## S7 Table. Summary of results of included studies; potential risk and protective factors explored

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **First author** | **Retention** **or** **Dropout****Rates** | **Outcome****Model and coefficients reported** | **Demographics****Age** **Gender** **Location** **Race**  | **Substance use****Poly-drug use** **Cannabis use** **BZD use** **Cocaine use** **Heroin use** **Alcohol use** **Amphetamines/ecstasy****Drug use patterns**  | **Treatment Factors** **Medication type** **Dosage****Previous treatments****Year of treatment intake** **Treatment setting****Treatment facilities**  | **Health Risk Behaviour****sexual behaviour****Injecting****Sharing needles**  | **Health Symptoms** **Non-fatal overdose****Clinical diagnosis:****Mental health (self-reported)****Physical health (self-reported)****HIV+/-****TB +/-** | **Social functioning** **Marital Status****Employment status** **Income****Education** **Living status** **Social Support** **Legal issues**  | **Other variables investigated in included studies**  |
| Abramsohn 2009 (35) | Retention at 1 year (85.6%) | Retention at 1 yearSurvival analysis with log rank of retention |  |  | - | - | - | - | High (>130) Sense of Coherence score – S3.50 (3.20-3.90) yearsLow (≤130) Sense of Coherence score – S2.90(2.50-3.30) years |
| Adelson 2013 (36) | Retention at 1 year (59.5%)  | Long-term treatment retention (4.5 years)Cox regression model Hazard Ratios (95% CI) | - | - | Methadone dose (high- ≥80mg/day) – S2.20 (1.30-3.70)  | - | Being sera positive to hepatitis C on admission – S 1.80 (1.10–2.80)  | - | - |
| Amiri 2018 (37) | Retention at 1 year (50%); at 3 years (30%) | Dropout (time to drop out between 2015-2017)Cox proportional hazard model (95% CI) Hazard Ratios (95% CI) | Age – S0.99 (0.98 - 0.99)Gender (ref: female) – NS1.17 (0.96 - 1 .41)Area deprivation index :(ref: Least deprived < 100)Most deprived > 100 – S1.79 (1.02 – 3.15) Ethnicity (ref: non-Hispanic white) other – NS1.00 (0.79 – 1.26) |  | Methadone dose (mean, SD) – S0.98 (0.98 – 0.98)Years on treatment (median, IQR) – S1.12 (1.06 – 1.18)  |  |  | Cannabis retail outlets in neighbourhood (median) – NS1.08 (0.99-1.18)Off-premise alcohol outlets in neighbourhood (median) – NS0.99 (0.96-1.03)On-premise alcohol outlets in neighbourhood (median) – NS1.00 (0.99-1.00) | Distance to OTP (ref: < 5 miles):>5 miles and <10 miles – NS0.84 (0.65 – 1.09) > 10 miles – NS1.12 (0.82 – 1.54)  |
| Astals 2009 (38) | Retention at 18 months (68.5%)  | Dropout (follow-up 18 months)Logistic regression Odds Ratios (95% CI) | Age – NS(no figures reported) Male – NS2.59 (0.98–6.84)  | Current diagnosis of cocaine and opiates other than heroin dependence – NSU- | Methadone dose NSU | - | Co-occuring psychiatric disorders NSU | Lower educational level – NS2.65 (0.98–7.13)  | - |
| Banta-Green 2009 (39) | Retention at 12 monthsPrescription type opioid only users (54%); Those who had used heroin (46%) | Retention at 12 monthsLogistic regression Odds Ratios (95% CI) | Age (10 year increments) – S 1.27(1.15-1.40)Female – NS1.12(0.93-1.34)Black (ref: white) - S  0.69 (0.52-0.91) Native American – NS0.95(0.62-1.44)Other race – NS0.96(0.72-1.30) | Cocaine – S0.75(0.63-0.91) Methamphetamine – S 0.62(0.44-0.89) | In treatment for prescription-type opioid primary(vs. heroin use) – NS 1.25(0.93-1.67) |  | Clinical diagnosis:Medical concerns – S 0.74(0.62-0.88)  | Public assistance (ref: no public assistance):GAU(low income ,temporarily disabled): -S 1.58(1.19-2.09)TANF(parenting) –S1.89(1.37-2.60) GAX or SSI (disabled) – S1.86(1.48-2.35) Medical assistance only – NS1.06(0.71-1.59)Other - NS1.42(0.37-5.46)Home conducive to recovery – S1.52(1.26-1.84) Children under 12 at home - S 1.35(1.03-1.78)Legal system involvement – S0.71(0.57-0.89) | Agency (ref: agency 1) : agency 2 – NS0.57(0.30-1.08)Agency 3 – NS0.62(0.34-1.14)Agency 4 – NS0.90(0.57-1.43)Agency 5 – NS0.66(0.42-1.05)Agency 6 – S 0.62(0.44-0.89)Agency 7 – NS0.82(0.56-1.20)Agency 8 –S0.73(0.53-0.99)Agency 9 – NS0.95(0.74-1.23)Agency 10 – NS1.15(0.79-1.66)Agency 11 – NS0.85(0.48-1.48) |
