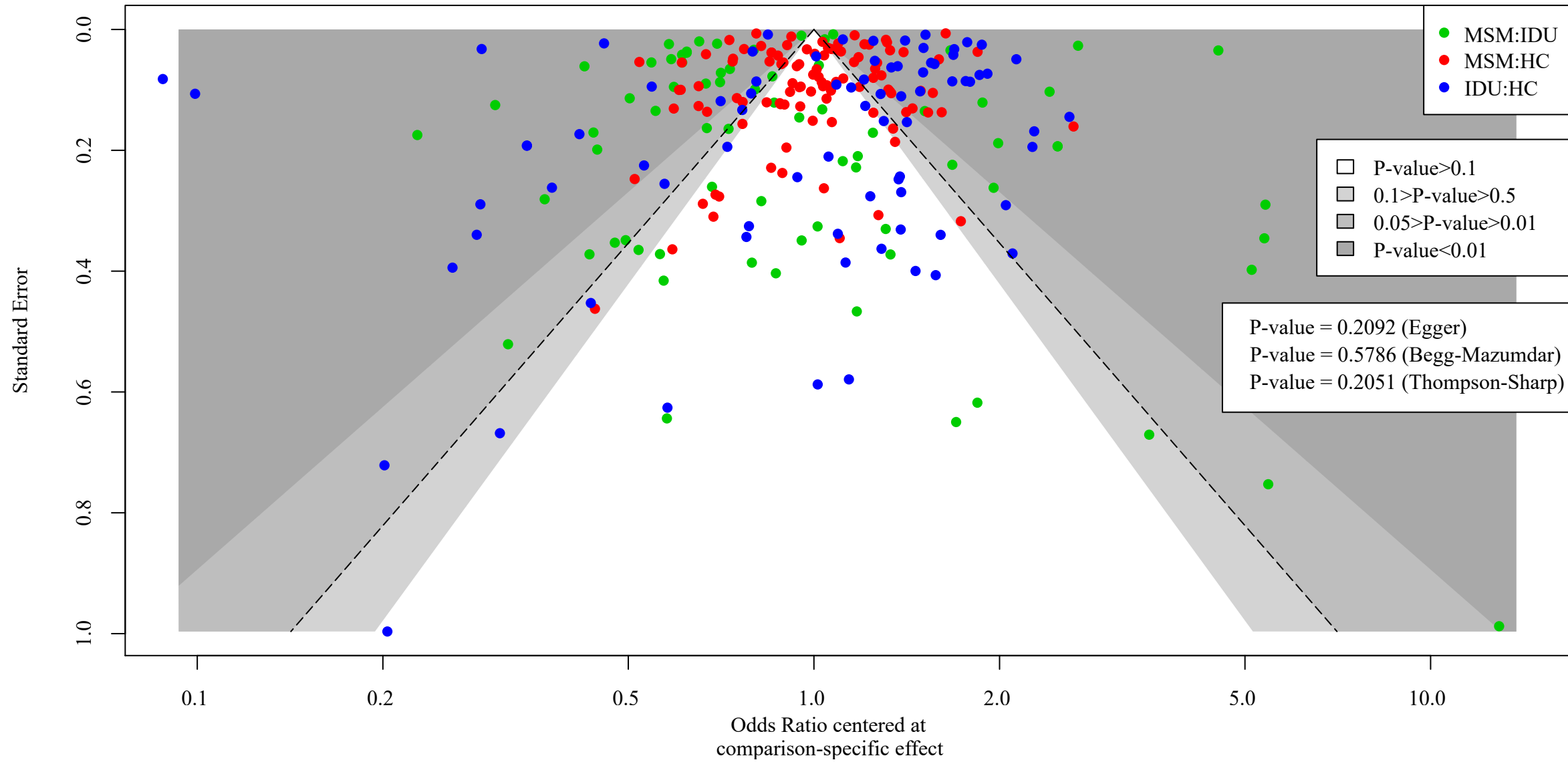


6.2 Figure 2: Conventional funnel plot with Y-axis of inverse of standard error

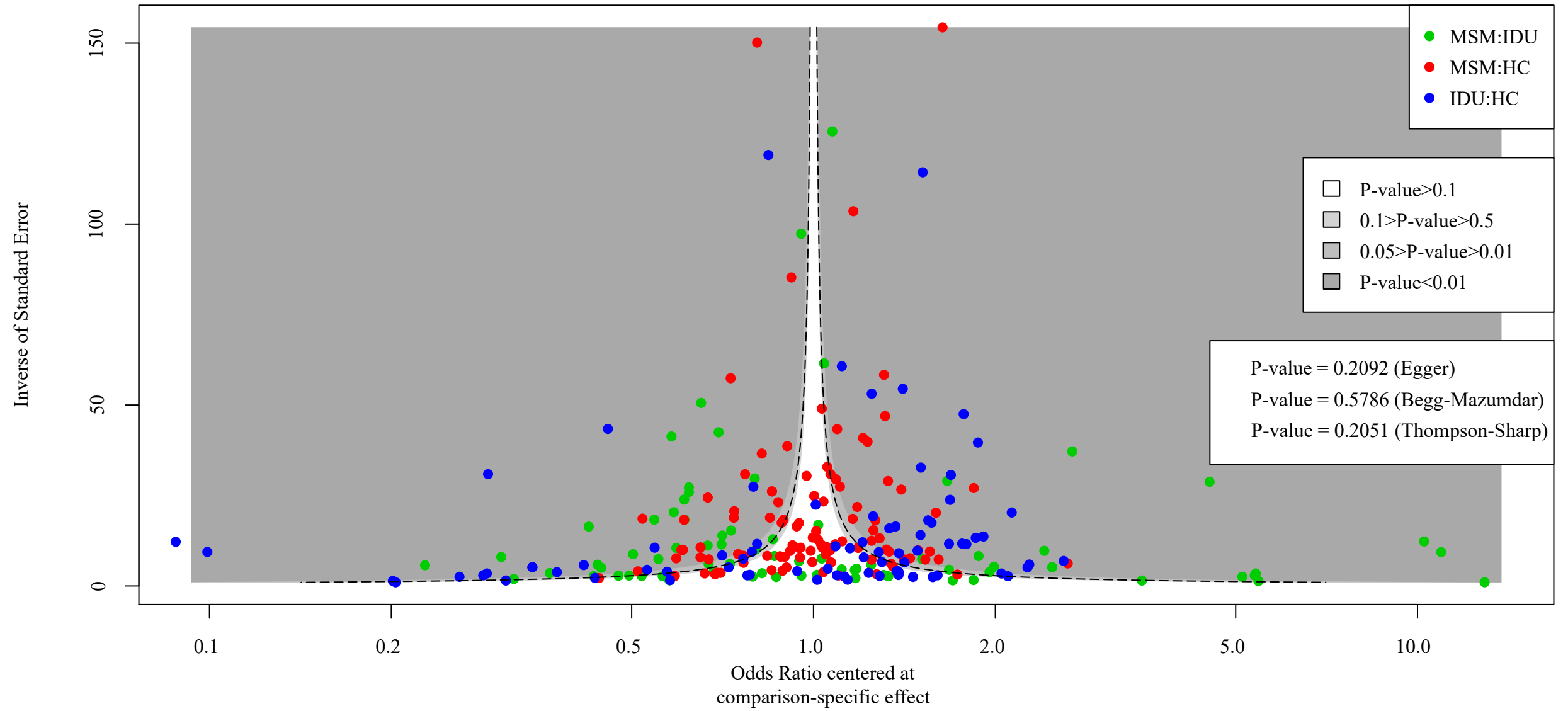




6.3 Figure 3: Contour-enhanced funnel plot with Y-axis of standard error



6.4 Figure 4: Contour-enhanced funnel plot with Y-axis of inverse of standard error



### 6.5 Explanation of conventional/contour-enhanced funnel plot

Many causes, such as publication bias and heterogeneity, would lead to the asymmetry of the funnel plot<sup>a</sup>. Although the symmetrical conventional funnel plot could indicate little risk of publication bias in the meta-analysis, it is difficult to tell the source of bias when a conventional funnel plot is asymmetrical. Hence, it is valuable to introduce another graph, Contour-enhanced funnel plot, to diagnose the asymmetry of funnel plots.

For contour-enhanced funnel plots<sup>b</sup>:

- (1) If the dots are located **symmetrically** in the white area of nonstatistical significance ( $P\text{-value}>0.1$ ), the meta-analysis will have little risk of publication bias.
- (2) If the dots are located **asymmetrically** in the white area of nonstatistical significance ( $P\text{-value}>0.1$ ), the meta-analysis will face the risk of publication bias rather than other bias like heterogeneity.
- (3) If the dots are located **symmetrically** in the white area of nonstatistical significance ( $P\text{-value}>0.1$ ) but **asymmetrically** in the dark grey area of statistical significance ( $P\text{-value}<0.01$ ), in this case, it is necessary to worry about the heterogeneity instead of publication bias. In other words, there is little risk of publication bias but the heterogeneity should be paid attention.

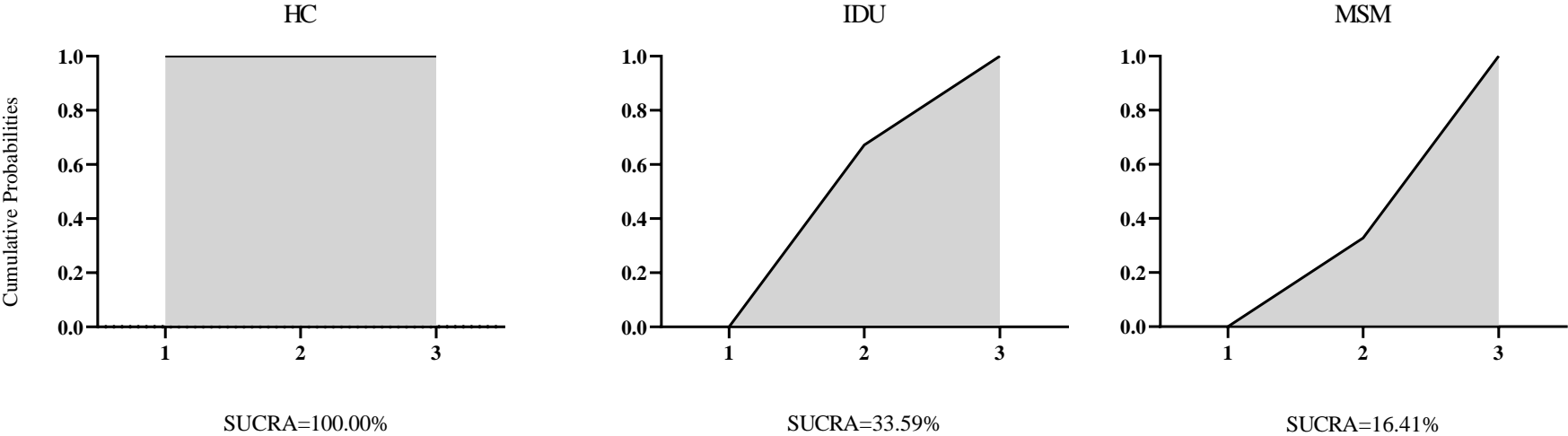
In this study, we could see that the dots are located symmetrically in the white area of nonstatistical significance ( $P\text{-value}>0.1$ ) but **asymmetrically** in the dark grey area of statistical significance ( $P\text{-value}<0.01$ ). Additionally, the statistical tests based on Egger/Begg-Mazumdar/Thompson-Sharp method were conducted respectively, showing that accepting the null hypothesis of no publication bias consistently. Thus, we consider that the meta-analysis has little risk of publication bias but faces the heterogeneity.

