Table 3: Summary of articles included in review

Rating	Study, Country	Design	Intervention	Sample	Method of Analysis	Outcomes	
						Cessation	*Behavioural*
Smoking Cessation Program							
S	Clarke *et al.* 2013 [44] USA	RCT	Pre-release intervention from prison with complete smoking ban 6 weekly sessions of MI & CBT. 2 brief phone follow-up sessions 1 day & 1 weeks post-release Abstinence validated urine cotinine measures	Male & female prisoners (35% female) *Intervention:n*=122 *Control: n*=125	Intention to treat Long-term effect: generalised estimating equation Group comparisons: Logistic regression	Significant long term impact on CA rates at follow ups (Intervention vs Control): 25.4% vs 7.2% - 3 weeks (>60% of control relapsed first day) 11.5% vs 2.4% - 3 months Predictors of abstinence at 3 weeks post-release (p=0.05): Intervention (OR=6.6); incarcerated > 6 months (OR=4.6); Hispanic (OR= 3.2); planning to not smoke (OR=1.6)	
S	Jalali *et al*. 2015 [33] Iran	RCT (double-blinded)	*Intervention:* group 1 5 sessions of MI over 5 weeks *Intervention: group 2* 5 sessions MI with 5 weeks NRT *Control:* no intervention Reductions in smoking within and between groups validated by expired CO readings Follow-up in prison	Male prisoners *Intervention 1*: n=71 *Intervention 2*: n=71 *Control:* n=71	x^2test (group comparisons) one sample t-test paired sample t-test Repeated-measures ANOVA Scheffe post hoc test	*CO readings pre-post mean change* End of treatment (5 weeks) : MI: 7.80 ± 4.34 (p=0.001) MI + NRT: 10.87 ± 4.53 (p=0.001) 90 day (3 month) follow up: MI: 7.81 ± 4.80 (p=0.001) MI + NRT: 11.24 ± 3.82 (p=0.001) CPD and FTND test scores pre-post for MI and MI+NRT groups also significant (p=0.02) *Pre-follow up CO mean change* MI +NRT vs MI /control (p=0.001)	
S	Richmond *et al.* 2013 [38] Australia	RCT	Testing long-term effectiveness of NOR as a part of an already effective smoking cessation intervention *Intervention:* 2 brief CBT sessions, NRT, NOR *Control:* 2 brief CBT sessions, NRT, placebo in place of NOR Abstinence validated by expired CO readings	Male prisoners *Intervention:n*=206 *Control:* n=219	Intention to treat Group comparisons: OR	NOR has no significant long term impact on CA rates at follow ups (Intervention vs Control): 23.8% vs 16.4% - 3 months 17.5 vs 12.3% - 6 months 11.7% vs 11.9 - 12 months	

Rating	Study, Country	Design	Intervention	Sample	Method of Analysis	Outcomes	
						Cessation	*Behavioural*
M	Cropsey *et al.* 2008 [30] USA	RCT	*Intervention:* Baseline questions: sociodemographics, smoking history, readiness to quit, quit history, CES-D-20. Received NRT and 10-session group counselling intervention based on mood management *Control:* no intervention Abstinence validated by expired CO readings	Female prisoners *Intervention:n*=250 *Control: n*=289, waiting list group	x^2test (group comparisons) Repeated-measures ANOVA Long-term effect: generalised estimating equation	PPA rates at follow ups: 18.4% - end of treatment 16.8% - 3 month follow-up 14.0% - 6 month follow-up 11.6% - 12 month follow-up Intervention vs control at 6 months 14.0% vs 2.8% (*p*=0.001)	
M	Naik, Khanagar, Kumar, Ramachandra, Vadavadagi & Dhananjaya 2014 [37] India	Pre-post	RCT Testing short and long-term effectiveness of MI on CPD, attempting to quit, willingness to quit and CO reading Intervention: MI (no. of sessions or setting details unknown) Abstinence validated by expired CO readings Follow up in prison	Male prisoners *Intervention:n*=300 *Control: n*=300	Chi-square Fisher's exact test	MI had significant short term impact on health outcomes, but not maintained at 6 month follow-up *Intervention Pre-Post* CPD ↓ (*p*<.001) Quit smoking = 16% Quit attempt: 25.7% vs 78.3% (*p*<.001) CO levels ↓ (*p*<.001) Reason to quit = health 64.3% vs 80.6% (*p*<.001) *Intervention vs Control – 6 months* CPD (*p*=0.92) Quit attempt: 78.3% vs 30.7% (*p*<.001) CO levels ↓ in intervention group (*p*<.001) Reason to quit = health 80.6% vs 72.8% (*p*<.001)	
W	Awofeso, Levy & Morris 2001 [43] Australia	Pre-post	Tobacco Control Pilot Program (not ban) Self-administered attitudinal survey NRT	Female prisoners, *n*=9 Male prisoners, *n*=15	Descriptive analysis	6 month follow-up CA: 4/24 (no females) 16.7% Those that resumed smoking showed ↓ in quantity smoked: 9/20 (45%)	