| Bhatraju 2017 (40) | Median retention 57 weeks | Dropout (Time to dropout between 2006 and 2013)Cox proportional hazard modelsModel 1: total sample; Model 2: Induction Patients Hazard Ratios (95% CI) | Model 1 (total sample): Age - NS0.98(0.97-1.00)Gender - NSEthnicity- NSModel 2 (induction patients)Age - NS0.99 (0.97-1.00)Gender - NSEthnicity- NS | Model 1 (total sample): Active Cocaine use - NS1.18(0.90–1.54)Active heroin use - NS 1.25(0.96–1.64)Model 2 (induction patients)Active Cocaine use - NS1.15(0.83–1.59)Active heroin use - NS 1.27(0.93–1.75) | Model 1 (total sample): Prior buprenorphine use – NSUYear of first visit (ref: 2007):2008 – NS0.81 (0.54–1.20)2009 –S0.67 (0.49–0.91)2010 - NS0.75 (0.54–1.04) 2011 - NS0.70 (0.49–1.01)2012 - NS0.61 (0.35–1.05)2013 - NS 0.62 (0.29–1.34)Inducted – NS: 1.46 (1.10–1.93)Outpatient counselling active – NSU12 step attendance active - NSUAny induction related adverse effects - NSUMethadone to buprenorphine induction - NSU Model 2 (induction patients)No factor significantly associated with time to dropout | - | - |  | - |
| Bounes 2013 (41) | Retention rate at 12 months (33%) | Retention at 12 monthsLogistic RegressionOdds Ratio (95% CI) | Gender (ref Male)-NS1.66 (0.71-3.87)Age-(ref < 30 yrs)-NS30-40 yrs: 1.08 (0.42-2.75)>40 yrs: 1.56 (0.59-4.18) |  | Type of OST (BUP ref MMT)- S0.33 (0.15-.072) |  | Acute pain exposure (ref unexposed)-NS0.48 (0.23-1.00) |  |  |
| Brands 2008 (42) | Retention at 2 years (60%) | DropoutCox Regression analysis | Age-NS (NR)Gender- NS (NR) | Opioid history-NS (NR)Benzodiazepine-NS (NR)Opioid and Cocaine use-S (β=0.95; p=0.008) HR 2.6 |  |  | Psychiatric treatment history-NS (NR) |  |  |
| Bukten 2014 (43) | 18 month retention rate (65.8%) | Dropout at 18 monthsCox proportional-hazards regression Hazard Ratios (95% CI) | Female – NS0.95(0.82-1.11)Age – S0.97(0.96-0.98)  | - | - | - | - | Pre-treatment offences (ref: none):Medium (1-24) offences – NS1.03(0.87-1.22)High (25+) offences - S 1.66(1.32-2.09)Drug offences in the last 30 days – S1.80(1.36-2.38) | - |
| Burns 2009 (44) | Retention1985: retention at 6 months (59%); at 12 months (50%)2000Retention at 6 months (54%); at 12 months (41%) | Dropout in the first 9 months and after 9 monthsCox proportional hazards model of leaving the first treatment episode, splitting the follow-up at 9 months (1985-2000) and 6 months (2001-2006).Hazard Ratios (95% CI) | Model 1 (1985-2000)Age(ref: <20 years) 40+ yrs - S0.45(0.42-0.49)30-39 yrs - S 0.55(0.53-0.58)20-29yrs - S 0.75(0.72-0.79)Male (ref: female): - S1.16(1.13-1.19) Model 2 (2001-2006)Age(ref: <20 years) 40+ yrs - S0.55(0.49-0.61)30-39 yrs - S 0.75(0.69-0.82)20-29yrs - S 0.84(0.77-0.91)Male (ref: female): - S1.14(1.08-1.21)  | - | Model 1 (1985-2000)Intake (ref:1985-1989) 1995-2000 – S1.24(1.19-1.28)1990-1994 – NS0.96(0.92-1.00)f**irst 9 months of treatment (ref: clinic)** Correctional facility - S0.61(0.56-0.65)Community pharmacy - S 0.68(0.64-0.72)Other - S 0.83(0.76-0.90)**after 9 months in treatment (ref: clinic)** Correctional facility - S 1.18 (1.09-1.28)Community pharmacy - S 0.86(0.80-0.92)Other – NS1.09(.99-1.20)Model 2 (2001-2006) Buprenorphine (ref Methadone) – S1.89(1.79-1.99)f**irst 6 months of treatment (ref: clinic)** Correctional facility - S0.76(0.69-0.83)Community pharmacy - S 0.44(0.38-0.50)Other - S 0.96(0.85-1.08)**After 6 months in treatment (ref: clinic)** Correctional facility - S 1.94 (1.76-2.15)Community pharmacy - S 0.45 (0.56-0.76)Other – NS0.63 (0.49-0.82) | - | - | - | - |
| Cao 2014 (45) | Retention at 6 years (35.7%)  | Dropout (follow-up time 6 years)Cox proportional hazards Hazard Ratios (95% CI) | - | Illicit drug use during treatment (ref: ≤ 10%):11-20% - S0.55(0.42-0.73)>20% - S0.63(0.52-0.76) | Dosage (ref: ≤ 30%) 31-60mg – S0.57(0.47-0.71)>60mg – S0.38(0.29-0.51) | - | - | Contact with drug users (ref: none) 1-30 – NS0.93(0.76-1.45)>30 – NS1.14(0.90-1.45)Relatives who were MMT clients (ref: no)Yes – S0.72(0.54-0.96) | - |
