Appendix Table 1 Table showing studies included in meta-analysis with study- and sample-related variables

First author (year)	Tool	Sample size	Gender	Study Design	Temporal design	Mean age (years)	% of sample that were violent	Violent outcome measured	Diagnoses	% with violent index offence	Length of follow-up (days)	Accuracy measures	QUADAS (Low or High)
Arai (2016)	HCR-20	93	Male	Cohort	Retrospective	n/a	12.9	Interpersonal	n/a	n/a	180	Sens: 1.00 Spec: 0.58 PPV: 0.26 NPV: 1.00 DOR: n/a AUC: 0.81	Low
	HCR-20	15	Female	Cohort	Retrospective	n/a	20.0	Interpersonal	n/a	n/a	180	Sens: 1.00 Spec: 0.67 PPV: 0.43 NPV: 1.00 DOR: n/a AUC: 0.76	Low
Chan (2014)	BVC	530	Mixed	Cohort	Prospective	39.2	17.7	Including verbal threat	Psychotic disorder (25%); Personality disorder (12%)	46.2	1	Sens: 0.16 Spec: 1.00 PPV: 0.98 NPV: 0.56 DOR: 70.09 AUC: 0.77	Low
	DASA	530	Mixed	Cohort	Prospective	39.2	17.7	Including verbal threat	Psychotic disorder (25%)	46.2	1	Sens: 0.73 Spec: 1.00 PPV: 0.91 NPV: 0.99 DOR: n/a AUC: 0.97	Low

First author (year)	Tool	Sample size	Study Design	Temporal design	Gender	Mean age (years)	% of sample that were violent	Violent outcome measured	Diagnoses	% with violent index offence	Length of follow-up (days)	Accuracy measures	QUADAS (Low or High)
Chu (2013)	BVC	70	Cohort	Prospective	Mixed	34.3	22.9	Interpersonal	Psychotic disorder (80%)	65.7	1	Sens: 0.95 Spec: 0.52 PPV: 0.12 NPV: 0.99 DOR: 16.15 AUC: 0.83	Low
	DASA	70	Cohort	Prospective	Mixed	34.3	22.9	Interpersonal	Psychotic disorder (80%); Personality disorder (20%)	65.7	1	Sens: 0.76 Spec: 0.81 PPV: 0.04 NPV: 1.00 DOR: 13.20 AUC: 0.83	Low
Daffern (2007)	DASA	38	Cohort	Prospective	Male	n/a	7.0	Including verbal threat	Personality disorder (100%)	n/a	1	Sens: 0.13 Spec: 0.98 PPV: 0.35 NPV: 0.94 DOR: 8.64 AUC: 0.65	Low
de Vogel (2005)	HCR-20	21	Cohort	Retrospective	Male	30.7	28.6	Interpersonal	n/a	74	561	Sens: 1.00 Spec: 0.27 PPV: 0.35 NPV: 1.00 DOR: n/a AUC: 0.93	Low

First author (year)	Tool	Sample size	Study Design	Temporal design	Gender	Mean age (years)	% of sample that were violent	Violent outcome measured	Diagnoses	% with violent index offence	Length of follow-up (days)	Accuracy measures	QUADAS (Low or High)
de Vogel (2005)	HCR-20	27	Cohort	Retrospective	Female	33.2	29.6	Interpersonal	n/a		306	Sens: 0.63 Spec: 0.42 PPV: 0.31 NPV: 0.73 DOR: 1.21 AUC: 0.59	Low
de Vogel (2006)	HCR-20	127	Cohort	Prospective	Male	32.9	15.0	Interpersonal	Personality disorder (66%)	93	645	Sens: 1.00 Spec: 0.79 PPV: 0.21 NPV: 1.00 DOR: n/a AUC: 0.85	Low
de Vries Robbe (2016)	HCR-20	146	Cohort	Prospective	Male	n/a	11.3	Including verbal threat	n/a	n/a	365	Sens: 0.49 Spec: 0.82 PPV: 0.26 NPV: 0.93 DOR: 4.38 AUC: 0.67	Low
	HCR-20	39	Cohort	Prospective	Female	n/a	10.2	Including verbal threat	n/a	n/a	365	Sens: 0.56 Spec: 0.80 PPV: 0.24 NPV: 0.94 DOR: 4.92 AUC: 0.67	Low

