Title: A systematic review and meta-analysis of diabetes mellitus, cardiovascular and respiratory condition epidemiology in sexual minority women.

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WEB APPENDIX

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Web Supplement 1. – Search strategy for Medline, Embase, PsycInfo and CAB Abstracts. December 2016

Database: Ovid MEDLINE(R) 1948 to Present (including In-Process & Other Non-Indexed Citations)

Search Strategy:

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1 lesbian.mp. or Homosexuality, Female/ (5704)
2 Bisexuality/ or bisexual women.mp. (4142)
3 wsw.mp. (120)
4 WSMW.mp. (5)
5 sexual orientation.mp. or Sexual Behavior/ (56050)
6 sexual identity.mp. (1251)
7 queer.mp. or Homosexuality/ (13250)
8 1 or 2 or 3 or 4 or 5 or 6 or 7 (70952)
9 limit 8 to yr="2015 -Current" (4625)
10 limit 9 to female (3011)
11 Great Britain/ or UK.mp. (276229)
12 10 and 11 (62)

SEARCH QUERY - EMBASE

(('homosexual female':ab,ti or 'bisexual female':ab,ti or 'women who have sex with women':ab,ti and [2015-2016]/py) or ('homosexual female'/exp or 'homosexual female') or 'bisexual female' or 'women who have sex with women' or wsw or wsmw) and (2015:py or 2016:py or 2017:py)) and 'united kingdom'

Database: PsycINFO <1967 to November Week 1 2016>

Search Strategy:

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1 exp Lesbianism/ or exp Sexual Orientation/ or exp Homosexuality/ or exp Bisexuality/ or lesbian$.mp. (30632)
2 bisexual women.mp. (613)
3 wsw.mp. (46)
4 wsmw.mp. (2)
5 sexual identity.mp. (3150)
6 queer.mp. (3030)
7 1 or 2 or 3 or 4 or 5 or 6 (32610)
8 limit 7 to (human and yr="2015 -Current") (3331)
9 limit 8 to female (1815)
10 Great britain.mp. (2848)
11 united kingdom.mp. (8990)

12 uk.mp. (30316)
13 british.mp. (20760)
14 gb.mp. (241)
15 english.mp. (118463)
16 scottish.mp. (2638)
17 welsh.mp. (1111)
18 irish.mp. (3268)
19 10 or 11 or 12 or 13 or 14 or 15 or 16 or 17 or 18 (177759)
20 9 and 19 (57)

Database: CAB Abstracts <1973 to 2016 Week 44>

Search Strategy:

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1 exp Lesbianism/ or exp Sexual Orientation/ or exp Homosexuality/ or exp Bisexuality/ or lesbian$.mp. (2168)
2 bisexual women.mp. (25)
3 wsw.mp. (100)
4 wsmw.mp. (1)
5 sexual identity.mp. (113)
6 queer.mp. (104)
7 1 or 2 or 3 or 4 or 5 or 6 (2365)
8 limit 7 to (human and yr="2015 -Current") [Limit not valid in CAB Abstracts; records were retained] (412)
9 limit 8 to female [Limit not valid in CAB Abstracts; records were retained] (412)
10 Great britain.mp. (34833)
11 united kingdom.mp. (152174)
12 uk.mp. (170127)
13 british.mp. (188436)
14 gb.mp. (8148)
15 english.mp. (41160)
16 scottish.mp. (5784)
17 welsh.mp. (3198)
18 irish.mp. (15558)
19 10 or 11 or 12 or 13 or 14 or 15 or 16 or 17 or 18 (252567)
20 9 and 19 (10)

Database: OVID Medline April 2015

1 Exp Homosexuality, Female/
2 wsw.tw
3 lesbian*.tw
4 gay.tw
5 LGBT*.tw
6 homosexual*.tw
7 Exp Bisexuality/
8 bisexual*.tw
9 pan?sexual*.tw
10 queer*.tw
11 “sexual orientation”.tw
12 “sexual preference*”
13 ”sexual minorit*”.tw
14 “same sex”.tw
15 1 or 2 or 3 or 4 or 5 or 6 or 7 or 8 or 9 or 10 or 11 or 12 or 13 or 14