#### Reference:

- a. Dekkers OM, Vandenbroucke JP, Cevallos M, Renehan AG, Altman DG, Egger M. COSMOS-E: Guidance on conducting systematic reviews and meta-analyses of observational studies of etiology. *PLoS medicine* 2019; 16(2): e1002742.
- b. Peters JL, Sutton AJ, Jones DR, Abrams KR, Rushton L. Contour-enhanced meta-analysis funnel plots help distinguish publication bias from other causes of asymmetry. *Journal of clinical epidemiology* 2008; 61(10): 991-6.

**Appendix A7 (SUCRA)**

**7.1 Figure 1: The surface under the cumulative ranking curve (SUCRA)**



## Appendix A8 (Subgroup analysis of network meta-analysis)

### 8.1 Continent results

#### (1) Asia (48 studies included)

##### 1) Network results

8.1.1.1 Table 1 Network results of AHD risk among MSM, IDU, and HC in Asia

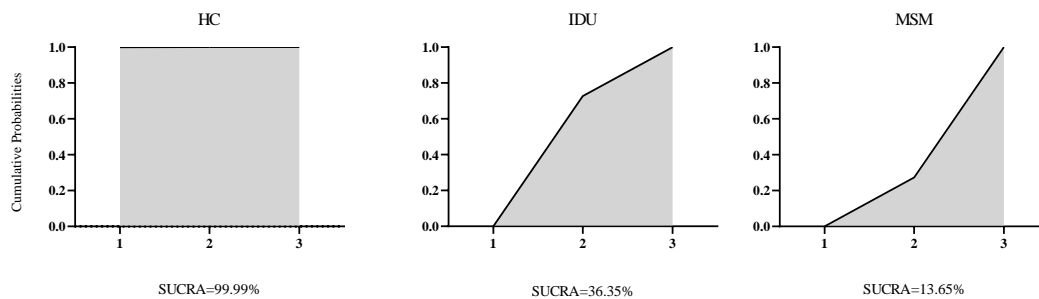
	MSM	IDU	HC
MSM (ref)	1		
IDU (ref)	0.99 (0.72, 1.40)	1	
HC (ref)	0.47 (0.36, 0.62)	0.52 (0.38, 0.72)	1

##### 2) Assessment of heterogeneity

8.1.1.2 Table 2 Assessment of heterogeneity in Asian studies

		Pair-wise I <sup>2</sup>	Network I <sup>2</sup>
IDU	HC	97.7%	97.6%
MSM	HC	94.7%	94.8%
MSM	IDU	97.7%	97.6%

##### 3) SUCRA



(2) *Europe (35 studies included)*

1) *Network results*

8.1.2.1 *Table 1 Network results of AHD risk among MSM, IDU, and HC in Europe*

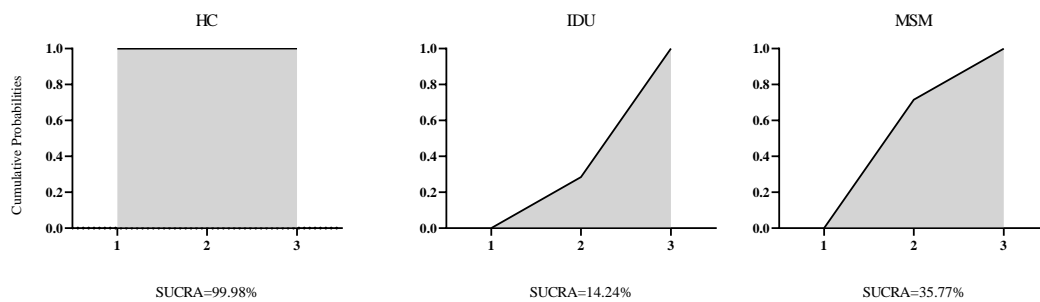
	MSM	IDU	HC
MSM (ref)	1		
IDU (ref)	1.10 (0.81, 1.50)	1	
HC (ref)	0.54 (0.40, 0.73)	0.59 (0.44, 0.78)	1

2) *Assessment of heterogeneity*

8.1.2.2 *Table 2 Assessment of heterogeneity in European studies*

		Pair-wise I <sup>2</sup>	Network I <sup>2</sup>
IDU	HC	98.8%	98.8%
MSM	HC	92.6%	92.6%
MSM	IDU	98.9%	98.9%

3) *SUCRA*



(3) *North America (12 studies included)*

1) *Network results*

8.1.3.1 *Table 1 Network results of AHD risk among MSM, IDU, and HC in North America*

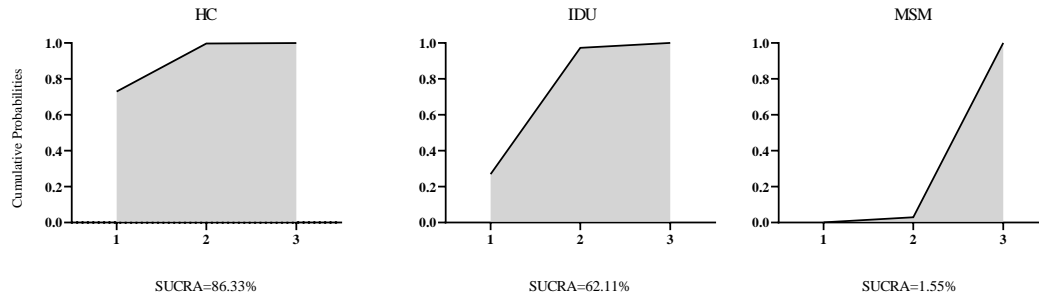
	MSM	IDU	HC
MSM (ref)	1		
IDU (ref)	0.74 (0.58, 1.00)	1	
HC (ref)	0.70 (0.55, 0.90)	0.92 (0.68, 1.20)	1

2) *Assessment of heterogeneity*

8.1.3.2 *Table 2 Assessment of heterogeneity in North American studies*

		Pair-wise I <sup>2</sup>	Network I <sup>2</sup>
IDU	HC	95.2%	95.6%
MSM	HC	99.5%	99.5%
MSM	IDU	98.5%	98.6%

3) *SUCRA*



**(4) Oceania (6 studies included)**

**1) Network results**

**8.1.4.1 Table 1 Network results of AHD risk among MSM, IDU, and HC in Oceania**

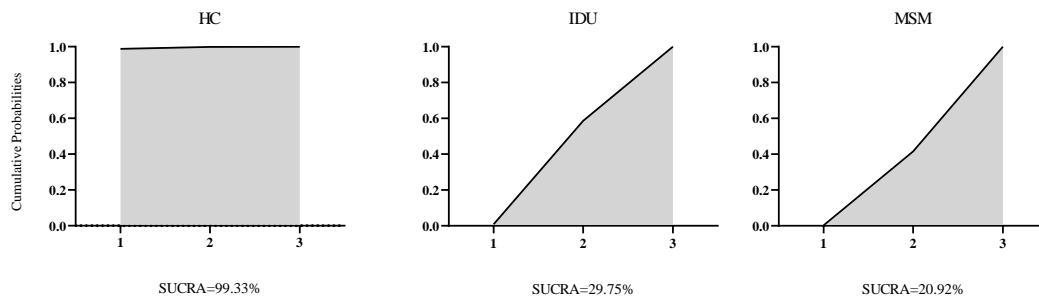
	MSM	IDU	HC
MSM (ref)	1		
IDU (ref)	0.93 (0.44, 1.80)	1	
HC (ref)	0.36 (0.19, 0.68)	0.38 (0.20, 0.81)	1

**2) Assessment of heterogeneity**

**8.1.4.2 Table 2 Assessment of heterogeneity in Oceanian studies**

		Pair-wise I <sup>2</sup>	Network I <sup>2</sup>
IDU	HC	53.5%	41.7%
MSM	HC	93.0%	92.8%
MSM	IDU	37.7%	30.1%

**3) SUCRA**





(5) *South America (4 studies included)*

1) *Network results*

8.1.5.1 *Table 1 Network results of AHD risk among MSM, and HC in South America*

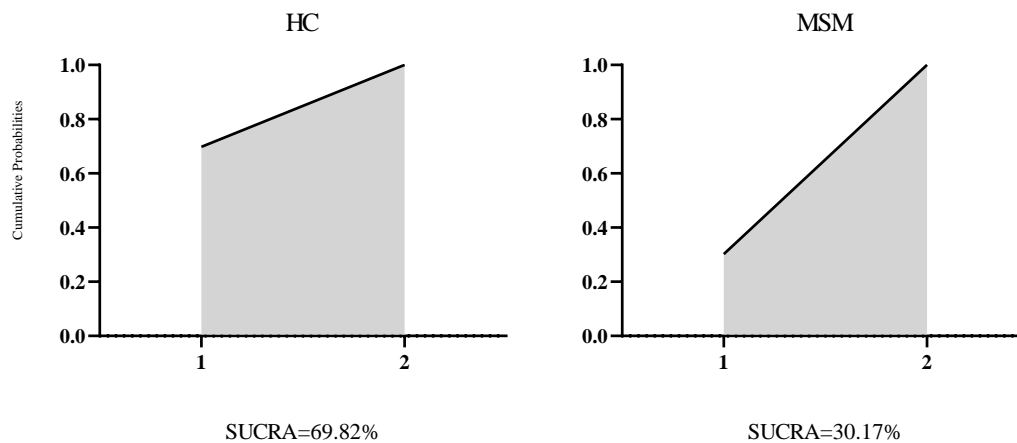
	MSM	IDU	HC
MSM (ref)	1		
IDU (ref)	-	1	
HC (ref)	0.86 (0.45, 1.60)	-	1

2) *Assessment of heterogeneity*

8.1.5.2 *Table 2 Assessment of heterogeneity in South American studies*

		Pair-wise I <sup>2</sup>	Network I <sup>2</sup>
MSM	HC	95.0%	95.0%

3) *SUCRA*



A total of 101 articles were included in the subgroup analysis on continents, with 105 studies.

8.2 PPP<sup>a</sup> 2009 Adjusted by International \$

(1) The Regions whose PPP 2009 was over or equal to the world average level (59 studies included)

1) Network results

8.2.1.1 Table 1 Network results of AHD risk among MSM, IDU, and HC in the regions with PPP 2009 over or equivalent to the world average level

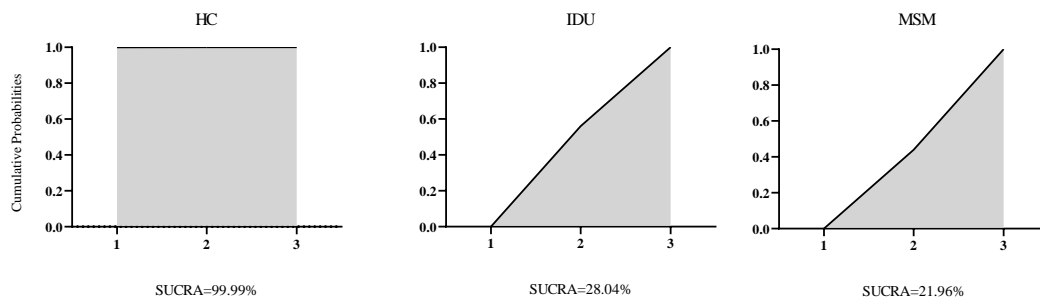
	MSM	IDU	HC
MSM (ref)	1		
IDU (ref)	0.98 (0.80, 1.20)	1	
HC (ref)	0.58 (0.48, 0.73)	0.59 (0.48, 0.70)	1

2) Assessment of heterogeneity

8.2.1.2 Table 2 Assessment of heterogeneity in the regions with PPP 2009 over or equal to the world average level

		Pair-wise I <sup>2</sup>	Network I <sup>2</sup>
IDU	HC	98.7%	98.7%
MSM	HC	98.7%	98.7%
MSM	IDU	98.5%	98.4%

3) SUCRA



a: Because the median study period of included studies was 2009, the studies were categorized into two groups by PPP 2009 to conduct this subgroup analysis.