First author (year)	Tool	Sample size	Study Design	Temporal design	Gender	Mean age (years)	% of sample that were violent	Violent outcome measured	Diagnoses	% with violent index offence	Length of follow-up (days)	Accuracy measures	QUADAS (Low or High)
Desmarais (2012)	START	120	Cohort	Pseudo-Prospective	Male	38	22.7	Interpersonal	Psychotic disorder (85%)	80	365	Sens: 0.96 Spec: 0.49 PPV: 0.36 NPV: 0.98 DOR: 24.89 AUC: 0.85	Low
Dolan (2008)	VRS-2	147	Cohort	Retrospective	Mixed	36	52.1	Including verbal threat	Psychotic disorder (90%); Personality disorder (4%)	51	56	Sens: 0.63 Spec: 0.66 PPV: 0.68 NPV: 0.61 DOR: 3.04 AUC: 0.69	Low
Fagan (2009)	HCR-20	81	Cohort	Prospective	Male	n/a	11.1	Including verbal threat	n/a	n/a	184.8	Sens: 0.78 Spec: 0.76 PPV: 0.29 NPV: 0.97 DOR: 11.32 AUC: 0.80	Low
Gunenc (2017)	START	44	Cohort	Prospective	Male	34.3	45.5	Interpersonal	Psychotic disorder (48%)	n/a	180	Sens: 0.75 Spec: 0.75 PPV: 0.71 NPV: 0.78 DOR: 9.00 AUC: 0.65	Low

First author (year)	Tool	Sample size	Study Design	Temporal design	Gender	Mean age (years)	% of sample that were violent	Violent outcome measured	Diagnoses	% with violent index offence	Length of follow-up (days)	Accuracy measures	QUADAS (Low or High)
Hvidhjelm (2014)	BVC	156	Cohort	Prospective	Mixed	38	48.7	Including verbal threat	Psychotic disorder (83%); Personality disorder (3%)	85.3	1	Sens: 0.66 Spec: 1.00 PPV: 0.37 NPV: 1.00 DOR: n/a AUC: 0.92	Low
Jeandarme (2017)	HCR-20	168	Cohort	Retrospective	Mixed	36.1	19.6	Interpersonal	Psychotic disorder (43%); Personality disorder (76%)	75.6	675.4	Sens: 0.33 Spec: 0.71 PPV: 0.22 NPV: 0.81 DOR: 1.23 AUC: 0.60	Low
McDermott (2011)	COVR	146	Cohort	Prospective	Mixed	46.1	15.1	Interpersonal	Psychotic disorder (78%)	63	140	Sens: 0.73 Spec: 0.63 PPV: 0.26 NPV: 0.93 DOR: 4.52 AUC: 0.73	Low
Mudde (2011)	HCR-20	102	Cohort	Pseudo-Prospective	Mixed	37.1	42.2	Including verbal threat	Psychotic disorder (73%)	70	1278	Sens: 0.54 Spec: 0.72 PPV: 0.58 NPV: 0.68 DOR: 2.84 AUC: 0.71	Low

First author (year)	Tool	Sample size	Study Design	Temporal design	Gender	Mean age (years)	% of sample that were violent	Violent outcome measured	Diagnoses	% with violent index offence	Length of follow-up (days)	Accuracy measures	QUADAS (Low or High)
Negredo (2015)	HCR-20	29	Cohort	Retrospective	Male	38	44.8	Interpersonal	Psychotic disorder (79%); Personality disorder (21%)	74.7		Sens: 0.77 Spec: 0.56 PPV: 0.59 NPV: 0.75 DOR: 4.29 AUC: 0.29	Low
	PCL:SV	29	Cohort	Retrospective	Male	38	44.8	Interpersonal	Psychotic disorder (79%); Personality disorder (21%)	74.7		Sens: 0.46 Spec: 0.88 PPV: 0.75 NPV: 0.67 DOR: 6.00 AUC: 0.24	Low
Nonstad (2010)	START	47	Cohort	Prospective	Mixed	36	34.8	Including verbal threat	Psychotic disorder (96%); Personality disorder (15%)	n/a	90	Sens: 0.81 Spec: 0.60 PPV: 0.52 NPV: 0.86 DOR: 6.50 AUC: 0.77	Low
Snowden (2009)	COVR	44	Cohort	Prospective	Male	n/a	52.3	Interpersonal	n/a	n/a	180	Sens: 0.74 Spec: 0.76 PPV: 0.77 NPV: 0.73 DOR: 9.07 AUC: 0.34	Low