| Cox 2013 (46) | Retention at 12 months (72%)Retention at 3 years (63%) | Dropout (time to dropout between 2004 and 2007)Cox Proportional Hazards Regression models of (1) Involuntary discharge; (2) voluntary dischargeHazard Ratios (95% CI) | Model 1: Involuntary Discharge Sex (Female) – S0.31 (0.13-0.71)Model 2: Voluntary dischargeSex (Female) – S2.47 (1.11-5.54) | Model 1: Involuntary Discharge Use of sedatives- S3.56 (1.77-7.19)Lifetime history of opioid abuse (> 5 years) - S2.05 (1.06-3.98)Model 2: Voluntary dischargeInjecting opioids – S4.44 (1.64-11.99)Use of sedatives- S3.69 (1.61-8.47) | -  | Injecting opioids – S4.44 (1.64-11.99) | - | Model 1: Involuntary Discharge  Number of lifetime arrests >6 - S2.70 (1.14-5.17)Any personal debt – S0.44( 0.21-0.91Days of serious conflict with others (>- 1 day excluding family) - S 4.40 (2.11-9.21) | - |
| Cunningham 2013 (47) | Retention at 6 months (54%) | Retention at 6 monthsLogistic regression Odds Ratios (95% CI) | - | Prior use of illicit buprenorphine only - NS 2.92(0.95-8.91) | Prior use of prescribed buprenorphine – NS2.53(0.81-7.88)Prior use of any buprenorphine –S2.65(1.05-6.70) | - | - | - | - |
| Davstad 2007 (48) | Retention at 1 year (84%); retention at 2 years (65%)  | Dropout between 1995 and 2000Poisson Regression and Spearman’s rank order correlations | - | - | Last mean adjusted dose was significantly lower for discharged patients than for those who remained in treatment: 70mg vs. 76mg at 6 months – Sp<.000175mg vs. 84mg at 1 year – Sp<.000181mg vs. 87mg at 2 years - Sp<.05 | - | - | - | - |
| Dayal 2017(49) | Retention at 6 months (19.1%); at 12 months (11.7%) | Dropout at 2 yearsCox Regression Hazard Ratios (95% CI) | - | Benzodiazepine use (ref: no) - NS0.58 (0.21-1.60) | Buprenorphine maintenance dose - S 0.86 (0.78-0.95) | Past month injection use (yes)– S 0.31(0.14-0.66) | - | Use of substance in 1st degree relatives (ref: no) – S2.40 (1.34-4.31)Parent support (ref: no) - NS0.99(0.57-1.73) | - |
| Deck 2005 (50) | Retention NR | Retention at 12 monthsLogistic regressionOdds Ratios (95% CI) | **Oregon**Age (in 10 year increments) – S1.25(1.09-1.43)Male – S0.79(0.67-0.95)African American (vs Caucasian) – NS0.79(0.58-1.08)Hispanic (vs. Caucasian) – NS1.01(0.64-1.57)Native American (vs. Caucasian) – NS0.81(0.51-1.28) **Washington** Age (in 10 year increments) – S1.21(1.06-1.38)Male – S0.73(0.61-.88)African American (vs Caucasian) – S0.49(0.38-0.64)Hispanic (vs. Caucasian) – NS0.96(0.67-1.40)Native American (vs. Caucasian) – NS0.70(0.45-1.09) | **Oregon**Cocaine as secondary drug – S0.69(0.62-0.88) Daily opiate use in past 30 days – S0.68(0.49-0.94)Alcohol as secondary drug – NS1.03(0.84-1.26)Amphetamines as secondary drug – S0.76(0.57-0.83)Year of opiate use (log transformation – NS1.09(0.95-1.25)**Washington**Cocaine as secondary drug - S 0.64(0.54-0.76)Daily opiate use in past 30 days – S0.78(0.61-0.99)Alcohol as secondary drug – NS1.00(0.83-1.20)Amphetamines as secondary drug – NS1.01(0.70-1.45)year of opiate use (log transformation) – NS1.08(0.95-1.22) | **Oregon**Prior methadone (past 2 years) – S1.44(1.17-1.79) Prior treatment (past 2 year) – NS1.17(0.97-1.41)Self-referral – NS0.86(0.67-1.12)Stable admission cohort (vs 1994) 1995 - NS1.23(0.95-1.58)1996 – NS1.29(0.95-1.75)1997 – S1.97(1.44-2.71)1998 – S3.54(2.61-4.80)1999 – S2.85(2.06-3.93)Treatment agency referral – NS1.05(0.78-1.39)Legal referral - NS 1.10(0.56-2.15)**Washington**Prior methadone (past 2 years) – NS1.23(.97-1.56)Prior treatment (past 2 year) – NS0.99(0.82-1.19)Admission cohort (vs 1994) 1995 – NS1.01(0.79-1.29)1996 – NS1.07(0.80-1.44)1997 – S1.40 (1.06-1.86)1998 – NS1.22 (0.90 -1.67)1999 – NS 1.12(0.83-1.52) Self-referral – NS0.96(0.72-1.28)Treatment agency referral – NS1.48(0.92-2.40)Legal referral – NS 1.24(0.75-2.02)  | **Oregon**Needle use in past 30 days – NS0.84(0.61-1.16)**Washington**Needle use in past 30 days – NS0.75(0.53-1.06) | **Oregon** Disabled (vs. welfare) – S0.60(0.43-0.84)Expansion (vs welfare) – NS0.80(0.61-1.05)Other (vs welfare) – NS0.75(0.52-1.07)Mental health needs - NSU-Stable medicaid eligibility - S2.45(1.98-3.04)**Washington**Disabled (vs. welfare) – NS1.16(0.92-1.48)Expansion (vs welfare) – NSU-Other (vs welfare) – NS1.23(0.96-1.59)Mental health needs - NS 1.05(0.87-1.26)Stable medicaid eligibility - S1.64(1.32-2.05) | **Oregon**Married (vs other status – NS1.10(0.88-1.37)Never married (vs other status) – NS1.08(0.89-1.30) Not employable – NS0.83(0.67-1.04)No source of income – NS0.90(0.74-1.10) Personal home (vs other living situation) - NS 