Web Table 1. Participant baseline characteristics

	Number of hetero-sexual women	Age	Ethnicity	Number of lesbians/bisexual/SMW	Age	Ethnicity	Demographic imbalances compared to heterosexual women.	Prevalence estimates weighted by:	Adjusted odds ratios weighted by:
Blosnich (2014)	51,639	Mean 47.3 (SE 0.16)	61.4% white, 3.6% black, 26.3% Hispanic	615 lesbians, 451 bisexual women	Mean 43.1 (SE 1.33) lesbians, 35.1 (SE 1.41) bisexual women	70.8% white, 4.3% black, 15.9% Hispanic lesbians, 61.1% white, 5.5% black, 24.0% Hispanic bisexual women	SMW younger, fewer partnered, lesbians more educated, more employed, bisexual women less educated, fewer employed, less income.	Age race/ethnicity, education, income	Age race/ethnicity, education, income (only conducted where bivariate analyses $p<0.05$)
Blosnich (2013)	53,875 opposite sex partnered	Mean 33.0 (SE 0.06)	67.5% white	433 same-sex partnered	Mean 32.7 (SE 0.69)	72.6% white	Same sex partnered lower income,	Education, income, race/ethnicity, overweight, smoking	'weighted to account for sampling design'
Boehmer (2014)	90,608	Mean 43.0 (SE 0.03)	50.1% white, 6.5% black, 13.0% Asian 24.6% Hispanic	1,265 lesbians, 1,369 bisexual women	Mean 42.4 (SE 0.47) lesbians, 36.3 (SE 0.53) bisexual women	68.5% white, 7.4% black, 4.9% Asian 11.8% Hispanic lesbians, 57.6% white, 10.0% Asian 7.0% black, 16.9% Hispanic bisexual women	SMW younger, more white, more educated, more US born, lesbians more income, bisexual women less income, fewer with health insurance	Unadjusted prevalence reported	Age, race/ethnicity, education, household income, nativity
Conron (2010)	39,701	35.2% aged 18-33	83.2% white, 4.1% black, 2.6% Asian, 8.9% Hispanic	719 lesbian, 432 bisexual women	30.4% lesbians, 65.1% bisexual women aged 18-33	87.2% white, 4.5% black, 1.2% Asian, lesbian, 5.7% Hispanic	Lesbians more educated	Age, gender	Age, gender, education, income

	Number of hetero-sexual women	Age	Ethnicity	Number of lesbians/bisexual/SMW	Age	Ethnicity	Demographic imbalances compared to heterosexual women.	Prevalence estimates weighted by:	Adjusted odds ratios weighted by:
						78.9% white, 4.7% black, 5.7% Asian, 9.3% Hispanic bisexual women			
Dilley (2010)	47,505	Mean 46.3	85.6% white, 1.8% black, 3.6% Asian, 7.1% Hispanic	589 lesbian, 561 bisexual women	Mean 40.0 lesbian, 32.9 bisexual women.	85.5% white, 1.6% black, 3.1% Asian, 7.2% Hispanic	More higher education in lesbians, less in bisexual women. Lesbians and bisexuals lower income.	Assumed that unadjusted prevalence reported	Sexual orientation, age, education
Everett (2013) and	6,072	Mean 28.7 (whole sample)	NR	138 gay/mostly gay 1345 bisexual/ mostly heterosexual,	NR	NR	NR	Possibly unadjusted prevalence reported	N/A
Clarke (2015)	5713	Mean 28.8 (95%CI 28.6 to 29.1)	67.7% white	71 homosexual, 60 mostly homosexual, 154 bisexual, 1089 mostly heterosexual	Mean (95%CI) 28.9 (28.3 to 29.5), homosexual, 28.4 (27.8 to 29.0) mostly homosexual, 28.3 (27.9 to 28.6) bisexual, 28.5 (28.2 to 28.7) mostly heterosexual	White 64.1% homosexual, 73.2% mostly homosexual, 69.4% bisexual, 77.5% mostly heterosexual	NR	See above	N/A