First author (year)	Tool	Sample size	Study Design	Temporal design	Gender	Mean age (years)	% of sample that were violent	Violent outcome measured	Diagnoses	% with violent index offence	Length of follow-up (days)	Accuracy measures	QUADAS (Low or High)
Snowden (2009)	COVR	8	Cohort	Prospective	Female	n/a	50.0	Interpersonal	n/a	n/a	180	Sens: 0.25 Spec: 0.75 PPV: 0.50 NPV: 0.50 DOR: 1.00 AUC: 0.79	Low
	HCR-20	44	Cohort	Prospective	Male	n/a	52.3	Interpersonal	n/a	n/a	180	Sens: 0.87 Spec: 0.24 PPV: 0.56 NPV: 0.63 DOR: 2.08 AUC: 0.91	Low
	HCR-20	8	Cohort	Prospective	Female	n/a	50.0	Interpersonal	n/a	n/a	180	Sens: 1.00 Spec: 0.75 PPV: 0.80 NPV:1.00 DOR: n/a AUC: 0.67	Low
	PCL-R	44	Cohort	Prospective	Male	n/a	52.3	Interpersonal	n/a	n/a	180	Sens: 0.83 Spec: 0.19 PPV: 0.53 NPV: 0.50 DOR: 1.12 AUC: 0.81	Low

First author (year)	Tool	Sample size	Study Design	Temporal design	Gender	Mean age (years)	% of sample that were violent	Violent outcome measured	Diagnoses	% with violent index offence	Length of follow-up (days)	Accuracy measures	QUADAS (Low or High)
	PCL-R	8	Cohort	Prospective	Female	n/a	50.0	Interpersonal	n/a	n/a	180	Sens: 0.50 Spec: 0.75 PPV: 0.67 NPV: 0.60 DOR: 3.00 AUC: 0.57	Low
Snowden (2009)	VRAG	44	Cohort	Prospective	Male	n/a	52.3	Interpersonal	n/a	n/a	180	Sens: 1.00 Spec: 0.14 PPV: 0.56 NPV: 1.00 DOR: n/a AUC: 0.63	Low
	VRAG	8	Cohort	Prospective	Female	n/a	50.0	Interpersonal	n/a	n/a	180	Sens: 1.00 Spec: 0.00 PPV: 0.50 NPV: 0.00 DOR: n/a AUC: 0.78	Low
Thomson (2008)	PCL-R	144	Cohort	Retrospective	Male	n/a	20.1	Including verbal threat	Psychotic disorder (100%)	n/a	2920	Sens: 0.56 Spec: 0.44 PPV: 0.77 NPV: 0.24 DOR: 1.02 AUC: n/a	Low

First author (year)	Tool	Sample size	Study Design	Temporal design	Gender	Mean age (years)	% of sample that were violent	Violent outcome measured	Diagnoses	% with violent index offence	Length of follow-up (days)	Accuracy measures	QUADAS (Low or High)
	PCL-R	145	Cohort	Retrospective	Male	n/a	20.0	Including verbal threat	Psychotic disorder (100%)	n/a	2920	Sens: 0.31 Spec: 1.00 PPV: 1.00 NPV: 1.00 DOR: n/a AUC: n/a	Low
Thomson (2008)	VRAG	17	Cohort	Retrospective	Female	n/a	17.7	Including verbal threat	Psychotic disorder (100%)	n/a	2920	Sens: 0.81 Spec: 0.12 PPV: 0.75 NPV: 0.16 DOR: 0.57 AUC: n/a	Low
	VRAG	17	Cohort	Retrospective	Female	n/a	17.7	Including verbal threat	Psychotic disorder (100%)	n/a	2920	Sens: 0.69 Spec: 0.00 PPV: 0.92 NPV: 0.00 DOR: n/a AUC: n/a	Low

Appendix Table 2 Median accuracy estimates and interquartile ranges for each violence risk assessment instrument