0.94(0.74-1.17) Homeless(vs other living situation) – NS0.99(0.70-1.41)Pregnant – NS0.72(0.44-1.20)Arrested (past 2 years) – S0.81(0.68-0.96)**Washington**Married (vs other status) – NS1.26(0.99-1.59)Never married (vs other status) – S1.24(1.02-1.52)Not employable – NS0.89(0.71-1.11)No source of income – NS1.08 (0.80-1.45)Personal home (vs other living situation) – NS1.06(0.81-1.40) Homeless(vs other living situation) – NS0.87(0.58-1.32)Pregnant – S0.42(0.26-0.67)Arrested (past 2 years) – S0.73(0.61-0.87)Enrolled in Alcoholism and Drug Addiction Treatment and Support Act system – S 0.54 (0.33-0.89) | **Oregon**Adjacent county (vs. county with clinic) – NS1.11(0.86-1.44)Distant country (vs county with clinic) – NS0.71(0.41-1.24)Agency provider (vs mean)A – NS0.97(0.79-1.20)B – NS0.95(0.79-1.14)C – NS0.99(0.78-1.25)D – S1.46(1.05-2.03)E – NS0.80(0.62-1.04)F – S0.42(0.33-0.54) G – S4.41(2.76-7.05)**Washington** Adjacent county (vs. county with clinic) – NS0.99 (0.68-1.29)Distant country (vs county with clinic) – NS0.75(0.43-1.31)Agency provider (vs mean) A - NS0.88(0.69-1.12)B – NS0.89(0.69-1.69)C – NS1.24(0.95-1.63)D – NS 0.78(0.54-1.15)E – S5.94(2.71-12.99) F – S0.31(0.16-0.59) |
| Dumchev 2017 (51) | RetentionRetention at 6 months (75.8%); 9 months (70.1%); 12 months (65.8%); 18 months (59.4%); 24 months (53.8%);60 months (39.6%) | Dropout (time to dropout between 2005 and 2012)Cox proportional hazards modelhazard ratio (95% CI)  | Age – NS1.00(1.00-1.00)Sex (male vs female) – NS1.00(0.94-1.07) | - | Medication type (buprenorphine vs methadone) – NS1.00(0.94-1.06)Last prescribed dose (high vs low) – S 0.57(0.44-0.75)Last prescribed dose (medium vs low) – S 0.57(0.45-0.71)Admission year:2010 vs 2011-2012 – NS 1.00(0.95-1.05)2009 vs 2011-2012 - NS0.99(0.92-1.07)2008 vs 2011-2012 - NS1.00(0.96-1.05)2007 vs 2011-2012 - NS1.01(0.88-1.17)2006 vs 2011-2012 - NS1.00(0.94-1.06)2005 vs 2011-2012 – S 3.39(2.04-5.63) | - | Last HIV test result (negative vs positive) – NS1.00(0.96-1.04)Last HIV test (not tested vs positive) – S4.44(3.10-6.35) Last HCV test result ( negative vs positive) - NS 1.00(0.92-1.08)Last HCV test result (not tested vs positive) – NS1.11(0.81-1.53)Last HBV test results (negative vs positive) - NS 0.88(0.59-1.30)Last HBV test (not tested vs positive) – NS1.12(0.80-1.57)Last TB test result (negative vs positive) – NS0.78(0.51-1.18)Last TB test result (not tested vs positive) – S3.34(2.23-5.01)  | - | Site (DPSPC vs DPGP5) –NS1.17(0.74-1.85)Site (PNDKR vs DPGP5) – NS0.82(0.53-1.26)Site (PNDN7 vs DPGP5) – NS0.93(0.69-1.25)Site (VOND1 vs DPGP5) – NS1.23(0.78-1.92)Site (VOND2 vs DPGP5) – NS1.02(0.87-1.19) |
| Eibl 2015 (52) | Retention at 1 yearNR(39.3%- 48.9%) | Retention at 1 yearLogistic regression Odds ratios (95% CI) | Southern Rural (ref: Southern Urban) – NS1.06(0.92-1.22)Northern Urban – S1.14(1.02-1.27)Northern Rural – S1.31(1.09-1.58) | - |  | - | - | - | - |
| Franklyn 2017(53) | Average retention rate at one year 43.4% | Dropout at 1 yearCox proportional hazard modelHazard Ratios (95% CI | Age - S0.98 (0.98–0.98)Gender (ref: male) - S0.77(0.70–0.84)Location: North (ref: south) – S0.59(0.54–0.66)Rural(ref: urban) - N S0.98(0.86–1.12) | First-month benzodiazepine use – S1.15(1.02–1.29) | - | - | - | - | - |
| Friedmann 2001 (54) | Retention in MMT at 1 year (49%) | Retention at 1 yearMultivariate logistic regression models Odds Ratios (95% CI) | Age per 10 years - S 1.34(1.31-1.37)Gender (ref: male): female – NS1.20(0.91-1.59)Race (ref: Caucasian):African American - S 0.69(0.49-0.97)Other – NS0.81(0.54-1.20) | Heavy alcohol use (ref: no):Yes – NS0.98(0.67-2.86)Primary drug type (other drug: ref):Heroin – NS1.01(0.67-1.52)Cocaine – NS0.69(0.39-1.22)Drug severity composite score – NS1.06(0.38-2.93) | Number prior drug treatments – NS 1.01(0.98-1.04) | - | Psychiatric severity composite score - NS 0.70(0.27-1.85)Medical severity composite score - NS 1.15(0.70-1.90)Insurance type (ref: uninsured): Private – NS1.36(0.84-2.21)Public - NS 1.10(0.79-1.55) | Any criminal status (ref: no): Yes – NS 0.99(0.74-1.33) Employment status (ref: no work):Legal work – NS (0.87 0.62-1.22)Illegal work – NS0.74 (0.51-1.07) | Provision of transportation assistance (ref: no): Yes – S2.97(2.10-4.20)Individual vouchers or payment (ref: no): yes - NS 0.96(0.71-1.29)Client capacity per 10 clients – NS 1.00(0.99-1.01)Treatment readiness score – NS1.06(0.60-1.88) |