	Number of hetero-sexual women	Age	Ethnicity	Number of lesbians/bisexual/SMW	Age	Ethnicity	Demographic imbalances compared to heterosexual women.	Prevalence estimates weighted by:	Adjusted odds ratios weighted by:
Farmer (2013)	5,356	36.2% aged 20-29	69.8% white, 12.0% black, 12.9% Hispanic	437 SMW	49.2% aged 20-29	73.4% white, 13.2% black, 8.6% Hispanic	SMW younger	Possibly unadjusted prevalence reported	N/A
Fredriksen-Goldsen (2012)	49,092	Mean 46.6 (SE 0.12)	83.7% white	626 lesbians, 536 bisexual women	Mean 42.9 (SE 0.81) lesbian, 32.7 (SE 0.85) bisexual women	85.4% white lesbian, 78.2% white bisexual women.	SMW younger, fewer partnered, lesbians less education, bisexual women lower income	Age	Age, education, income
Fredriksen-Goldsen (2013)	57,466	Mean 63.8 (SD 0.06)	91.8% white	562 lesbians, 291 bisexual women	Mean 58.6 (SD 0.37)	90.3% white	SMW more employed, fewer partnered, fewer less educated	Unclear weighting factors	Age, education, income
Frisch (2013)	61,993,266	Aged 18+	NR	655,941 same sex cohabiting	Aged 18+	NR	NR	(Mortality estimate - by age)	N/A
Garland-Forshee (2014)	25,602	28.8% aged 18-34	86.7% white	347 lesbians, 322 bisexual women	26.9% lesbian, 62.3% bisexual women aged 18-34	81.6% lesbians, 85.8% bisexual women white	SMW less likely to be partnered, more education, more urban residence, Lesbians more employed, Bisexual women younger, less income	Unclear weighting factors	Age, education, relationship status, rural or urban residency
Jackson (2016)	37,185	NR	68.3% white, 12.3%	525 lesbians, 353 bisexual women	NR	71.4% white, 12.7% black,	Lesbians more educated, fewer	Age, ethnicity, educational attainment,	Age race/ethnicity, education,

	Number of hetero-sexual women	Age	Ethnicity	Number of lesbians/bisexual/SMW	Age	Ethnicity	Demographic imbalances compared to heterosexual women.	Prevalence estimates weighted by:	Adjusted odds ratios weighted by:
			black, 12.9% Hispanic			12.5% Hispanic lesbian 73.5% white, 16.0% black, 7.2% Hispanic bisexual women	partnered, bisexual women less income	annual household income, occupational class, health status, region of residence	income, occupational class, health status, region of residence
Ward (2015)	17,399	NR	NR	296 lesbians, 121 bisexual women	NR	NR	NR	As Jackson 2016 above	Age, race/ethnicity, education, income, marriage status, employment, health insurance status, region of residence
Kann (2016) identity	6,105	NR	NR	167 lesbian, 734 bisexual women	NR	NR	NR	Sex, race/ ethnicity and grade	N/A
Kann (2016) behaviour	3,054	NR	NR	173 lesbians, 572 bisexual women	NR	NR	NR	Sex, race/ ethnicity and grade	N/A
Matthews (2014)	6,110	25.7% aged 18-34	71.3% white, 20.7% black, 5.2% Hispanic	86 SMW	40.6% aged 18-34	77.7% white, 14.1% black, 1.7% Hispanic	SMW younger, more likely to use mobile phones	Survey design	Age
McNair (2011)	8,083	25-30	NR	99 lesbians, 100 bisexual women	25-30	NR	SMW lower income, less likely to be partnered, fewer with	Unclear weighting factors	N/A