Rating	Study, Country	Design	Intervention	Sample	Method of Analysis	Outcomes	
						Cessation	*Behavioural*
W	MacAskill *et al.* 2008 [35] UK	Pre-post	Pilot Smoking Cessation Program - 4 prisons *Intervention*: NRT for recommended course, and either group support with facilitator/one-on-one support by prison-based staff for 6 weeks. Included 3-phase social marketing approach. Qualitative data: Semi-structured interviews in small groups/pairs. Quantitative data: routinely collected on attendance and smoking levels Abstinence validated by expired CO reading.	Male prisoners, *n*=159 Interviews with 25 of the sample	Descriptive analysis Process evaluation: case study approach to examine and compare 4 pilots	4 week follow-up Small group PPA rate: 58 - 82% One-on-one PPA rate: 25 - 40%	Black market for nicotine patches developed
W	Makris, Gourgoulianis & Hatzoglou 2012 [36] Greece	Pre-post	Smoking Cessation Centre within prison Baseline questionnaire: medical history, smoking history, drug use history, corrections history and FTND *Internvention*: Pharmaceutical (Varenicline for 3 or 4 months) and/or counselling	Male smoker prisoners, *n*=154	x^2 test and independent-sample t-test	3 month follow-up CA: 30.7% 1 year follow-up CA: 20.2% Factors related to long-term CA (*p*<.005): decreased smoking when incarcerated, prior quit attempts, average dependence levels, started smoking >21yrs old, no history of drug addiction, long-term incarceration, limited prisoners & smokers in cell	
W	Richmond *et al.* 2006 [8] Australia	Pre-post	Feasibility of multi-component smoking cessation intervention *Intervention:* 2 brief CBT sessions, NRT, bupropion and self-help resources Abstinence validated by expired CO readings	Male prisoners, *n*=30	Group comparisons: Fisher's exact test Wilcoxon's sign-rank test	5 month follow-up PPA rate: 37%; CA rate: 26% 6 month follow-up PPA rate: 26%; CA rate: 22% Relapsed prisoners: smoked significantly less tobacco/week (*p*<.05)	

Rating	Study, Country	Design	Intervention	Sample	Method of Analysis	Outcomes	
						Cessation	*Behavioural*
W	Turan & Turan 2016 [48] Turkey	Pre-post	Pharmacological intervention in prison with indoor smoking ban. Information session also held for all prisoners and staff. Intervention options for those with moderate/high FTND score &desire to quit included: NRT, bupropion, or varenicline – participants required to pay for all options 4 data collections point: baseline, 1,2 & 6 months	179 participants - 109 prisoners & 70 staff - 166 men & 13 women Tobacco cessation treatment offered to 63 participants (49 prisoners & 14 staff) - 59 accepted (at cost to themselves)	Mann-Whitney U test Pearson's r Chi-square test Fisher's exact test	Mean CPD ↑ (20.2 to 22.3) since incarceration. High attrition at 1 month follow up - only 2 had been taking planned pharmacotherapy (not all the time and did not quit). Attrition due to prisoners being released or moving prison (19), or not taking planned pharmacotherapy and continuing smoking (40). Reasons for not taking pharmacotherapy: High cost (40%), unsuitable prison environment (35%), strong desire to smoke (25%).	