| Gerra 2011(55) | Dropout at 12 months Clinic A (42%); Clinic B (26%); clinic C (50%)Retention at 12 months 60.66% | Dropout at 1 yearEvent history analysis Odds Ratios ( p values) |  |  | MMT Policy (Clinic A: under supervised daily consumption:Clinic B (contingent take home)-S0.535 (p=0.02)Clinic C (non-contingent take home) –NS1.144 (p=0.56) |  |  |  |  |
| Gryczynski 2014(56) | Treatment dropout at 6 months 42.1% | Time to dropout at 6 monthsCox proportional hazards modelHazard Ratio (95% CI) | Female-NS0.91 (0.63-1.32)Age-S0.95 (0.91-1.00[)[time varying covariates separate model:Age-S1.0006 (1.0002-1.0012)] | Intensive outpatient counselling (ref standard counselling)-NS0.96 (0.67-1.38)Buprenorphine dose-S0.84 (0.78-1.89)[time varying covariates separate model:Buprenorphine dose-S1.002 (1.001-1.003)] | Injection drug users-NS1.42 (0.94-2.13)Baseline positive cocaine urine-S1.71 (1.18-2.48) |  |  |  | Intended treatment duration (weeks)- NS1.004 (0.97-1.04) |
| Gu 2012 (57) | 51.3% of participants had dropped out of MMT at completion | Dropout at 18 monthsCox RegressionRisk Ratio (95% CI)  | - | -  | - | - | - | - | MMT is intended primarily for detoxification (Agree) (appropriate perception = 1): misconception - NS 2.29(0.97-5.41) After using MMT for 2-3 months one could be detoxified and can quit using MMT (Agree) (appropriate perception = 1): misconception – S3.10(1.84-5.25) MMT requires a long term or even life time treatment (disagree) (appropriate perception=1): misconception – S2.22(1.12-4.38) One should reduce the dosage of methadone as it is harmful to one’s health (agree)(appropriate response=1): misconception – S2.07(1.05-4.07) Number of items reflecting misconception (0-1=1):2-3 – S 3.80(1.26-11.49) 4 – S7.13(2.38-21.37)  |
| Haddad 2013 (58) | 56.8% retained at 6 months | Dropout at 6 and 12 monthsCox proportional hazardModel 1 (dropout at 6 months)Model 2: Dropout at 12 monthsHazard Ratio (95% CI) | **Model 1** Age-S0.96 (0.94-0.98)Female-S0.59 (0.37-0.92) | **Model 1** Baseline cocaine screen Positive-S2.18 (1.35-3.50)**Model 2**Baseline cocaine screen Positive-S3.12 (1.57-6.16) | **Model 1** Receipt of substance abuse counselling-S0.54(0.36-0.79)**Model 2**Receipt of substance abuse counselling-S0.34(0.19-0.59) |  | **Model 1** Prescribed psychiatric medication-NS0.69 (0.47-1.01)HCV Positive-S0.56 (0.36-0.86)**Model 2** Prescribed psychiatric medication-S0.36 (0.20-0.62) |  |  |
| Huissoud 2012 (59) | Retention in treatment at 1 year (69%); at 3 years (45%) | Dropout (time to dropout between 2001 and 2008)Multivariate Cox regression model Hazard Ratios (p values) | Younger than 30 years – S1.29(p = .001) Gender – NS(no figure reported)  | - | Methadone maintenance dosage reached at the beginning of treatment – NS (no figure reported)Participants in a first treatment – S 1.31 (p = .001) Methadone delivered (4 times a week) – NS p=0.52 | - | State of health as estimated by the doctor – NS (no figure reported) | No fixed abode or living in an institution/prison – S1.82 (p=.001)  | Interaction between the mode of delivery and living condition – NS(p = 0.13)Source of income – NS(no figure reported)  |
| Johns 2018 (60) | Retention at 12 months (85%)  |  Dropout at 1 year Cox regression analyses Hazard Ratios (95% CI) | **Model 1:**Age (years) (ref: 30 – 40 years) <30 years – NS1.58 ( 0.68 – 3.65) >40 years – NS0.74 ( 0.28 – 1.99) Gender (percentage female) (ref: male) – NS3.05 ( 0.41 – 22.50) |  | **Model 1:**Length of time on MMT before entering study: (ref: > 12 months to 24 months)One month or less – NS0.18 (0.03 – 1.12)Less than one month to three months – NS0.53 (0.17 – 1.67)Less than 3 months to 12 months – NS0.93 ( 0.43 – 2.02) Methadone dose at three months of MMT (mg) (ref: 60 or more)Less than 60mg – NS1.36 ( 0.56 – 3.29)Missing – NS0.47 ( 0.10 – 2.12)  |  | **Model 1:**HIV status at baseline (self-reported): positive (ref: no) – S0.24 ( 0.09 – 0.66) )  | **Model 1:**Marital status at baseline (ref: widowed/divorced/separated)Single – NS0.79 (0.30 – 2.12) Married/long-term