	Number of hetero-sexual women	Age	Ethnicity	Number of lesbians/bisexual/SMW	Age	Ethnicity	Demographic imbalances compared to heterosexual women.	Prevalence estimates weighted by:	Adjusted odds ratios weighted by:
							children, more urban residence, Lesbians more educated, bisexual women less educated,		

Web Table 2. Critical Appraisal Skills Programme (CASP) quality assessment results

Study	1	2	3	4	5a	5b	6a	6b	9	10	11
Blosnich (2014)	Y	Y	Y	N	n	CT	N/A	N/A	Y	Y	Y
Blosnich (2013)	Y	Y	CT	N	N	CT	N/A	N/A	Y	Y	Y
Boehmer (2014)	Y	Y	Y	N	CT	N	N/A	N/A	Y	Y	Y
Clarke (2015)	Y	Y	Y	Y	N	CT	N/A	N/A	Y	Y	Y
Conron (2010)	Y	Y	Y	N	N	CT	N/A	N/A	Y	Y	Y
Dilley (2010)	Y	Y	Y	N	N	CT	N/A	N/A	Y	Y	Y
Everett (2013)	Y	Y	Y	Y	N	CT	N/A	N/A	Y	Y	Y
Farmer (2013)	Y	Y	Y	N	N	CT	N/A	N/A	Y	Y	Y
Fredriksen-Goldsen (2012)	Y	Y	Y	N	N	CT	N/A	N/A	Y	Y	Y
Fredriksen-Goldsen (2013)	Y	Y	Y	N	N	CT	N/A	N/A	Y	Y	Y
Frisch (2013)	Y	Y	CT	Y	N	CT	CT	Y	Y	Y	N/A
Garland-Forshee (2014)	Y	Y	Y	N	N	CT	N/A	N/A	Y	Y	Y
Jackson (2016)	Y	Y	Y	N	N	Y	N/A	N/A	Y	Y	Y

Study	1	2	3	4	5a	5b	6a	6b	9	10	11
Kann (2016)	Y	Y	Y	N	N	Y	N/A	N/A	Y	Y	Y
Matthews (2014)	Y	Y	Y	N	CT	CT	N/A	N/A	Y	Y	Y
McNair (2011)	Y	Y	Y	N	N	CT	N/A	N/A	Y	Y	Y
Ward (2015)	Y	Y	Y	N	N	CT	N/A	N/A	Y	Y	Y

The checklist questions were 1. Did the study address a clearly focused issue? 2. Was the cohort recruited in an acceptable way? 3. Was the exposure accurately measured to minimise bias? 4. Was the outcome accurately measured to minimise bias? 5a. Have the authors identified all important confounding factors? 5b) Have they taken account of the confounding factors in the design and/or analysis? 6a. Was the follow up of subjects complete enough? 6b. Was the follow up of subjects long enough? 9. Do you believe the results? 10. Can the results be applied to the local population? 11. Do the results of this study fit with other available evidence?