(2) *The Regions whose PPP 2009 was below the world average level (43 studies included)*

1) *Network results*

8.2.2.1 *Table 1 Network results of AHD risk among MSM, IDU, and HC in the regions with PPP 2009 under the world average level*

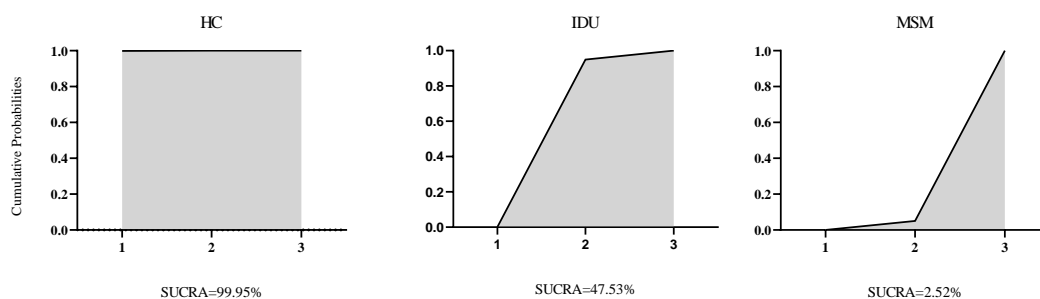
	MSM	IDU	HC
MSM (ref)	1		
IDU (ref)	0.78 (0.58, 1.00)	1	
HC (ref)	0.49 (0.39, 0.61)	0.63 (0.47, 0.84)	1

2) *Assessment of heterogeneity*

8.2.2.2 *Table 2 Assessment of heterogeneity in the regions with PPP 2009 under the world average level*

		Pair-wise I <sup>2</sup>	Network I <sup>2</sup>
IDU	HC	97.6%	97.7%
MSM	HC	96.4%	96.4%
MSM	IDU	90.0%	88.6%

3) *SUCRA*



A total of 98 articles were included in the subgroup analysis on the level of economic development, with 102 studies.

### 8.3 Study method

#### (1) Surveillance (65 studies included)

##### 1) Network results

8.3.1.1 Table 1 Network results of AHD risk among MSM, IDU, and HC in surveillance studies

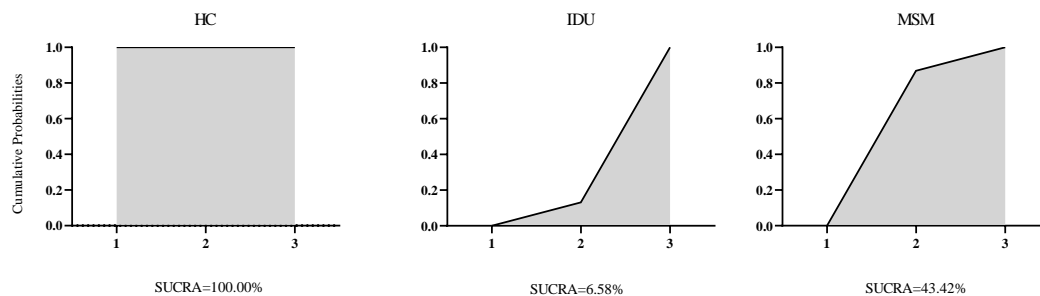
	MSM	IDU	HC
MSM (ref)	1		
IDU (ref)	1.10 (0.90, 1.50)	1	
HC (ref)	0.55 (0.45, 0.67)	0.48 (0.38, 0.61)	1

##### 2) Assessment of heterogeneity

8.3.1.2 Table 2 Assessment of heterogeneity in surveillance studies

		Pair-wise I <sup>2</sup>	Network I <sup>2</sup>
IDU	HC	98.9%	98.9%
MSM	HC	99.1%	99.1%
MSM	IDU	98.4%	98.4%

##### 3) SUCRA



(2) *Cross-section (15 studies included)*

1) *Network results*

8.3.2.1 *Table 1 Network results of AHD risk among MSM, IDU, and HC in cross-section studies*

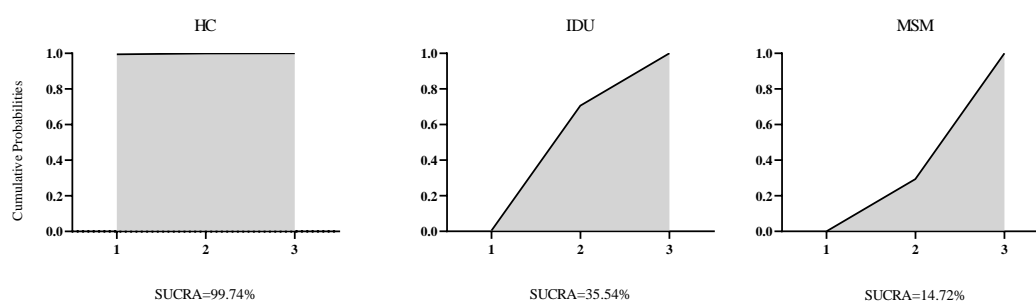
	MSM	IDU	HC
MSM (ref)	1		
IDU (ref)	0.89 (0.57, 1.40)	1	
HC (ref)	0.49 (0.34, 0.71)	0.55 (0.36, 0.85)	1

2) *Assessment of heterogeneity*

8.3.2.2 *Table 2 Assessment of heterogeneity in cross-section studies*

		Pair-wise I <sup>2</sup>	Network I <sup>2</sup>
IDU	HC	87.8%	88.0%
MSM	HC	92.7%	92.8%
MSM	IDU	90.9%	90.6%

3) *SUCRA*



(3) Cohort (25 studies included)

1) Network results

8.3.3.1 Table 1 Network results of AHD risk among MSM, IDU, and HC in cohort studies

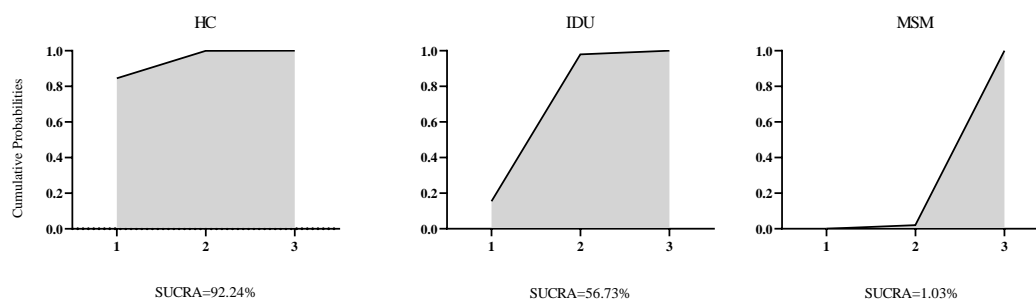
	MSM	IDU	HC
MSM (ref)	1		
IDU (ref)	0.67 (0.47, 0.98)	1	
HC (ref)	0.56 (0.40, 0.78)	0.83 (0.57, 1.20)	1

2) Assessment of heterogeneity

8.3.3.2 Table 2 Assessment of heterogeneity in cohort studies

		Pair-wise I <sup>2</sup>	Network I <sup>2</sup>
IDU	HC	97.2%	97.3%
MSM	HC	93.4%	93.4%
MSM	IDU	98.2%	98.2%

3) SUCRA



A total of 101 articles were included in the subgroup analysis on study method, with 105 studies.

## 8.4 Time lag

### (1) Shorter time lag ( $0 \leq \text{Time lag} \leq 3 \text{ months}$ ) (43 studies included)

#### 1) Network result

8.4.1.1 Table 1 Network results of AHD risk among MSM, IDU, and HC in studies with a shorter time lag

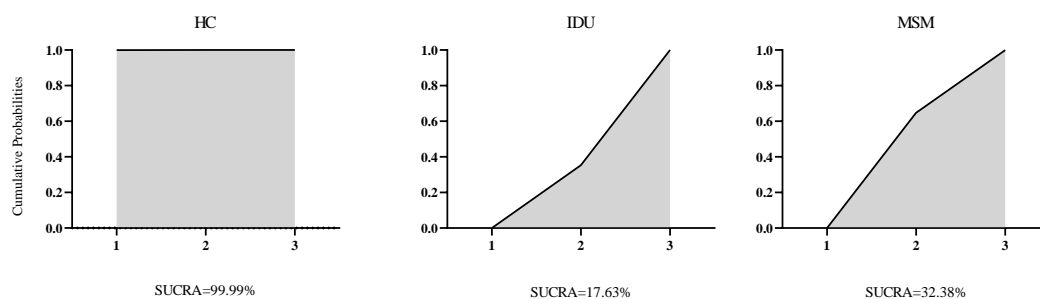
	MSM	IDU	HC
MSM (ref)	1		
IDU (ref)	1.10 (0.77, 1.50)	1	
HC (ref)	0.57 (0.43, 0.77)	0.54 (0.39, 0.75)	1

#### 2) Assessment of heterogeneity

8.4.1.2 Table 2 Assessment of heterogeneity in studies with a shorter time lag

		Pair-wise $I^2$	Network $I^2$
IDU	HC	98.5%	98.4%
MSM	HC	94.5%	94.6%
MSM	IDU	98.7%	98.7%

#### 3) SUCRA



(2) *Longer time lag (3 < Time lag ≤ 12 months) (22 studies included)*

1) *Network result*

8.4.2.1 *Table 1 Network results of AHD risk among MSM, IDU, and HC in studies with a longer time lag*

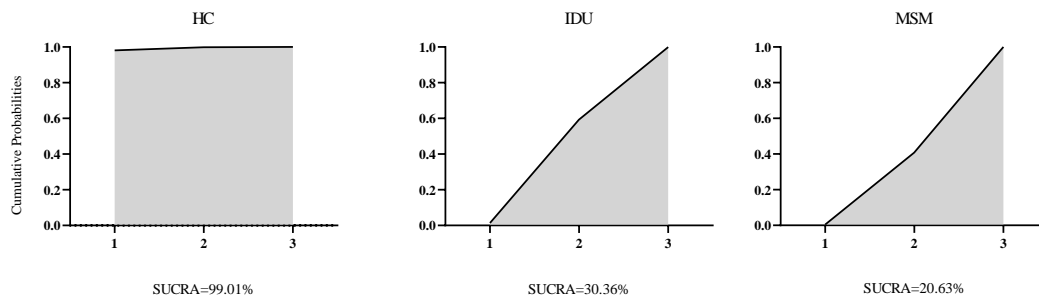
	MSM	IDU	HC
MSM (ref)	1		
IDU (ref)	0.95 (0.62, 1.50)	1	
HC (ref)	0.59 (0.40, 0.88)	0.62 (0.41, 0.95)	1

2) *Assessment of heterogeneity*

8.4.2.2 *Table 2 Assessment of heterogeneity in studies with a longer time lag*

		Pair-wise I <sup>2</sup>	Network I <sup>2</sup>
IDU	HC	99.3%	99.3%
MSM	HC	99.5%	99.5%
MSM	IDU	99.2%	99.1%

3) *SUCRA*



A total of 61 articles were included in the subgroup analysis on time lag, with 65 studies.