Indoor Smoking Ban

Rating	Study, Country	Design	Intervention	Sample	Method of Analysis	Cessation	Behavioural
M	Kauffman *et al.* 2011 [34] USA	Pre-post	Indoor smoking ban NRT available for purchase Questionnaire: modified NHANES tobacco questionnaire, FTND, addition questions on quitting (from NHIS) and health impacts of tobacco use	Male prisoners, *n*=200	*Group comparisons*: Fisher's exact test *Pre-post individual change*: McNemar's test Paired t-test Wilcoxon's sign-rank test	no. of smokers ↑ CPD ↓ (*p*<.001) smokeless tobacco consumption ↑ (*p*<.001) No smokers participated in free prison-sponsored group counselling program or NRT	51.2% of smokers smoked indoors following ban

Rating	Study, Country	Design	Intervention	Sample	Method of Analysis	Outcomes	
						Cessation	*Behavioural*
W	Etter *et al.* 2012 [45] Switzerland	Separate pre-post	Indoor ban (3 prisons) Interviews & focus groups to develop prison-based interventions *Interventions in prison A, B & C:* A (open): extension smoke-free zones; NRT for purchase; self –help booklets B (closed): limit smoking locations; counselling; free NRT (limited); self –help booklets C (remand): limit smoking locations; counselling; free NRT; self –help booklets Pre (2009) -post (2011) surveys of prisoners and staff	Pre (2009); Post (2011) (respectively) A: male prisoners, *n*=70; *n*=60 staff, *n*=51; *n*=48 B: male prisoners, *n*=27; *n*=30 staff, *n*=27; *n*=24 C: mainly male prisoners, *n*=116; *n*=66 staff, *n*=126; *n*=0	Group comparisons: tests, Mann-Whitney U tests and independent-sample t-tests	No significant change in prisoner smoking behaviours or duration of exposure to SHS across prisons. Significant changes in prison A (*p*<.005): prisoners reported receiving more medical support to quit and reported decreased SHS exposure; staff reported decreased SHS exposure. Prison C (*p*<.005): reported increased SHS exposure in medical service	
W	Lasnier *et al.* 2011 [46] Canada	Pre-post	Indoor smoking ban 3 correctional centres in Quebec	Male & female prisoners, *n*=113	Descriptive analysis	89.0% of smokers reported reduction in tobacco consumption 34.0% reported perceived reduction in exposure to SHS 45.0% perceived improvement in health	93.0% of smokers smoked indoors following ban Limited cigarettes/ prisoner vs reported number of CPD suggests cigarette black market Poor enforcement by smoking staff
Complete Smoking Ban /Combination							
M	Cropsey & Kristeller 2005 [31] USA	Pre-post	Smoking ban NRT available for purchase Baseline questionnaire: FTND, CES-D, HHWS, questions on smoking history, stage of change, and level of agreement with ban. Follow-up questionnaire 4 days & 1 month after ban: CES-D, HHWS, QSU-Brief Form, questions on difficulty quitting, smoking behaviors, and level of agreement with ban	Male prisoners, *n*=188 Participants classified as smokers or quitters (in prison following ban)	Univariate ANOVA Repeated-measures 2 x 2 ANCOVA	Smokers were more nicotine dependent (*p*<.001). Smoking status was predictor of withdrawal effect at follow-up (*p*<.01).	76% of participants were still smoking in prison 1 month after the ban. Poor enforcement of ban by staff