Web Table 3. Prevalence of CVD by sexual orientation

Study name	Heterosexual	Lesbian	AOR (95%CI)	Bisexual	AOR (95%CI)	SMW	AOR (95%CI)
Blosnich 2014&	5.8%# (SE 0.002)	5.0%# (SE 0.002)	NR	7.0%# (SE 0.024)	NR	NR	NR
Boehmer 2014£	4.9% (SE 0.11)	5.8% (SE 1.30)	1.46 (0.92 to 2.34)	3.8% (SE 0.75)	1.14 (0.75 to 1.72)	NR	NR
Conron 2010&	1.3%# (SE 0.1)	1.8%# (SE 0.6)	1.92 (0.95 to 3.87)	3.3%# (SE 2.2)	2.24 (0.53 to 9.43)	NR	NR
Fredriksen-Goldsen 2013&	10.7%#	NR	NR	NR	NR	10.5%#	1.37 (1.00 to 1.86)*
Garland-Forshee 2014&	6.2%# (5.8 to 6.6)	4.0%# (2.1 to 7.5)	1.0 (0.5 to 1.9)	1.8%# (0.6 to 6.0)	0.7 (0.2 to 2.9)	NR	NR
Jackson 2016 (heart disease)	10.8%	9.9%	0.91 (0.61 to1.35)	7.2%	0.73 (0.40 to 1.35)	NR	NR
Jackson 2016 (stroke)	3.2%	5.8%	1.96 (1.14 to 3.39)*	3.4%	1.68 (0.71 to 3.97)	NR	NR
Matthews 2014	4.1%	NR	NR	NR	NR	0.4%	0.19 (0.04 to 0.87)

* - statistically significant to p<0.05 or less, # - weighted percentages, & - calculated from weighted percentages, £ - calculated from unweighted percentages, RR – relative risk.

Web Table 4. Prevalence of hypertension (or hypertensive medication use) by sexual orientation

Study name	Heterosexual	Lesbian	AOR (95%CI)	Bisexual	AOR (95%CI)	SMW	AOR (95%CI)
Boehmer 2014	21.2% (SE 0.19)	19.0% (SE 1.81)	0.99 (0.77 to 1.26)	17.6% (SE 1.70)	1.21 (0.95 to 1.53)	NR	NR
Boehmer 2014 (medication use)	65.3% (SE 0.47)	66.0% (SE 4.29)	1.57 (0.90 to 2.75)	45.0% (SE 4.69)	0.74 (0.44 to 1.24)	NR	NR
Dilley 2010	22.7% (22.1 to 23.4)	14.7% (9.8 to 21.4)	1.0 (0.6 to 1.7)	17.0% (12.2 to 23.1)	1.6 (1.1 to 2.5)*	NR	NR
Everett 2013&	12.2%# (SE 0.65)	10.3%# (SE 3.21)	NR	11.4%# (SE 1.19)	NR	NR	NR
Farmer 2013£ (medication use)	14.7%	NR	NR	NR	NR	11.6%	Not statistically significant
Garland-Forshee 2014	25.6%# (24.3 to 26.8)	22.9%# (13.8 to 35.7)	1.2 (0.6 to 2.4)	12.4%# (7.5 to 19.9)	0.9 (0.5 to 1.7)	NR	NR
Jackson 2016	35.5%	32.2%	0.91 (0.74 to 1.12)	32.1%	0.96 (0.71 to 1.31)	NR	NR
Matthews 2014	33.2%	NR	NR	NR	NR	22.0%	1.00 (0.43 to 2.33)