	Sample used in meta-analysis (k=35)						Wider Sample (k=78)	
	No. of studies	*Sensitivity*	*Specificity*	*PPV*	*NPV*	*DOR*	*No. of studies*	*AUC [a]*
BVC	3	0.66 (0.41-0.80)	1.00 (0.76-1.00)	0.37 (0.25-0.68)	0.99 (0.78-0.99)	43.1 (29.6-56.6) [c]	5	0.83 (0.75-0.87)
COVR	3	0.73 (0.49-0.73)	0.75 (0.69-0.76)	0.50 (0.38-0.64)	0.73 (0.61-0.83)	4.5 (2.8-6.8)	3	0.73 (0.34-0.79)
DASA	3	0.73 (0.43-0.75)	0.98 (0.90-0.99)	0.35 (0.20-0.63)	0.99 (0.97-1.00)	10.9 (9.8-12.1) [c]	5	0.83 (0.65-0.90)
HCR-20	13	0.78 (0.56-1.00)	0.71 (0.56-0.76)	0.31 (0.26-0.56)	0.94 (0.75-1.00)	3.6 (1.9-4.5)	27	0.70 (0.62-0.80)
PCL-R	4	0.53 (0.45-0.63)	0.60 (0.38-0.81)	0.72 (0.63-0.82)	0.55 (0.43-0.70)	1.1 (1.1-2.1)	10	0.64 (0.61-0.69)
PCL:SV	1			- [b]			7	0.68 (0.54-0.72)
START	3	0.81 (0.78-0.89)	0.60 (0.55-0.68)	0.52 (0.44-0.62)	0.86 (0.82-0.92)	9.0 (7.8-17.0)	8	0.81 (0.69-0.88)
VRAG	4	0.91 (0.78-1.00)	0.06 (0.00-0.12)	0.66 (0.55-0.79)	0.08 (0.00-0.37)	0.6 (0.3-0.8)	9	0.63 (0.57-0.64)
VRS	1			- [b]			4	0.63 (0.50-0.69)

[a] Median AUCs calculated using wider sample
[b] Only two samples or fewer, so median or interquartile ranges only given for AUC using wider sample
[c] Based on only two, of three, samples

Appendix Table 3 Results of meta-regression analyses of longer-term instrument samples examining AUCs to pre-specified study- and sample-related variables

Variable	Number of samples (k)	Beta coefficient (β)	95% confidence intervals	Significance (p)
Gender	25	0.0002	-0.0015 – 0.0019	0.81
Sample size	25	0.0004	-0.0010 – 0.0019	0.56
Mean age	12	-0.0484	-0.1035 – 0.0067	0.08
Temporal design [a]	25	-0.0431	-0.1201 – 0.0338	0.26
Tool type [b]	25	0.1075	-0.0454 – 0.2604	0.16
Violent outcome [c]	25	-0.0448	-0.2432 – 0.2537	0.65
Psychotic diagnosis	9	0.0016	-0.0089 – 0.0121	0.73
Personality disorder diagnosis	6	0.0022	-0.0085 – 0.0129	0.60
Violent index offence	9	0.0039	-0.0171 – 0.0248	0.68
Follow-up period	23	0.0001	-0.0002 – 0.0004	0.49

[a] Prospective design coded as 1; pseudo-prospective coded as 2; retrospective coded as 3
[b] Actuarial tool coded as 1; structured professional judgement tool coded as 2
[c] Violent outcome including verbal aggression coded as 1; violent outcome only including interpersonal physical violence coded as 2

Appendix Table 4 Results of meta-analysis with different binning strategy

Performance measure	Imminent	Longer-term (L v M+H) [a]	Longer-term (L+M v H) [a]
Sensitivity	0.59 (0.29 – 0.83)	0.75 (0.65 – 0.83)	0.34 (0.22 – 0.48)
Specificity	0.99 (0.80 – 1.00)	0.56 (0.46 – 0.66)	0.91 (0.86 – 0.95)
PPV*	0.36 (0.10 – 0.93)	0.55 (0.30 – 0.75)	0.68 (0.52 – 0.93)
NPV*	0.99 (0.85 – 1.00)	0.75 (0.58 – 0.95)	0.71 (0.50 – 0.90)
DOR	-	4.00 (3.00 – 6.00)	5.39 (3.17 – 9.16)
AUC	0.83 (0.71 – 0.85)	0.68 (0.62 – 0.75)	0.78 (0.74 – 0.81)

* Median (interquartile range)
[a] L = low risk category, M = moderate risk category, H = high risk category