## 8.5 Prevalence of AHD

(1) *The study whose prevalence of AHD was over or equal to the mean (higher prevalence) (53 studies included)*

### 1) Network result

8.5.1.1 *Table 1 Network results of AHD risk among MSM, IDU, and HC in the higher prevalence group*

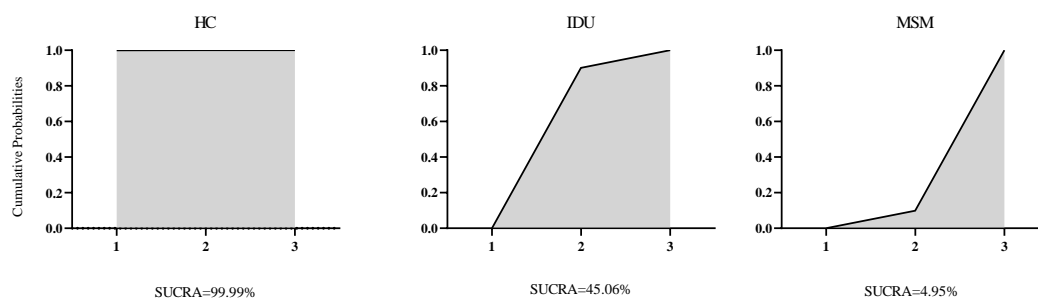
	MSM	IDU	HC
MSM (ref)	1		
IDU (ref)	0.85 (0.66, 1.10)	1	
HC (ref)	0.54 (0.43, 0.67)	0.63 (0.49, 0.81)	1

### 2) Assessment of heterogeneity

8.5.1.2 *Table 2 Assessment of heterogeneity in the higher prevalence group*

		Pair-wise I <sup>2</sup>	Network I <sup>2</sup>
IDU	HC	98.9%	98.9%
MSM	HC	99.2%	99.2%
MSM	IDU	98.3%	98.2%

### 3) SUCRA



(2) *The study whose prevalence of AHD was under the mean (lower prevalence) (52 studies included)*

1) *Network result*

8.5.2.1 *Table 1 Network results of AHD risk among MSM, IDU, and HC in the lower prevalence group*

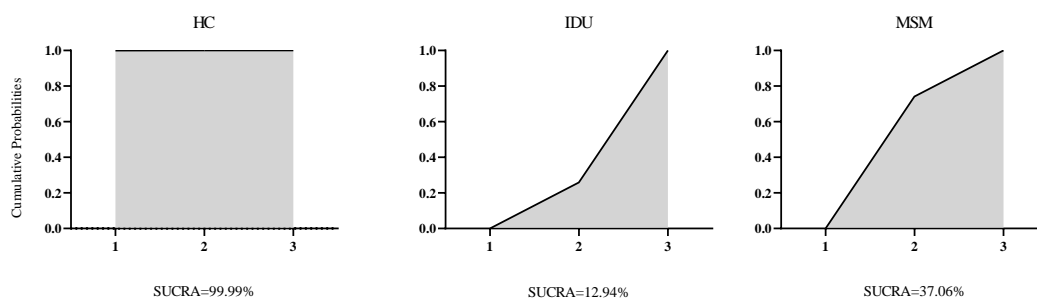
	MSM	IDU	HC
MSM (ref)	1		
IDU (ref)	1.10 (0.83, 1.40)	1	
HC (ref)	0.54 (0.43, 0.68)	0.50 (0.38, 0.65)	1

2) *Assessment of heterogeneity*

8.5.2.2 *Table 2 Assessment of heterogeneity in the lower prevalence group*

		Pair-wise I <sup>2</sup>	Network I <sup>2</sup>
IDU	HC	98.1%	98.1%
MSM	HC	94.7%	94.7%
MSM	IDU	98.5%	98.4%

3) *SUCRA*



A total of 101 articles were included in the subgroup analysis on the prevalence of AHD, with 105 studies.

**Appendix A9 (Assessment of AHD risk among PLHIV via HC under different sex work policies)**

**9.1 Table 1: Characteristic of the studies for ecological regression to assess the AHD risk among PLHIV via HC under different sex work policies**

Region	Sex work policy	No. of AHD via HC	No. of PLHIV via HC	PPP 2005	PPP 2009
Argentina <sup>32</sup>	Legal	93	507	13916·53051	16753·39489
Australia <sup>20,53</sup>	Limitedly Legal	152	539	32575·06925	40300·30823
Australia (Victoria) <sup>8</sup>	Legal	173	491	32575·06925	40300·30823
Brazil <sup>50</sup>	Legal	127	277	11004·95894	13288·43881
Canada <sup>53</sup>	Legal	20	231	36211·08460	38797·38505
China (Mainland) <sup>9,52,62,69,78,97</sup>	Illegal	20716	44606	5081·04904	8352·68993
China (Hong Kong) <sup>1</sup>	Legal	255	876	36461·35168	43949·57139
Denmark <sup>35</sup>	Legal	43	107	34150·15580	40339·68872
Finland <sup>3</sup>	Legal	76	289	31993·40726	37830·02314
France <sup>53,63,68,71,77</sup>	Legal	4486	14062	30498·57929	34685·17380
Georgia <sup>64</sup>	Illegal	414	1003	4673·31805	6316·00442
Germany <sup>5</sup>	Legal	35	69	31968·46745	37042·44788
Guatemala <sup>83</sup>	Legal	832	3174	5585·65058	6458·25303
Italy <sup>4,11,33,49,53,74</sup>	Legal	3261	6772	30051·77327	34513·97292
Israel <sup>55</sup>	Legal	28	87	24810·95568	27499·12129
Malaysia <sup>76</sup>	Illegal	1616	3345	16531·59892	19283·45231
Netherlands <sup>14</sup>	Legal	2725	6576	37625·56171	44566·06190
New Zealand <sup>40</sup>	Legal	85	202	25677·41908	30699·66202
Peru <sup>19</sup>	Legal	492	777	6705·08808	9078·556657
Poland <sup>72</sup>	Legal	381	840	13895·92354	19246·44868
Puerto Rico <sup>27</sup>	Legal	228	458	31518·48470	32816·94611
Singapore <sup>13</sup>	Legal	1426	2641	55809·70032	62873·49475
South Korea <sup>24</sup>	Illegal	412	1189	24196·42385	28325·20930
Spain <sup>6,7,15,34,37,38,48,79</sup>	Legal	6514	14974	27702·46431	32391·02051
Sweden <sup>84</sup>	Legal	88	121	34006·10428	39694·97557
UK <sup>18</sup>	Legal	14	34	32492·25961	34769·39632
USA <sup>53,81</sup>	Limitedly Legal	26470	73285	44114·74778	47099·98047
USA (California) <sup>23,73</sup>	Illegal	4981	6633	44114·74778	47099·98047
USA (Texas) <sup>25</sup>	Illegal	854	2648	44114·74778	47099·98047
USA (Florida) <sup>47</sup>	Illegal	2777	8906	44114·74778	47099·98047
USA (South Carolina) <sup>21,22,29</sup>	Illegal	711	1366	44114·74778	47099·98047
USA (Washington) <sup>26</sup>	Illegal	125	284	44114·74778	47099·98047
9 European countries <sup>a66</sup>	Legal	321	985	Over world PPP	Over world PPP
World	-	-	-	10130·40305	12229·53682

a: Belgium, Germany, Greece, Italy, Netherlands, Portugal, Spain, Switzerland, and the United Kingdom

Legal and Illegal were coded as TRUE and FALSE respectively.

Two studies were excluded in this model due to inconsistent sex work legislation in different territories/states in Australia<sup>20,53</sup>/USA<sup>53</sup>.

Source of PPP:

<https://data.worldbank.org/indicator/NY.GDP.PCAP.PP.CD>

Source of sex work policies:

In accordance with the ProCon.org, sex work policies in different regions were classified:

<https://prostitution.procon.org/view.resource.php?resourceID=000772>

Particularly, the sex work policies in Australia (Capital Territory), Australia (Victoria), China (Hong Kong), Sweden, USA (California), USA (Texas), USA (Florida), USA (South Carolina), and USA (Washington) were based on following sources:

Australia (Capital territory): [https://en.wikipedia.org/wiki/Prostitution\\_in\\_Australia#Australian\\_Capital\\_Territory](https://en.wikipedia.org/wiki/Prostitution_in_Australia#Australian_Capital_Territory)

Australia (Victoria): <http://www.scarletalliance.org.au/laws/vic/>

China (Hong Kong): <http://www.hklii.hk/chi/hk/legis/ord/200/>

Sweden: Charlotta H, May-Len S. The Swedish Sex Purchase Act: Where Does it Stand? Oslo Law Review 2017; **2**(4): 82-104

USA (California): <https://statelaws.findlaw.com/california-law/california-prostitution-laws.html>

USA (Texas): <https://statelaws.findlaw.com/texas-law/texas-prostitution-laws.html>

USA (Florida): <https://statelaws.findlaw.com/florida-law.html>

USA (South Carolina): <https://statelaws.findlaw.com/south-carolina-law/south-carolina-prohibited-consensual-sexual-activity-laws.html>

USA (Washington): <https://statelaws.findlaw.com/washington-law/washington-prostitution-laws0.html>

**9.2 Table 2: Sensitivity analysis regarding the relation between sex work policies and the AHD among PLHIV through HC**

Variable	Unadjusted model 1 <sup>a</sup>	Adjusted model 2 <sup>b</sup>	Unadjusted model 2 <sup>c</sup>	Adjusted model 2 <sup>d</sup>
	OR (95%CI)	OR (95%CI)	OR (95%CI)	OR (95%CI)
<b>PPP</b>				
≤ World PPP	Ref.	Ref.	Ref.	Ref.
> World PPP	0.91 (0.89, 0.93)	0.85 (0.83, 0.88)	0.91 (0.89, 0.93)	0.84 (0.82, 0.87)
<b>Sex work Policy</b>				
Legal	Ref.	Ref.	Ref.	Ref.
Illegal	1.30 (1.27, 1.33)	1.22 (1.18, 1.25)	1.30 (1.27, 1.32)	1.21 (1.18, 1.25)
<b>Time Lag</b>				
≤ 3 months	Ref.	Ref.	Ref.	Ref.
> 3 months	1.90 (1.85, 1.96)	2.04 (1.98, 2.11)	1.90 (1.85, 1.96)	2.07 (2.01, 2.13)

a: Model 1 is based on all the studies for the network meta-analysis. The study median period for included studies in this review (not only for those in the ecological model) is 2009, and hence, model 1 incorporates PPP 2009 to evaluate the robustness of estimation.

b: The adjusted model 1 takes PPP 2009 of the regions, the time lag and sex work policies into consideration.

c: Model 2 is based on the studies whose number of PLHIV via HC over or equal to lower quartile. The study median period for included studies in the ecological model is 2005, and hence in model 2, PPP 2005 was adopted.

d: The adjusted model 2 takes PPP 2005 of the regions, the time lag, and sex work policies into consideration.

The regression model is weighted by sample sizes.

The studies which do not report explicit time lag were excluded.