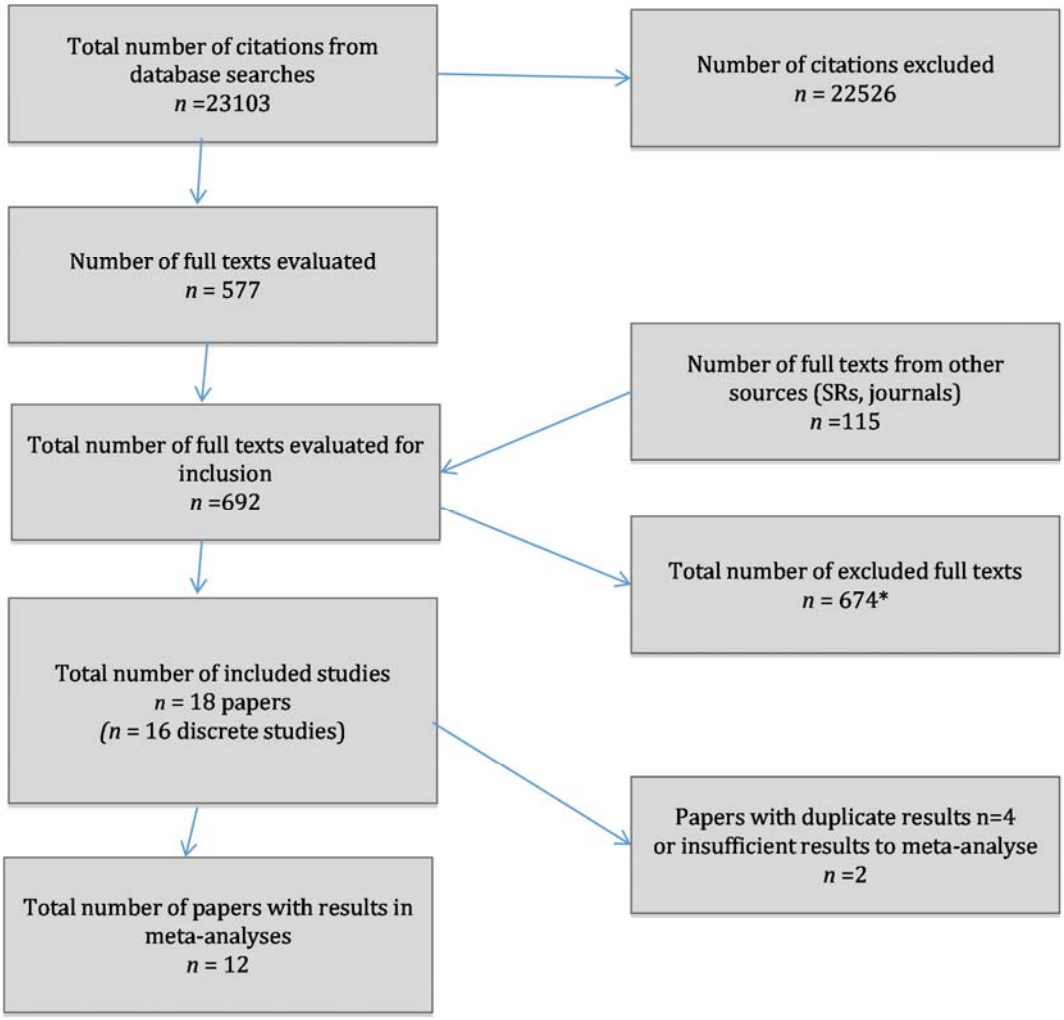
* - statistically significant to p<0.05 or less, # - weighted percentages, & - calculated from weighted percentages, £ - calculated from unweighted percentages, RR – relative risk.

Web Table 5. Prevalence of any type of diabetes mellitus by sexual orientation

Study name	Heterosexual	Lesbian	AOR (95%CI)	Bisexual	AOR (95%CI)	SMW	AOR (95%CI)
Blosnich 2014&	10.2%# (SE 0.002)	6.8%# (SE 0.016)	NR	6.1%# (SE 0.016)	0.75 (0.44 to 1.29)	NR	NR
Boehmer 2014£	5.7% (SE 0.12)	4.6% (SE 0.74)	1.07 (0.76 to 1.50)	4.2%	1.10 (0.79 to 1.55)	NR	NR
Clark 2015	6.0%	1.9%	NR	6.8%	NR	7.2%	NR
Conron 2010	3.9% (SE 0.1)	3.8% (SE 0.9)	1.23 (0.74 to 2.06)	3.9% (SE 1.1)	1.04 (0.62 to 1.76)	NR	NR
Dilley 2010	6.3% (6.0 to 6.5)	5.1% (3.3 to 7.7)	1.3 (0.8 to 2.0)	5.8% (3.8 to 8.8)	1.8 (1.1 to 2.8)*	NR	NR
Farmer 2013	5.3%	NR	NR	NR	NR	6.4%	Not statistically significant
Garland-Forshee 2014	6.5% (6.1 to 6.8)	10.8% (4.1 to 26.0)	2.2 (0.6 to 7.8)	2.4% (1.2 to 5.0)	0.8 (0.4 to 1.6)	NR	NR
Jackson 2016	10.7%	7.7%	0.88 (0.58 to 1.34)	7.1%	0.63 (0.33 to 1.20)	NR	NR
Matthews 2014	11.3%#	NR	NR	NR	NR	4.3%#	0.55 (0.17 to 1.82)