partner – S0.29 (0.10 – 0.80) Highest education achieved at baseline (ref: secondary/high school or more)Less than secondary school – NS1.26 ( 0.51 – 3.12)Employment at baseline (ref: full-time, part-time, or self-employment) Homemaker, retired or student – S2.78 (1.54- 4.99)Not working (seeking or not) – NS0.49 ( 0.16 – 1.45) Change of employment status in year before start of study (ref: no) – NS0.83 ( 0.41 – 1.68)Size of household (baseline) – S0.83 ( 0.07 – 0.97)   | **Model 1:**Travel more than 30 minutes (one way) to MMT clinic (ref: no)Yes - NS1.50 ( 0.51 – 4.42) Amount paid for transport to MMT clinic at baseline (VND thousands) – 1.04 (0.69 – 1.57) Household expenditures at baseline (annual VND thousands) – S0.95 (0.91 – 0.99)Income below poverty line (ref: no) – NS1.17 ( 0.48 – 2.84) Clinical province had user fee policy (ref: no) – NS0.17 ( 0.02 – 1.29)  |
| Kayman 2006 (61) | Retention at 1 year (52%) | Dropout at 1 yearLogistic regressionOdds Ratios (95% CI) | Mean age – NSUFemale – NSUEthnicity (white and other, African American, Hispanic) – NSU | Cocaine use in past 30 days – NSU-Alcohol use in past 30 days – NSU-  | Been in MMT program – NREver in drug detoxification (0=no, 1=yes) – S 1.9 p=.00 | Injecting in the past 30 days – NSU- | - | Never married – NSU-Lacks high school diploma – NSU- | Opinions about methadone (1-5 low score = less favourable opinions) – S0.90 p=0.01 |
| Kelly 2011 (62) | Retention at 12 months (58.4%)  | Dropout at 1 year (starting at 3 months)Cox proportional hazards regressionHazard Ratios (95% CI) | Age – NS0.98(0.95-1.02)Gender – NS1.50(0.84-2.70) Race – NS1.21(0.56-2.60) | **Baseline variables**Smoked crack/cocaine (lifetime) – NS1.05(0.62-1.77)Alcohol composite – NS0.24(0.03-1.95)Drug composite – NS2.90(0.15-56.82) | **3 month variables**Dose – S 0.99 (0.98-1.00)Counsellor – NS 1.00 (.97 – 1.04) | - | **Baseline variables** Psychiatric composite (self-reported)– NS0.72(0.13-3.96)Medical composite (self-reported) –S0.31(0.10-0.93) | **Baseline variables**Employment composite – NS2.43(0.68-8.65)Family/social composite – NS3.45(0.56-21.38)Legal composite – S3.60 (1.03-12.63)On parole or probation – NS1.12(0.63-1.97) | **Baseline variables**Problem recognition – NS0.97(0.92-1.03)Desire for help – NS0.99(0.89-1.11)Treatment readiness –NS1.08(0.99-1.18)**3 month variables**Treatment satisfaction – S0.91(0.84-0.99)Problem recognition – NS1.04(0.99-1.09)Desire for help – NS0.94(0.85-1.03)Treatment readiness –N S0.98(0.91-1.04) |
| Lambdin 2014 (63) | Retention at 6 months (67%); 12 months (57%); and 24 months (48%) | Dropout (time to dropout between 2011 and 2013)Cox proportional hazards Hazard Ratios (95% CI) | Age (ref: ≤ 25):26-35 - S0.35(0.23-0.52)36-45 – S0.25(0.16-0.39)>45 – S0.11(0.03-0.38)Gender (female) 0.50 (0.28-0.90) | - | Methadone dose at initiation (ref:<40mg)40-85mg - S 0.50(0.37-0.68)>85mg – S0.41(0.29-0.59)  | Risky sexual behaviour in the last 6 months – NS1.29(0.99-1.68) | Any history of sexual abuse – S2.84(1.24-6.51) | - | - |
| Ledgerwood 2019 (64) | NR  | Retention (days retained between 2002 and 2009)Multiple Linear regression analyses Beta (P values) | African American – NS0.07 (0.398)≥ high school education – NS-0.05 (0.446) | Early opioid use onset ( < 21 years) - NS-0.06 (0.334)Past year cocaine use disorder – S-0.26 (<0.001) |  | Injection use – NS -0.06 (0.371)   | Hepatitis C positive – NS0.01 (0.927) |  |  |
| Lin 2013(65) | Retention at 6 months (61.5%); 12 months (41.6%; 18 months (32.3%) | Dropout at 18 months(from 3 months)Cox proportional hazards modelHazard Ratios (95% CI)  | Model 1: Age – NS0.99 (0.96–1.01)Male – NS1.34 (0.87–2.16)Location - NSModel 2:Age – NS1.00(0.98-1.04)Male – NS1.33(0.72-2.66)Location - NSRace - NS | Model 1:Severity of heroin dependence on the Chinese Version of the Severity of Dependence Scale (SDS) – NS0.96 (0.91–1.01)Harmful impact of heroin use on the Questionnaire for the Harm of Opioid Use (Q-HOU) - S1.04 (1.00–1.07)Lifetime methamphetamine use – NS1.01 (0.75–1.37)Age of initial heroin use – NS1.02 (0.99–1.05)Model 2:Severity of heroin dependence on the Chinese Version of the Severity of Dependence Scale (SDS) – NS0.95(0.87-1.02)Harmful impact of heroin