Rating	Study, Country	Design	Intervention	Sample	Method of Analysis	Outcomes	
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M	Thibodeau, Jorenby, Seal, Kim & Sosman 2010 [39] USA	Pre-post	Complete smoking ban 2 interviews 1 month pre, 1 month post release	Males prisoners,*n*=49 Average incarceration time = 2.3 years	Bivariate analyses Multivariate modelling	Pre-release intent predicts post-release behavior (*p*<.001) *Pre-release:* 67.3% perceived health improvements; 22% intended to smoke upon release; 67% intended abstinence. *Post-release*: 61% abstinent 1 month; 84% supportive of pre-release smoking abstinence program; ↓ in FTND mean score post release	
W	Howell, Guydish, Kral & Comfort 2015 [32] USA	Cross-sectional survey	Complete smoking ban	172 male ex-prisoners Release from prison in past 12 months but not past 3 months.	Logistic regression – bivariate & multivariate	74% smoking since recent release (PPA) from prison with complete ban Significant predictors of return to smoking: Unadjusted model – every five years of incarceration (OR=1.32) Adjusted model – lifetime history of substance use (OR=2.47) Total average incarceration time across life time: non-smokers = 10.5 years; smokers = 12.1 years	
W	Leone & Kinkade 1994 [47] USA	Separate pre-post	Complete smoking ban Pre –post analysis of staff sick days, prisoner-on-prisoner and prisoner-on-staff assaults, disciplinary actions, and attempted and completed suicides	Administrative data - 1 year pre, and 1 year post	t-test	No significant change in staff sick days No significant change in no. of prisoner attempted/completed suicides	↑ monthly mean prisoner-on-prisoner assaults without injury 1.31 to 3.73 (*p*<.001), prisoner-on-staff assaults without injury 0.08 to 0.64 (*p*<.05) ↑ no. of prisoners moved to SHU C (administrative segregation) 334.46 to 309.10 (*p*<.005), but not SHU D (disciplinary segregation)

Rating	Study, Country	Design	Intervention	Sample	Method of Analysis	Outcomes	
						Cessation	*Behavioural*
W	Lincoln *et al.* 2009 [42] USA	Pre-post	Complete smoking ban Smoking resumption post release Intake interview on smoking habits. Follow-up interviews at 1 and 6 months	Prisoners, *n*=102 Smokers prior to prison High rates of comorbidity including Hepatitis C Average incarceration time = 2 months	Descriptive analysis	1 month follow-up 1 day CA rate: 37.3% 1 week CA rate: 17.7% 1 month CA rate: 13.7% 6 month follow-up estimated CA: 3.1%	
W	Turner *et al.* 2013 [40] Canada	Separate pre-post	Complete smoking ban Gambling survey pre and post smoking ban	Pre: 254 male prisoners Post: 395 male prisoners	Mixed models analysis		Survey: significant drop in tobacco used as currency by gambling offenders post ban from 28.6% to 2.3% (*p*<.001). Increase in money wagers. In-depth interview: drop on federal offenders who gambled in prison post ban.
W	Voglewede & Noel 2004 [41] USA	Pre-post	Smoking ban Predicted current need to smoke for incarcerated smokers Interview: questions regarding demographics, custodial history, smoking habits 12 months prior to incarceration, modified FTND & QSU	Males prisoners, *n*=150 Smokers prior to prison	Hierarchical regression analyses	Predictors of need to smoke (*p*<.005): No. of times incarcerated & future intent to smoke once released Predictors of nicotine dependence (*p*<.005): age, years of smoking, no. of CPD	

Abbreviations S: Strong; M: Moderate; W:Weak; RCT: randomised controlled trial; NRT: nicotine replacement therapy; CES-D: Centre for Epidemiologic Studies Depression Scale; CES-D-20: Centre for Epidemiologic Studies Depression Scale-20 item; PPA: point prevalence abstinence; CA: continuous abstinence; CBT: cognitive-behavioural therapy; NHANES: National Health and Nutrition Examination Survey; FTND: Fagerstrom Test for Nicotine Dependence; NHIS: National Health Interview Survey; HHWS: Hughes-Hatsukami Withdrawal Scale; NOR: nortriptyline; QSU: Questionnaire of Smoking Urges; OR: odds ratio; CPD: cigarettes per day; SHS: second-hand smoke; SHU: special housing units; CO: carbon monoxide.