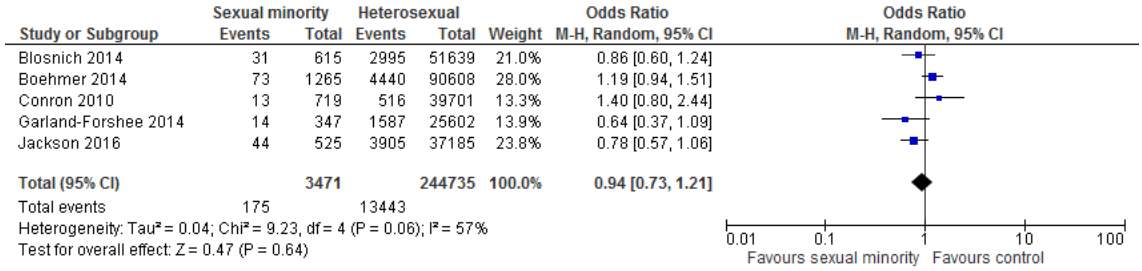
* - statistically significant to p<0.05 or less, # - weighted percentages, & - calculated from weighted percentages, £ - calculated from unweighted percentages, RR – relative risk.

Web Figure 1. PRISMA flow diagram

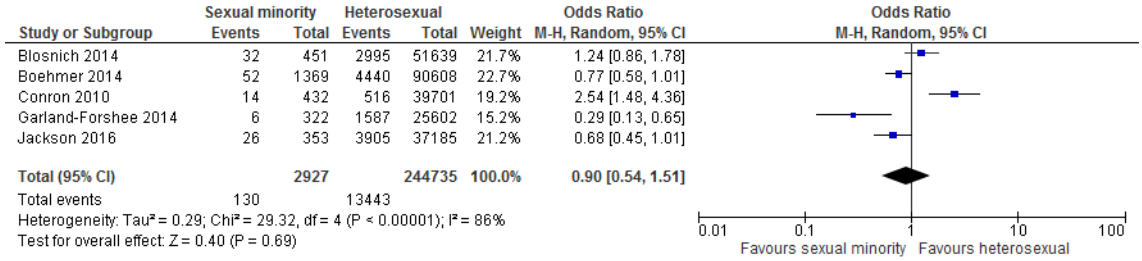


* Reasons for 674 full text exclusions: case studies = 7, diagnostic studies = 8, experimental studies = 8, in children only = 7, no comparison with heterosexual women = 1, no relevant numerical outcomes = 94, pilot studies = 2, qualitative studies = 123, results in men and women combined only = 124, reviews/editorials = 74, surveys on wrong topic = 226.