use on the Questionnaire for the Harm of Opioid Use (Q-HOU) - S1.05(1.00-1.11)Lifetime methamphetamine use – NS0.98(0.65-1.50)Age of initial heroin use – NS1.00(0.97-1.04) | Model 1:Being compulsory to receive MMT by the court – NS1.34 (0.86–2.18)Model 2:Methadone dose at 3 months after starting MMT - S0.99(0.98-1.00)Being compulsory to receive MMT by the court – NS1.26(0.69-2.25) | - | Model 1:Clinical diagnosis:Severity of depression on the Center for Epidemiological Studies –Depression Scale (CES-D) – NS1.01 (0.99–1.02)Positive serum HIV antibody test – NS0.76 (0.47–1.19)TB +/- nsModel 2:Clinical diagnosis:Severity of depression on the Center for Epidemiological Studies –Depression Scale (CES-D) – NS1.00(0.98-1.02)Positive serum HIV antibody test – NS0.96(0.54-1.62)TB +/- ns | Model 1:Unmarried or divorced – NS0.87 (0.60–1.30)Regular employment - NS 0.98 (0.74–1.30)Education level less than or equal to 9 years - NS 0.87 (0.65–1.16)Family support on the Family APGAR index – S 0.96 (0.93–1.00Prior criminal records – NS0.99 (0.73–1.34)Model 2:Unmarried or divorced – NS0.72(0.43-1.27)Regular employment - NS 0.84(0.58-1.23)Education level less than or equal to 9 years - NS 0.95(0.65-1.40)Family support on the Family APGAR index – NS 0.97(0.92-1.02)Prior criminal records – NS1.23(0.81-1.85) | Model 1:High monthly cost of heroin – S1.43 (1.07–1.91)High economic burden related to heroin use – NS1.1 (0.81–1.49)Advantages of heroin use on the Decision Balance Scale (DBS) – NS1.00 (0.96–1.04)Disadvantages of heroin use on the DBS - NS 0.99 (0.96–1.02)Travel time to MMT – NS1.00 (0.99–1.01)Acceptable weekly expense for receiving MMT – NS1.00(1.00-1.00)Acceptable daily time spent receiving MMT – NS1.10 (0.94–1.27)Unfavourable attitudes towards MMT on the Client Attitudes toward Methadone Programs Scale (CAMP)- NS0.97 (0.90–1.05)Pre-contemplation stage on the Readiness to Change Questionnaire (RCQ-12) – NS1.02 (0.95–1.09)Contemplation stage on the RCQ-12- NS1.02 (0.96–1.07)Action stage on the RCQ-12 – NS1.00 (0.93–1.08)Model 2:High monthly cost of heroin – NS1.27(0.86-1.87)High economic burden related to heroin use – NS1.10(0.74-1.66)Advantages of heroin use on the Decision Balance Scale (DBS) – NS1.03 (0.97-1.08)Disadvantages of heroin use on the DBS - NS 1.01(0.97-1.06)Travel time to MMT – NS0.99(0.98-1.00)Acceptable weekly expense for receiving MMT – NS1.00(1.00-1.00)Acceptable daily time spent receiving MMT – NS1.09(0.87-1.33)Unfavourable attitudes towards MMT on the Client Attitudes toward Methadone Programs Scale (CAMP)- NS0.99(0.89-1.10)Pre-contemplation stage on the Readiness to Change Questionnaire (RCQ-12) – NS1.03(0.94-1.13)Contemplation stage on the RCQ-12- NS0.98(0.91-1.06)Action stage on the RCQ-12 – NS0.96(0.87-1.07) |
| Lin 2015 (66) | Retention at 6 months (73.3%); 12 months (61.1%); at 18 months (48.9%) | Dropout at 18 monthsCox multivariate regression Hazard Ratios (95% CI) | Age – NS1.01 (.98-1.04)Age at first heroin use – NS0.99(0.95-1.04) Gender (male) - S0.45(0.21-0.96)  |  | methadone dose after 30 days (mg) S0.99 – S (0.98 - 0.99),Program site (new Tapei city) - S2.84 (1.06 -7.58)Program site (Keelung city) – NS0.59(0.23 - 1.52)program site(Yilan city) – NS2.8(0.96-8.73) |  | HIV sero-status (positive) - NS0.55 (0.25 - 1.22)HCV stero-status (positive) - S3.91 (1.01-15.12) | Incarcerated during study period (no) – S0.44 (0.25 - 0.76)Education (at least 9 years) – NS1.05 (0.61 - 1.79)Employed (yes) - NS0.76(0.40 - 1.44)Marital status (single) - NS 1.28 (0.50 -3.30)Marital status(divorce/widowed)- NS 1.79(0.89 - 3.60) | House to clinic distance(km) – S1.08 (1.04-1.13) |
| Liu 2017 (67) | Dropout within 12 months (21%) | Dropout at 12 monthsCox regression model Hazard Ratios (95% CI) | - | Over-drinking alcohol (ref: no) - NS1.17(0.72-1.92)Drinking frequency (ref: never) at least once – NS0.84(0.54-1.29)Drinks on a typical day when drinking (ref: 1-2 drinks): > 3 drinks – NS1.38(0.71-2.69)Frequency of having 6 drinks or more on one occasion when drinking (ref: never) at least once – NS1.94(1.00-3.78)Use of methamphetamine in the last 6 months (ref: no) – S2.26(1.15-4.43)Use of MaGU ( methamphetamine and caffeine) in last six months (ref: no) – NS1.79(0.55-5.80)Use of ketamine in the last six months (ref: no) – NS0.91(0.12-6.78)Use of ecstasy in the last six months (ref: no) – NS 1.63(0.22-12.23)Use of any club drugs in the last 6 months (ref: no) –S1.90(1.01-3.56)Age of first drug use – NSUUse of triazolam in the last 6 months (ref: no) –NS 1.51(0.21-10.97) | No. of times compulsory drug detoxification three times or more versus never – S0.36(0.16–0.83) | - | - | Current marital status: divorced or other (ref: single) – S2.10(1.13-3.89) (data not tabulated) | - |