**Appendix A10 (Assessment of AHD risk among PLHIV via IDU under different types of law towards CCC)**

**10.1 Table 1: Characteristic of the studies for ecological regression to assess the AHD risk among PLHIV via IDU under different types of law towards CCC**

Region	Type of law	No. of AHD via IDU	No. of PLHIV via IDU	PPP 2004	PPP 2009
Australia <sup>2,8,20,53</sup>	C	44	265	31327-37749	40300-30823
Canada <sup>53</sup>	No federal law	8	92	33796-99920	38797-38505
China (Mainland) <sup>9,52,69,78,97</sup>	C	427	1298	4449-56192	8352-689933
China (Hong Kong) <sup>1</sup>	C	7	23	33071-35549	43949-57139
Finland <sup>3</sup>	M+S	31	237	31118-14662	37830-02314
France <sup>53,71,77</sup>	C	952	2468	29034-00071	34685-17380
Georgia <sup>64</sup>	M	392	649	4109-37201	6316-00442
Germany <sup>5</sup>	C	11	23	31417-36334	37042-44788
Israel <sup>55</sup>	C	5	52	25199-13405	27499-12129
Italy <sup>4,11,33,49,53,74</sup>	S	1217	9657	29447-35351	34513-97292
Malaysia <sup>76</sup>	C	592	1056	15522-70405	19283-45231
Netherlands <sup>14</sup>	C	336	701	35777-15324	44566-06190
Poland <sup>72</sup>	C	322	667	13341-10000	19246-44868
Puerto Rico <sup>27</sup>	Unfound	61	139	31141-05605	32816-94611
Spain <sup>6,7,15,34,37,38,48,79</sup>	C	4638	23268	26180-06058	32391-02051
Sweden <sup>84</sup>	C	150	191	33567-30607	39694-97557
UK <sup>18</sup>	C	9	23	31788-46875	34769-39632
USA <sup>53</sup>	No federal law	1357	3470	41712-80107	47099-98047
USA (California) <sup>23</sup>	C	1916	3324	41712-80107	47099-98047
USA (Texas) <sup>25</sup>	C	240	792	41712-80107	47099-98047
USA (South Carolina) <sup>21,22,29</sup>	C	293	496	41712-80107	47099-98047
USA (Washington) <sup>26</sup>	C	75	179	41712-80107	47099-98047
World	-	-	-	9516-57792	12229-53682

C and M/S/M+S were coded as TRUE and FALSE respectively.

Three studies were excluded in this model due inconsistent legislation to CCC in different regions in Canada<sup>53</sup>, Puerto Rico<sup>27</sup>, and the USA<sup>53</sup>.

Source of PPP

<https://data.worldbank.org/indicator/NY.GDP.PCAP.PP.CD>

Sources of CCC with criminal or non-criminal justices were mainly based on this article:

Israelsson M, Gerdner A. Compulsory commitment to the care of substance misusers: international trends during 25 Years. *European addiction research* 2012; **18**(6): 302-21.

Particularly, sources of CCC in Malaysia, Sweden and USA were based on these websites.

Malaysia: WHO Regional Office for the Western Pacific. Assessment of compulsory treatment of people who use drugs in Cambodia, China, Malaysia and Viet Nam: Application of selected human rights principles. Geneva: World Health Organization; 2009.

Sweden:

[https://www.government.se/496f5b/contentassets/89b85401ed204484832fb1808cad6012/rk\\_21164\\_broschyr\\_narkotika\\_a4\\_en\\_3\\_tillg.pdf](https://www.government.se/496f5b/contentassets/89b85401ed204484832fb1808cad6012/rk_21164_broschyr_narkotika_a4_en_3_tillg.pdf)

USA: <https://www.therecoveryvillage.com/recovery-blog/which-states-have-involuntary-commitment-laws-for-addiction-treatment/#gref>

Sources of Criminal law on Controlled drug possession in the USA were based on the following websites.

USA (California): <https://statelaws.findlaw.com/california-law/california-drug-possession-laws.html>

USA (Texas): <https://statelaws.findlaw.com/texas-law/texas-drug-possession-laws.html>

USA (South Carolina): <https://statelaws.findlaw.com/south-carolina-law/south-carolina-heroin-laws.html>

USA (Washington): <https://statelaws.findlaw.com/washington-law/washington-drug-possession-laws-.html>

**10.2 Table 2: Sensitivity analysis regarding the relationship between criminal justice legislation towards CCC and AHD among PLHIV through IDU using different ecological regression models.**

Variable	Unadjusted model 1 <sup>a</sup>	Adjusted model 1 <sup>b</sup>	Unadjusted model 2 <sup>c</sup>	Adjusted model 2 <sup>d</sup>
	OR (95%CI)	OR (95%CI)	OR (95%CI)	OR (95%CI)
<b>PPP</b>				
≤ World PPP	Ref.	Ref.	Ref.	Ref.
> World PPP	0.51 (0.46, 0.55)	0.48 (0.41, 0.48)	0.51 (0.47, 0.56)	0.45 (0.42, 0.49)
<b>CCC</b>				
Non-Criminal CCC	Ref.	Ref.	Ref.	Ref.
Criminal CCC	1.95 (1.85, 2.05)	4.38 (4.10, 4.67)	1.95 (1.85, 2.06)	4.44 (4.12, 4.74)
<b>Time Lag</b>				
≤ 3 months	Ref.	Ref.	Ref.	Ref.
> 3 months	1.44 (1.39, 1.50)	2.72 (2.57, 2.87)	1.48 (1.39, 1.51)	2.75 (2.61, 2.91)

a: Model 1 is based on all the studies for the network meta-analysis. The study median period for included studies in this review (not only for those in the ecological model) is 2009, and hence, model 1 incorporates PPP 2009 to evaluate the robustness of estimation.

b: The adjusted model 1 takes PPP 2009 of the regions, the time lag, and legislation to CCC into consideration.

c: Model 2 is based on the studies whose number of PLHIV via IDU over or equal to lower quartile. The study median period for included studies in the ecological model is 2004, and hence in model 2, PPP 2004 was adopted.

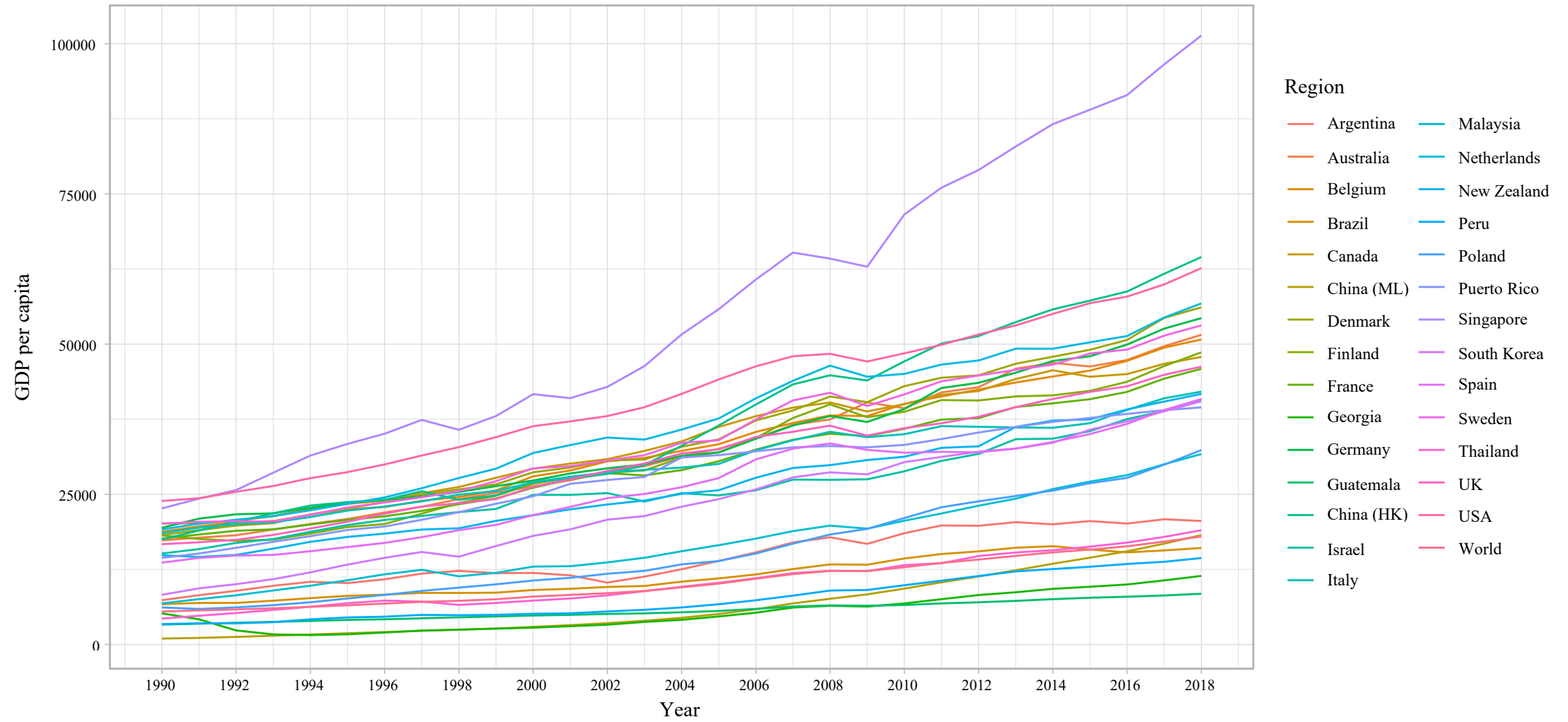
d: The adjusted model 2 takes PPP 2004 of the regions, the time lag, and legislation to CCC into consideration.

The regression model is weighted by sample sizes.

The studies which do not report explicit time lag were excluded.

*Appendix A11 (PPP tendency regarding included studies in the review)*

*11.1 Figure 1: PPP tendency during the period from 1990 to 2018*



**11.2 Table 1: Detailed PPP in 15 of 28 regions incorporated in ecological analysis during the period from 1990 to 2018**