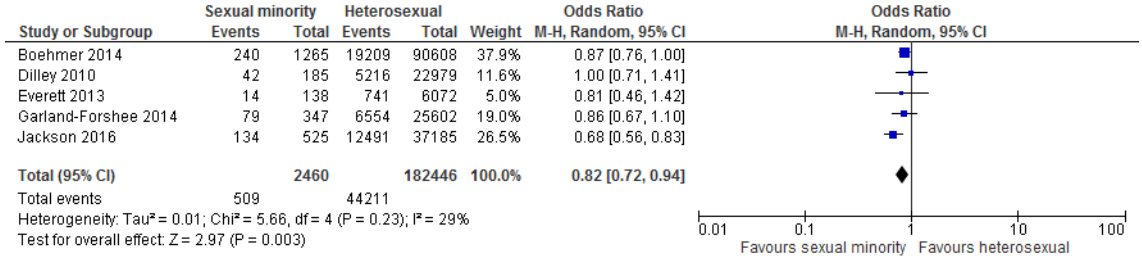
Web Figure 2a. CVD in lesbians



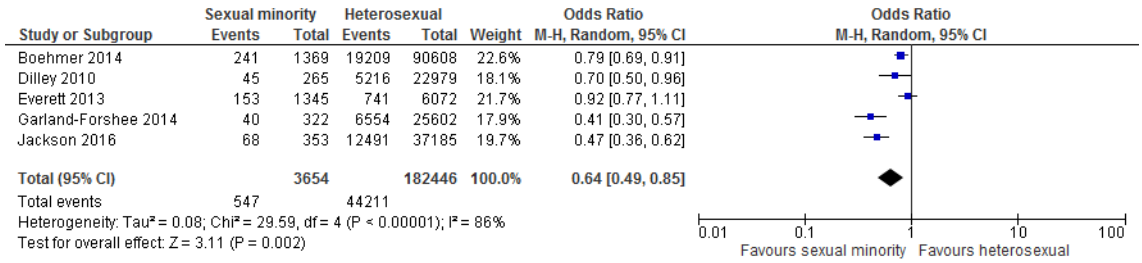
Web Figure 2b, CVD in bisexual women



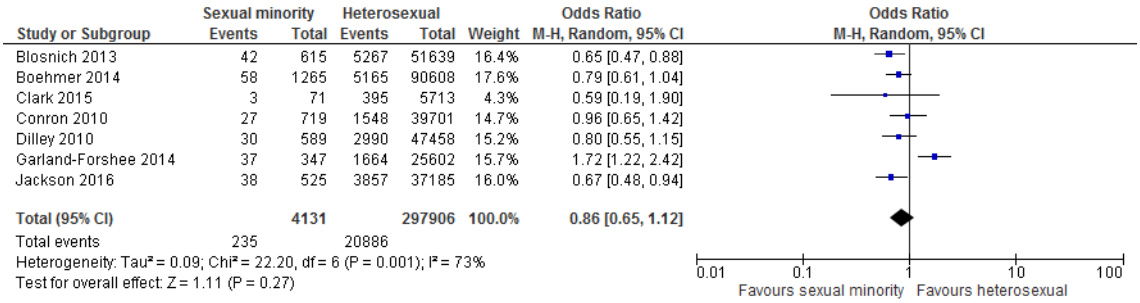
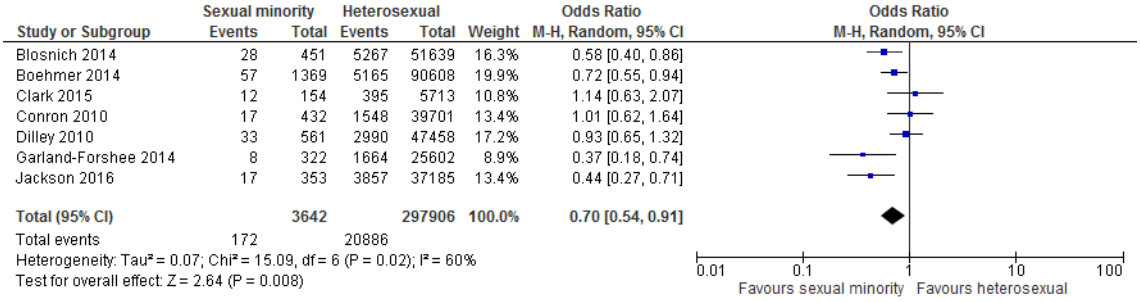
Web Figure 3a. Hypertension in lesbians



Web Figure 3b. Hypertension in bisexual women



Web Figure 4a. Diabetes mellitus in lesbians



Web Figure 4b. Diabetes mellitus in bisexual women