Year	Argentina	Australia	Belgium	Brazil	Canada	China (ML)	Germany	Denmark	Finland	France	UK	Georgia	Guatemala	China (HK)	Israel
1990	7380-115	17329-578	18758-998	6710-966	20173-936	987-641	19423-020	18215-506	18149-458	17624-238	16698-342	5181-281	3310-022	17504-338	15149-217
1991	8210-643	17790-766	19675-633	6919-983	20160-729	1100-814	20952-373	19044-468	17557-338	18309-472	17022-742	4196-651	3465-056	18970-183	15886-333
1992	8942-570	18189-077	20349-327	6925-382	20557-463	1270-297	21676-676	19794-108	17263-162	18931-870	17428-601	2346-805	3629-281	20439-901	16914-438
1993	9777-214	19131-540	20550-640	7297-686	21367-203	1463-802	21834-092	20197-841	17457-700	19175-313	18248-570	1685-498	3771-760	21843-256	17555-120
1994	10435-911	20064-287	21600-125	7723-902	22555-697	1671-201	22769-204	21655-924	18453-167	19972-179	19312-177	1566-383	3915-657	23129-518	18769-467
1995	10225-119	20894-397	22531-717	8102-671	23401-875	1872-607	23581-176	22661-059	19557-936	20745-458	20434-785	1703-638	4100-385	23701-063	19890-470
1996	10857-430	21972-053	22891-103	8300-247	23962-499	2074-362	24109-590	23711-021	20057-653	21331-450	21760-009	2000-438	4202-790	24070-361	20728-735
1997	11802-843	22934-786	23927-506	8594-563	25167-520	2281-444	24644-531	24925-790	21778-647	22241-413	22959-332	2322-295	4363-092	25520-756	21402-493
1998	12255-676	24196-721	24563-975	8588-360	26220-266	2464-186	25392-582	25813-649	23558-561	23359-058	23515-161	2482-006	4530-221	24087-881	22038-863
1999	11878-731	25264-364	25642-262	8624-439	27745-807	2668-230	26360-147	26653-829	24768-647	24307-499	24209-651	2643-925	4666-098	24810-071	22565-641
2000	11916-583	26328-674	27988-474	9073-979	29265-084	2936-288	27298-109	28662-105	26752-872	26094-253	26255-127	2806-774	4830-764	27068-822	24912-328
2001	11514-619	27336-683	28958-493	9274-250	30107-657	3227-419	28475-876	29449-615	27770-597	27501-542	27512-344	3053-171	4935-713	27613-445	24901-805
2002	10310-129	28718-241	30482-785	9581-995	30853-201	3553-924	29326-912	30640-345	28567-171	28523-886	28881-941	3300-718	5086-551	28388-907	25207-923
2003	11307-758	29693-906	31056-430	9747-943	32225-052	3958-472	29989-985	30786-244	28984-889	28141-461	30126-162	3759-114	5188-204	29858-759	23792-062
2004	12527-800	31327-377	32237-965	10460-553	33796-999	4449-562	31417-363	32908-685	31118-147	29034-001	31788-469	4109-372	5368-507	33071-355	25199-134
2005	13916-531	32575-069	33332-331	11004-959	36211-085	5081-049	31968-467	34150-156	31993-407	30498-579	32492-26	4673-318	5585-651	36461-352	24810-956
2006	15334-937	34306-652	35386-244	11659-396	37999-039	5867-797	34241-768	37295-655	34363-043	32434-860	34554-357	5298-315	5928-026	39949-113	25670-087
2007	16994-696	36560-406	36872-635	12568-201	39439-807	6847-070	36450-821	38968-509	37703-174	34088-360	35407-539	6157-052	6327-755	43300-433	27454-700
2008	17850-130	37459-308	38133-501	13332-147	40275-990	7615-030	38028-772	41278-329	39969-388	35095-263	36426-503	6448-184	6516-891	44813-102	27414-748
2009	16753-395	40300-308	38008-832	13288-439	38797-385	8352-690	37042-448	40339-689	37830-023	34685-174	34769-396	6316-004	6458-253	43949-571	27499-121
2010	18524-857	39324-369	40051-956	14320-372	40012-391	9303-734	39187-403	42999-626	38737-414	35900-046	36012-677	6838-624	6576-669	47123-352	28829-531
2011	19817-450	41965-358	41284-151	15061-957	41569-450	10355-496	42692-520	44403-394	40683-528	37440-639	36820-322	7545-939	6844-541	50085-959	30568-959
2012	19764-225	42826-790	42435-909	15506-562	42189-196	11328-282	43564-148	44803-962	40620-176	37679-122	37911-258	8239-544	7031-531	51344-503	31725-325
2013	20365-613	45902-048	43611-073	16111-444	44188-732	12361-398	45232-198	46726-853	41293-516	39523-854	39505-353	8694-221	7264-854	53649-863	34178-483
2014	20008-321	46880-221	44604-511	16358-391	45645-564	13446-402	47190-769	47901-448	41470-202	40141-585	40867-476	9263-947	7552-718	55781-745	34262-616
2015	20551-833	46270-197	45592-356	15813-873	44567-866	14454-998	47979-484	49058-496	42220-958	40833-242	42042-919	9617-557	7788-498	57235-183	35514-545
2016	20130-408	47352-112	47214-181	15331-551	45011-643	15513-273	49921-331	50694-189	43729-964	42047-287	42977-221	9993-515	7955-320	58755-308	37513-392
2017	20843-155	49653-716	49411-869	15662-247	46723-318	16782-208	52574-260	54356-448	46343-577	44255-942	44896-265	10674-176	8166-858	61706-815	38867-762
2018	20567-302	51544-867	50774-906	16068-020	47870-726	18210-094	54327-126	56120-128	48635-850	45877-075	46239-713	11420-630	8447-447	64487-596	40786-280

Source of PPP: [https://data.worldbank.org/indicator/NY.GDP.PCAP.PP.CD?end=2018&name\\_desc=false&start=2009](https://data.worldbank.org/indicator/NY.GDP.PCAP.PP.CD?end=2018&name_desc=false&start=2009)



**11.3 Table 2: Detailed PPP in 13 of 28 regions incorporated in ecological analysis during the period from 1990 to 2018**

Year	Italy	South Korea	Spain	Malaysia	Netherlands	New Zealand	Peru	Poland	Puerto Rico	Singapore	Sweden	Thailand	USA	World
1990	18547.405	8273.406	13627.326	6850.467	19145.3862	14863.604	3409.303	6175.624	14423.787	22655.1187	20120.529	4317.520	23888.600	5494.054
1991	19456.168	9345.823	14410.138	7552.844	20116.464	14566.031	3530.681	5915.541	15147.648	24286.781	20422.895	4788.441	24342.259	5676.672
1992	20051.934	10044.191	14802.792	8197.668	20768.309	14917.763	3522.121	6183.525	16095.725	25705.585	20525.561	5240.479	25418.991	5843.826
1993	20339.528	10875.124	14919.635	8994.020	21378.214	15960.705	3723.090	6549.984	17097.759	28598.323	20458.667	5754.843	26387.294	6034.345
1994	21216.387	12008.474	15527.29	9784.927	22346.117	17092.406	4191.260	7029.081	18025.633	31448.465	21595.665	6289.816	27694.853	6269.067
1995	22286.227	13299.161	16218.281	10698.850	23409.695	17907.653	4511.594	7664.955	19063.859	33390.077	22814.831	6874.042	28690.876	6525.277
1996	22968.134	14433.001	16916.101	11682.302	24484.181	18464.033	4636.048	8254.596	19640.503	35086.415	23634.028	7314.036	29967.713	6812.005
1997	23818.968	15406.220	17868.826	12431.504	26014.333	19137.323	4930.388	8922.219	20760.356	37384.437	24496.822	7150.100	31459.139	7101.487
1998	24946.914	14621.300	19029.289	11355.614	27708.513	19343.059	4879.817	9471.456	22028.159	35740.227	25544.733	6598.524	32853.677	7274.110
1999	25531.625	16392.809	19907.161	11931.658	29268.536	20579.366	4943.312	10022.395	23432.969	38026.449	27181.362	6919.689	34513.562	7532.387
2000	27027.191	18082.955	21533.909	12973.900	31875.236	21521.707	5115.128	10652.937	24672.338	41662.744	29320.702	7312.811	36334.909	7983.224
2001	27932.620	19168.215	22910.780	13037.700	33194.046	22500.478	5193.025	11101.960	26748.013	41000.418	29679.246	7659.243	37133.243	8256.708
2002	28641.558	20775.105	24363.015	13670.038	34447.205	23306.280	5500.924	11781.071	27384.784	42886.181	30636.360	8190.496	38023.161	8549.789
2003	29081.294	21376.766	25055.975	14437.407	34111.803	23967.421	5778.612	12257.145	27890.783	46342.296	31512.931	8875.774	39496.486	8914.929
2004	29447.354	22936.812	26180.061	15522.704	35777.153	25080.472	6171.598	13341.100	31141.056	51612.824	33567.306	9621.586	41712.801	9516.578
2005	30051.773	24196.424	27702.464	16531.599	37625.562	25677.419	6705.088	13895.924	31518.485	55809.700	34006.104	10270.273	44114.748	10130.403
2006	32331.961	25820.972	30815.268	17632.131	40971.261	27758.166	7365.737	15142.185	32150.488	60745.456	37463.617	11039.842	46298.731	10955.456
2007	33996.491	27822.277	32597.056	18872.822	43896.739	29385.896	8140.980	16787.970	32821.900	65230.108	40628.148	11885.809	47975.968	11718.652
2008	35402.917	28655.984	33463.654	19787.699	46420.202	29860.528	8984.079	18310.443	33036.526	64230.636	41904.129	12261.460	48382.558	12257.153
2009	34513.973	28325.209	32391.021	19283.452	44566.062	30699.662	9078.557	19246.449	32816.946	62873.495	39694.976	12207.968	47099.98	12229.537
2010	35008.068	30365.278	31923.123	20605.201	45040.318	31253.054	9869.070	21048.331	33229.923	71566.000	41632.686	13213.315	48466.823	12871.543
2011	36347.342	31228.511	32068.271	21806.823	46599.021	32734.537	10626.077	22850.639	34195.651	76034.334	43808.501	13537.488	49883.114	13584.861
2012	36237.110	32097.164	31988.254	23105.075	47272.103	32986.183	11400.336	23833.210	35286.059	78978.823	44774.387	14727.143	51603.497	14144.581
2013	36131.132	32615.773	32603.906	24279.372	49241.518	36219.424	12169.120	24719.248	36207.680	82881.407	45721.995	15318.637	53106.910	14755.240
2014	36070.806	33587.583	33709.649	25875.503	49233.215	37260.629	12561.219	25612.258	37053.753	86611.514	46572.456	15694.337	55032.958	15333.022
2015	36836.426	35760.734	35028.301	27116.576	50302.068	37475.178	12945.252	26856.065	37715.362	89007.461	48436.975	16293.610	56803.472	15802.705
2016	39045.168	37142.833	36715.845	28185.539	51338.573	39122.542	13404.222	27735.351	38383.036	91452.043	49084.066	16961.266	57904.202	16343.491
2017	40981.282	38824.115	39037.378	30004.079	54422.008	40438.571	13772.290	29930.992	39006.391	96552.603	51404.785	17917.207	59927.93	17136.637
2018	42080.426	40479.346	40854.581	31698.371	56772.036	41702.518	14393.452	32356.522	39470.856	101352.577	53119.706	19017.736	62641.014	17971.072

Source of PPP: [https://data.worldbank.org/indicator/NY.GDP.PCAP.PP.CD?end=2018&name\\_desc=false&start=2009](https://data.worldbank.org/indicator/NY.GDP.PCAP.PP.CD?end=2018&name_desc=false&start=2009)

**Appendix A12 (References included in this review)**

1. Ka-Hing W, Shui-Shan L, Kelvin HKL, and Wai-Yee W, Temporal Trend and Factors Associated with Late HIV Diagnosis in Hong Kong, a Low HIV Prevalence Locality. *AIDS Patient Care STDS* 2003; **17**(9): 461-469.
2. McDonald EA, Currie MJ, Bowden FJ. Delayed diagnosis of HIV: Missed opportunities and triggers for testing in the Australian Capital Territory. *Sexual Health* 2006; **3**(4): 291-5.
3. Kivelä PS, Krol A, Salminen MO, Ristola MA. Determinants of late HIV diagnosis among different transmission groups in Finland from 1985 to 2005. *HIV Medicine* 2010; **11**(6): 360-7.
4. Girardi E, Sampaolesi A, Gentile M, Nurra G, Ippolito G. Increasing proportion of late diagnosis of HIV infection among patients with AIDS in Italy following introduction of combination antiretroviral therapy. *Journal of Acquired Immune Deficiency Syndromes* 2000; **25**(1): 71-6.
5. Spornraft-Ragaller P, Boashie U, Stephan V, Schmitt J. Analysis of risk factors for late presentation in a cohort of HIV-infected patients in Dresden: Positive serology for syphilis in MSM is a determinant for earlier HIV diagnosis. *Infection* 2013; **41**(6): 1145-55.
6. Carnicer-Pont D, de Olalla PG, Cayla JA, Grp AW. HIV Infection Late Detection in AIDS Patients of an European City with Increased Immigration Since Mid 1990s. *Current HIV Research* 2009; **7**(2): 237-43.
7. Castilla J, Sobrino P, De La Fuente L, Noguer I, Guerra L, Parras F. Late diagnosis of HIV infection in the era of highly active antiretroviral therapy: Consequences for AIDS incidence. *AIDS* 2002; **16**(14): 1945-51.
8. Lemoh C, Guy R, Yohannes K, et al. Delayed diagnosis of HIV infection in Victoria 1994 to 2006. *Sexual Health* 2009; **6**(2): 117-22.
9. Jiang HB, Xie NH, Fan YZ, et al. Risk Factors for Advanced HIV Disease and Late Entry to HIV Care: National 1994-2012 HIV Surveillance Data for Wuhan, China. *AIDS Patient Care and STDs* 2015; **29**(10): 541-9.
10. Helleberg M, Engsig FN, Kronborg G, et al. Late presenters, repeated testing, and missed opportunities in a Danish nationwide HIV cohort. *Scandinavian Journal of Infectious Diseases* 2012; **44**(4): 282-8.
11. Longo B, Pezzotti P, Boros S, Urciuoli R, Rezza G. Increasing proportion of late testers among AIDS cases in Italy, 1996-2002. *AIDS Care - Psychological and Socio-Medical Aspects of AIDS/HIV* 2005; **17**(7): 834-41.
12. Delpierre C, Cuzin L, Lauwers-Cances V, et al. High-risk groups for late diagnosis of HIV infection: A need for rethinking testing policy in the general population. *AIDS Patient Care and STDs* 2006; **20**(12): 838-47.
13. Tey JSH, Ang LW, Tay J, et al. Determinants of late-stage HIV disease at diagnosis in Singapore, 1996 to 2009. *Annals of the Academy of Medicine Singapore* 2012; **41**(5): 194-9.

14. Op De Coul ELM, Van Sighem A, Brinkman K, et al. Factors associated with presenting late or with advanced HIV disease in the Netherlands, 1996-2014: Results from a national observational cohort. *BMJ Open* 2016; **6**(1): 1-10.
15. Teira Cobo R, Suárez Lozano I, Santamaría Jáuregui JM, et al. [Delayed diagnosis of HIV infection in the Spanish VACH cohort [1997-2002]] (in Spanish). *Gaceta Sanitaria* 2007; **21**(1): 66-9.
16. Ndiaye B, Salleron J, Vincent A, et al. Factors associated with presentation to care with advanced HIV disease in Brussels and Northern France: 1997-2007. *BMC Infectious Diseases* 2011; **11**: 11.
17. Lee CY, Jen IA, Lan YC, et al. AIDS incidence trends at presentation and during follow-up among HIV-at-risk populations: a 15-year nationwide cohort study in Taiwan. *Bmc Public Health* 2018; **18**(1): 589.
18. Manavi K, McMillan A, Ogilvie M, Scott G. Heterosexual men and women with HIV test positive at a later stage of infection than homo- or bisexual men. *International Journal of STD and AIDS* 2004; **15**(12): 811-4.
19. Maquera-Afaray J, Cvetkovic-Vega A, Cardenas MM, Kalviainen H, Mejia CR. [Late diagnosis and advanced disease of HIV in adult patients from a Peruvian social security hospital] (in Spanish). *Revista chilena de infectologia: organo oficial de la Sociedad Chilena de Infectologia* 2016; **33**(Suppl 1): 20-6.
20. Wright ST, Law MG, Cooper DA, et al. Temporal trends of time to antiretroviral treatment initiation, interruption and modification: Examination of patients diagnosed with advanced HIV in Australia. *Journal of the International AIDS Society* 2015; **18**(1): 19463.
21. Wohl AR, Tejero J, Frye DM. Factors associated with late HIV testing for Latinos diagnosed with AIDS in Los Angeles. *AIDS care* 2009; **21**(9): 1203-10.
22. Rurangirwa J, Bingham TA, Kim J, Hu YW, Bing EG. Late HIV detection among adult males in Los Angeles County, 2000-2004. *AIDS Care - Psychological and Socio-Medical Aspects of AIDS/HIV* 2013; **25**(4): 481-7.
23. Tang JJ, Levy V, Hernandez MT. Who are California's late HIV testers? An Analysis of State AIDS surveillance data, 2000-2006. *Public Health Reports* 2011; **126**(3): 338-43.
24. Lee JH, Kim GJ, Choi BS, et al. Increasing late diagnosis in HIV infection in South Korea: 2000-2007. *BMC public health* 2010; **10**: 411.
25. Yang BR, Chan SK, Mohammad N, et al. Late HIV diagnosis in Houston/Harris County, Texas, 2000-2007. *AIDS Care-Psychological and Socio-Medical Aspects of AIDS/HIV* 2010; **22**(6): 766-74.
26. Saganic L, Carr J, Solorio R, Courogen M, Jaenicke T, Duerr A. Comparing Measures of Late HIV Diagnosis in Washington State. *AIDS Research and Treatment* 2012; **2012**: 182672.
27. Tossas-Milligan KY, Hunter-Mellado RF, Mayor AM, Fernandez-Santos DM, Dworkin MS. Late HIV Testing in a Cohort of HIV-Infected Patients in Puerto Rico. *Puerto Rico Health Sciences Journal* 2016; **35**(2): 113-21.

28. Mocroft A, Lundgren JD, Sabin ML, et al. Risk Factors and Outcomes for Late Presentation for HIV-Positive Persons in Europe: Results from the Collaboration of Observational HIV Epidemiological Research Europe Study (COHERE). *Plos Medicine* 2013; **10**(9): e1001510.
29. Duffus WA, Weis K, Kettinger L, Stephens T, Albrecht H, Gibson JJ. Risk-Based HIV Testing in South Carolina Health Care Settings Failed to Identify the Majority of Infected Individuals. *AIDS Patient Care and STDs* 2009; **23**(5): 339-45.
30. Li X, Zhu ZP, Li XS, et al. [Epidemiological characteristics of HIV/AIDS among people aged 50 and above in Nanjing City] (in Chinese). *Occupation and Health* 2018; **34**(12): 1651-3.
31. Delpierre C, Dray-Spira R, Cuzin L, et al. Correlates of late HIV diagnosis: Implications for testing policy. *International Journal of STD and AIDS* 2007; **18**(5): 312-7.
32. Kundro MA, Terwel SR, Toibaro JJ, Vilorio GA, Losso MH. Late diagnosis of HIV infection in asymptomatic patients. *Medicina (Argentina)* 2016; **76**(5): 273-8.
33. Colucci A, Balzano R, Camoni L, et al. Characteristics and behaviors in a sample of patients unaware of their infection until AIDS diagnosis in Italy: A cross-sectional study. *AIDS Care - Psychological and Socio-Medical Aspects of AIDS/HIV* 2011; **23**(9): 1067-75.
34. Oliva J, Galindo S, Vives N, et al. [Delayed diagnosis of HIV infection in Spain] (in Spanish). *Enfermedades Infecciosas y Microbiología Clínica* 2010; **28**(9): 583-9.
35. Leutscher PDC, Laursen T, Andersen B, Østergaard L, Laursen A, Larsen CS. HIV late presenters in Denmark - need for increased diagnostic awareness among general practitioners. *Danish Medical Bulletin* 2011; **58**(4): A4253.
36. Jeong SJ, Italiano C, Chaiwarith R, et al. Late Presentation into Care of HIV Disease and Its Associated Factors in Asia: Results of TAHOD. *AIDS Research and Human Retroviruses* 2016; **32**(3): 255-61.
37. Sobrino-Vegas P, Miguel LGS, Caro-Murillo AM, et al. Delayed Diagnosis of HIV Infection in a Multicenter Cohort: Prevalence, Risk Factors, Response to HAART and Impact on Mortality. *Current HIV Research* 2009; **7**(2): 224-30.
38. Sobrino-Vegas P, Moreno S, Rubio R, et al. Impact of late presentation of HIV infection on short-, mid- and long-term mortality and causes of death in a multicenter national cohort: 2004-2013. *Journal of Infection* 2016; **72**(5): 587-96.
39. Liu ZQ. [Late diagnosis of HIV/AIDS and its influencing factors in Tianjin in 2004-2015] (in Chinese). *Chinese Journal of Preventive Medicine* 2016; **17**(12): 925-8.
40. Dickson NP, McAllister S, Sharples K, Paul C. Late presentation of HIV infection among adults in New Zealand: 2005-2010. *HIV Medicine* 2012; **13**(3): 182-9.
41. Sun L, Wei ZY, Cao Y. [Analysis on the characteristics of late diagnosis of HIV/AIDS patients in Yangzhou] (in Chinese). *Chinese Journal of AIDS & STD* 2017; **23**(11): 1010-2.
42. Zhang NN, Song MM, Liu DY, Yu SQ. [Analysis on the late diagnosed HIV/AIDS cases reported during 2005-2015 in Weifang city] (in Chinese). *Chinese Journal of AIDS & STD* 2017; **23**(7): 609-12.

43. Kiertiburanakul S, Boonyarattaphun K, Atamasirikul K, Sungkanuparph S. Clinical presentations of newly diagnosed HIV-infected patients at a university hospital in Bangkok, Thailand. *Journal of the International Association of Physicians in AIDS Care (Chicago, Ill : 2002)* 2008; **7**(2): 82-7.
44. Lo YC, Wu PY, Hsieh CY, et al. Late Diagnosis of Human Immunodeficiency Virus Infection in the Era of Highly Active Antiretroviral Therapy: Role of Socio-behavioral Factors and Medical Encounters. *Journal of the Formosan Medical Association* 2011; **110**(5): 306-15.
45. Pyziak-Kowalska KA, Dusza M, Mularska E, et al. Late presenters among newly diagnosed HIV-infected in Poland in 2006-2008. *HIV and AIDS Review* 2017; **16**(4): 244-50.
46. Mao LC, Zhang ZK, Zhang QJ, Wei XQ, Cao HZ, Wang XL. [Analysis of the late diagnosis and its influential factors by newly diagnosed cases in Tangshan] (in Chinese). *Chinese Journal of AIDS & STD* 2017; **23**(3): 267-8.
47. Trepka MJ, Fennie KP, Sheehan DM, Lutfi K, Maddox L, Lieb S. Late HIV diagnosis: Differences by rural/urban residence, Florida, 2007-2011. *AIDS Patient Care and STDs* 2014; **28**(4): 188-97.
48. Oliva J, Díez M, Galindo S, et al. Predictors of advanced disease and late presentation in new HIV diagnoses reported to the surveillance system in Spain. *Gaceta sanitaria / SESPAS* 2014; **28**(2): 116-22.
49. Bai F, Tincati C, Merlini E, et al. Reduced Central Memory CD4+ T Cells and Increased T-Cell Activation Characterise Treatment-Naive Patients Newly Diagnosed at Late Stage of HIV Infection. *AIDS Research and Treatment* 2012; **2012**: 314849.
50. Valentini MB, de Toledo MLG, Fonseca MO, et al. Evaluation of late presentation for HIV treatment in a reference center in Belo Horizonte, Southeastern Brazil, from 2008 to 2010. *Brazilian Journal of Infectious Diseases* 2015; **19**(3): 253-62.
51. Tang HL, Mao YR, Zhang TJ, Han J, He N. [Analysis on late diagnosis reasons of newly diagnosed HIV/AIDS patients] (in Chinese). *Chinese Journal of Preventive Medicine* 2012; **46**(11): 1004-8.
52. Dai SY, Liu JJ, Fan YG, et al. Prevalence and factors associated with late HIV diagnosis. *Journal of Medical Virology* 2015; **87**(6): 970-7.
53. Hall HI, Halverson J, Wilson DP, et al. Late diagnosis and entry to care after diagnosis of human immunodeficiency virus infection: A country comparison. *PLoS ONE* 2013; **8**(11): e77763.
54. Jin X, Xiong R, Wang LY, Mao YR. [Analysis on the 'late diagnosis' (LD) phenomena among newly identified HIV/AIDS cases in China, 2010-2014] (in Chinese). *Chinese Journal of Epidemiology* 2016; **37**(2): 218-21.
55. Levy I, Maor Y, Mahroum N, et al. Missed opportunities for earlier diagnosis of HIV in patients who presented with advanced HIV disease: A retrospective cohort study. *BMJ Open* 2016; **6**(11): e012721.
56. Lin ZM, Li Y, Fu XB, et al. [Characteristics and influencing factors for late diagnosed HIV/AIDS cases in Guangdong Province] (in Chinese). *South China Journal of Preventive Medicine* 2017; **43**(6): 501-6.

57. Qi Y, Cui Q. [Analysis of epidemiological characteristics of HIV/AIDS and influencing factors of late diagnosis in Yancheng] (in Chinese). *Jiangsu Journal of Preventive Medicine* 2015; **26**(2): 24-8.
58. Jin L, Cheng XL, Qin YZ, Su B. [Analysis of the influential factors of late diagnosis among newly identified HIV/AIDS cases in Anhui Province, 2011-2015] (in Chinese). *Chinese Journal of Preventive Medicine* 2018; **52**(4): 415-8.
59. Guo Y, Ning TL, Zhou N. [The characteristics of late diagnosed HIV/AIDS cases in Tianjin from 2011 to 2015 and its influencing factors] (in Chinese). *The Chinese Journal of Human Sexuality* 2017; **26**(7): 77-80.
60. Li JZ, Ren QY, Li XR. [Analysis on the characteristics and associated factors of late diagnosed HIV/AIDS cases during 2011-2016 in Jinnan city] (in Chinese). *Chinese Journal of Preventive Medicine* 2018: 2-6.
61. Zhang HL, Wei XL, Zhao X, Zheng HC. [Influencing factors of late diagnosis of newly identified HIV/AIDS cases in Xi'an, 2011-2017] (in Chinese). *China Tropical Medicine* 2018; **18**(8): 799-803.
62. Pan X, Chen L, Xu Y, Xia Y, Guo Z, Yang J. [Characteristics and influencing factors of HIV detection among HIV/AIDS patients in Zhejiang province in 2012] (in Chinese). *Chinese Journal of Preventive Medicine* 2014; **48**(5): 380-5.
63. Senard O, Burdet C, Visseaux B, et al. Epidemiological Profile of Newly Diagnosed HIV-Infected Patients in Northern Paris: A Retrospective Study. *AIDS Research and Human Retroviruses* 2017; **33**(1): 11-6.
64. Chkhartishvili N, Chokoshvili O, Bolokadze N, et al. Late presentation of HIV infection in the country of Georgia: 2012-2015. *PLoS ONE* 2017; **12**(10): e0186835.
65. Li X, Xu YY, Li XS, et al. [HIV epidemic status in China Comprehensive AIDS Response pilot area in Nanjing City from 2012 to 2016] (in Chinese). *Journal of Medical Pest Control* 2017; **33**(10): 1031-4.
66. Fakoya I, Alvarez-Del Arco D, Monge S, et al. HIV testing history and access to treatment among migrants living with HIV in Europe. *Journal of the International AIDS Society* 2018; **21**(Suppl 4): e25123.
67. Meng Q, Zhu QY, Zhou XJ, Tang ZZ, Shen ZY. [Epidemiological characteristics of late diagnosed HIV/AIDS cases of 2014 in Guangxi] (in Chinese). *Chinese Journal of AIDS & STD* 2016; **22**(4): 282-4.
68. Cuzin L, Yazdanpanah Y, Huleux T, et al. No relationship between late HIV diagnosis and social deprivation in newly diagnosed patients in France. *HIV Medicine* 2018; **19**(3): 238-42.
69. Chen ZB, Tong L. [Analysis of late detection rate and influencing factors of HIV infections in Shunde District of Foshan City in 2016] (in Chinese). *China Modern Medicine* 2017; **24**(20): 154-6.
70. Wilson KdA, Dray-Spira R, Aubriere C, et al. Frequency and correlates of late presentation for HIV infection in France: older adults are a risk group - results from the ANRS-VESPA2 Study, France. *AIDS Care-Psychological and Socio-Medical Aspects of AIDS/HIV* 2014; **26**: S83-93.

71. Toure A, Khanafer N, Baratin D, et al. First presentation for care of HIV-infected patients with low CD4 cell count in Lyon, France: Risk factors and consequences for survival. *AIDS Care-Psychological and Socio-Medical Aspects of AIDS/HIV* 2012; **24**(10): 1272-6.
72. Siwak E, Horban A, Witak-Jedra M, et al. Long-term trends in HIV care entry: over 15 years of clinical experience from Poland. *HIV medicine* 2019; **20**(9): 581-90.
73. Schwarcz S, Hsu L, Dilley JW, Loeb L, Nelson K, Boyd S. Late diagnosis of HIV infection - Trends, prevalence, and characteristics of persons whose HIV diagnosis occurred within 12 months of developing AIDS. *Jaids-Journal of Acquired Immune Deficiency Syndromes* 2006; **43**(4): 491-4.
74. Mena M, Magnani C, Villa M, et al. Characterisation of AIDS presenters and their response to antiretroviral therapy at Legnano general hospital (Italy) during the period 2000-2008. *New Microbiologica* 2010; **33**(3): 207-14.
75. McDonald AM, Li YM, Dore GJ, Ree H, Kaldor JM. Late HIV presentation among AIDS cases in Australia, 1992-2001. *Australian and New Zealand Journal of Public Health* 2003; **27**(6): 608-13.
76. Lim CL, Kumar S. Trends in baseline CD4 count at presentation to care among HIV-positive patients in Sungai Buloh Hospital, Malaysia. *HIV and AIDS Review* 2019; **18**(2): 85-91.
77. Lanoy E, Mary-Krause M, Tattevin P, et al. Frequency, determinants and consequences of delayed access to care for HIV infection in France. *Antiviral Therapy* 2007; **12**(1): 89-96.
78. Hu X, Liang B, Zhou C, et al. HIV late presentation and advanced HIV disease among patients with newly diagnosed HIV/AIDS in Southwestern China: a large-scale cross-sectional study. *AIDS Research and Therapy* 2019; **16**(1): 6.
79. de Munain JL, Camara MM, Santamaria JM, Zubero Z, Baraia-Etxaburu J, Munoz J. Clinical and epidemiological characteristics of persons newly diagnosed of HIV infection. *Medicina Clinica* 2001; **117**(17): 654-6.
80. Chen K-T, Chang H-L, Chen C-T, Chen Y-A. The Changing Face of the HIV Epidemic in Taiwan: A New Challenge for Public Health Policy Strategies. *AIDS Patient Care and STDs* 2009; **23**(3): 195-201.
81. Centers for Disease C, Prevention. Late HIV testing - 34 states, 1996-2005. *Morbidity and Mortality Weekly Report* 2009; **58**(24): 661-5.
82. Castilla J, Lorenzo JM, Izquierdo A, et al. Characteristics and trends of newly diagnosed HIV-infections, 2000-2004. *Gaceta Sanitaria* 2006; **20**(6): 442-8.
83. Reinhardt S, Spec A, Melendez J, et al. Aids-defining illnesses at initial diagnosis of HIV in a large guatemalan cohort. *Open Forum Infectious Diseases* 2016; **4**(4): ofx249.
84. Brannstrom J, Akerlund B, Arneborn M, Blaxhult A, Giesecke J. Patients unaware of their HIV infection until AIDS diagnosis in Sweden 1996-2002--a remaining problem in the highly active antiretroviral therapy era. *International journal of STD & AIDS* 2005; **16**(10): 702-6.

85. Tianfa L, Zhiqiang L, Zeming L, Huiying Z. [Analysis of the situation and influential factors of late diagnosis among newly reported HIV/AIDS cases in Ruijin from 2005 to 2018] (in Chinese). *Applied Preventive Medicine* 2019; **25**(2): 99-102.
86. Liyue C, Shifu L, Ying C, et al. [Analysis on the situation of late diagnosis and relevant impact factors of newly reported HIV cases in Yuxi prefecture from 2006 to 2017] (in Chinese). *Modern Preventive Medicine* 2018; **45**(20): 3794-7.
87. Min Z, Yuanying S, Jizheng L. [Epidemiological characteristics of late diagnosis of HIV/AIDS cases in DaLi city from 2011 to 2017] (in Chinese). *Chinese Journal of AIDS & STD* 2019; **25**(1): 79-81.
88. Hongmei L, Xiaoyong N, Shengcai M, et al. [Late diagnosis of newly identified HIV/AIDS cases and its influencing factors in Shanxi, 2011-2016] (in Chinese). *Chinese Journal of AIDS & STD* 2018; **24**(11): 1097-100.
89. Hai X, Fei H, Xiuran P, Shide M, Chongmei W, Yan L. [Analysis of the influencing factors of late diagnosis in Fangchenggang city from 2012 to 2016] (in Chinese). *Applied Preventive Medicine* 2018; **24**(1): 43-6.
90. Heng T, Xingfu S, Wei Z, Honglin J. [Characteristics and influencing factors of late-diagnosed cases among newly reported sexually transmitted HIV/AIDS cases in Hubei Province, 2012-2016] (in Chinese). *Practical Preventive Medicine* 2018; **25**(9): 1025-8.
91. Kai Y, Guoping P, Honglin J, heng T. [Analysis of epidemiological characteristics of newly reported HIV/AIDS patients in Hubei Province (2016-2017)] (in Chinese). *Journal of Preventive Medicine & Public Health* 2019; **30**(2): 123-5.
92. Yin X, Ying L, Hongda L, Jianmei T. [Influencing factors of late diagnosis for newly identified HIV/AIDS cases in Jiangyin City and prediction model] (in Chinese). *Occupation and Health* 2019; **35**(8): 1086-9.
93. Yalan H, Qiuting C, Juane X, Cangtao H. [Characteristics and influencing factors of Late diagnosis of HIV/AIDS in Quanzhou city from 2011 to 2017] (in Chinese). *Strait Journal of Preventive Medicine* 2018; **24**(5): 26-9.
94. Zuokai Y, Hui W, Yirong F, Xiangling L, Xingren S. [Analysis on characteristics of newly reported HIV/AIDS cases in Shaoxing] (in Chinese). *Preventive Medicine* 2019; **31**(6): 603-5.
95. Zairan D, Jian W, bo L, Li Z. [Characteristics and Influencing Factors of Late Detected HIV/AIDS Cases Between 2012 and 2016 in Hejiang County of Sichuan Province] (in Chinese). *The Chinese Journal of Dermatovenereology* 2018; **32**(9): 1047-51.
96. Pengfei B, Yanqiu Z, Xiuping Z, Zhuohua F. [Situation and influencing factors of HIV cases in Suzhou from 2012-2017] (in Chinese). *Jiangsu Journal of Preventive Medicine* 2018; **29**(5): 522-40.
97. Qingsong X, Liying C, Xiaohua Z, Ting Q. [Proportion and influencing factors of late diagnosis of HIV/AIDS cases in Xiangcheng district, Suzhou] (in Chinese). *Jiangsu Journal of Preventive Medicine* 2018; **29**(2): 182-205.
98. Zhenghong Z, Yanjiao F, Zhengdong D, Yuying L, Guoming C, Min Z. [Status and influencing factors on late diagnosis of HIV/AIDS among newly identified cases in



- Wuhu city from 2013 to 2017] (in Chinese). *Chinese Journal of AIDS & STD* 2019; **25**(7): 702-5.
99. Lu Y, Minghui Z, Chengfeng H, Yun W, Chao L, Xiaoxia L. [Characteristics and influencing factors on Late diagnosis of HIV/AIDS in ZhenJiang city from 2010-2017] (in Chinese). *Jiangsu Journal of Preventive Medicine* 2018; **29**(5): 514-7.
100. Yong Z, Fengxun M, Weidong W, Xuejun H, Jianping Q, Sheng L. [Analysis on the characteristics of delayed diagnosis of HIV/AIDS cases in Rongchang district of Chongqing from 2012 to 2017] (in Chinese). *Chinese Journal of AIDS & STD* 2019; **25**(1): 37-9.
101. Shanzi H, Yi Z, Xiaofeng L, Wei L. [Analysis on influencing factors of late diagnosed AIDS cases in Zhuhai] (in Chinese). *Journal of Tropical Medicine* 2018; **18**(9): 1246-9.