| Manhapra 2017 (68) | Retention > 1 year (61.6%); retention for > 3 years (31.8%) | Dropout (follow-up 3 to 4 years)Cox proportional hazard analysis Hazard Ratios (p values)  | Black race – S1.26 ( p=0.003 |  |  |  | Charlson comorbidity index – S1.03 p=0.013) (Visits to the emergency room during FY 2012 – S1.03 p<0.0001 |  |  |
| Manhapra 2018 (69) | 45% retained in treatment for more than one year; 13.7% retained at > 3 years | Dropout (follow-up 3 years)Cox proportional hazards model Hazard Ratios (95% CI) | Above median age of 31 years – S0.82 ( 0.80 – 0.85)**Model 2:**Above median age of 31 years – S0.90( 0.87 – 0.93) | Any substance use under disorder diagnosis – S1.06 ( 1.02 – 1.10)**Model 2:**Any substance use under disorder diagnosis – S1.05 ( 1.01 – 1.10) |  |  | Inpatient mental health treatment in fiscal year (FY) 2011 – S1.20 ( 1.19 – 1.30)Emergency department visits in FY 2011 - S1.10 (1.06 – 1.14)Any psychiatric diagnosis – S1.05 (1.01 – 1.09)Any psychotherapy in FY 2011 – S0.86 ( 0.83 – 0.89)**Model 2:**Inpatient mental health treatment in fiscal year (FY) 2011 – S1.30 ( 1.24 – 1.36)Emergency department visits in FY 2011 - S1.07 (1.04 – 1.14)Any psychiatric diagnosis – S1.05 (1.01 – 1.10)Any psychotherapy in FY 2011 – S0.90 ( 0.86 – 0.92) |  | **Model 2:** Each 30 days of insurance enrolment after buprenorphine initiation – S0.90( 0.90 – 0.91)  |
| Meshberg – Cohen 2018 (70) | Retention at 6 months (64%) | Retention at 6 monthsLogistic regression model Odds Ratios (95% CI | Age – S1.04 ( 1.01 -1.08) | Heroin use – S 0.26 ( 0.11 – 0.64) |  |  | PTSD diagnosis + PTSD treatment – S43.36 (8.10 – 232.06)No PTSD diagnosis – NS2.20 (0.86 – 5.70) |  | Service connection status – NS0.95 (0.39 – 2.29) |
| Monico 2015 (71) | Retention NR | Retention at 6 monthsLogistic regression Odds Ratios (95% CI) | Age (in years) – NS1.00(0.97-1.04)Gender (ref: female) – NS0.93(0.57-1.52) | Co-occurring cocaine use (ref: no) – S0.48(0.29-0.80)Prior illicit buprenorphine Use (ref: no) – NS2.09(1.23-3.56) | Prior buprenorphine treatment (ref: no) – NS1.03(0.62-1.69)Clinic site (ref: site 1) – NS 0.97(0.59-1.61) | - | - | - | - |
| Montalvo 2019 (72) | Retention at one year (52.6%); at 2 years (35.5%)  | Retention at 1 and 2 yearsModel 1: Multiple logistic regression of retention at 1 yearModel 2: Multiple logistic regression of retention at 2 yearsOdds Ratios (95% CI) | **Model 1:**Age – NS* 1. (0.98 – 1.04)

Gender (ref: male) – NS0.95 (0.54 – 1.67) Ethnicity (ref: white)Black/African-American – NS1.71 ( 0.67 – 4.39)Hispanic/Latino – NS0.51 (0.12 – 2.17)Denied/not available – NS0.81 (0.31 – 2.09)Other – NS2.73 (0.08 – 88.46) **Model 2:** Age – NS * 1. (0.99 – 1.05)

Gender – S2.08 (1.16 – 3.73)Ethnicity (ref: white)Black/African-American – NS2.28 ( 0.92 – 5.64)Hispanic/Latino – NS0.78 (0.15 – 4.17)Denied/not available – NS1.56 (0.59 – 4.12)Other – NS11.55 ( 0.24 – 551.23)  | **Model 1:**Stimulant use disorder – NS1.13 (0.56 – 2.31)Alcohol use disorder – NS1.36 ( 0.63 – 2.92) Nicotine use – S2.40 (1.35 – 4.27) Other substance use order – NS1.51 (0.86 – 2.67) **Model 2:** Stimulant use disorder – NS0.57 (0.28 – 1.18)Alcohol use disorder – NS1.18 ( 0.56 – 2.49) Nicotine use – S2.00 (1.13 – 3.52) Other substance use order – NS1.46 (0.79 – 2.70) |  |  | **Model 1:**Depressive order – NS2.16 (0.99 – 4.70)Other mood disorder – S3.42 ( 1.95 – 5.98)PTSD – NS* 1. ( 0.56 – 1.89)

Co-prescription of medications with buprenorphine:Benzodiazepines – S2.44 (1.30 – 4.56)Clonidine – NS1.29 ( 0.64 – 2.60)Gabapentin – NS1.42 ( 0.81 – 2.47) Stimulants – NS1.31 (0.67 – 2.54) **Model 2:** Depressive order –S4.61 (1.49 – 14.29)Other mood disorder – S3.60 ( 1.88 – 6.88)PTSD – NS1.28 ( 0.70 – 2.35)Co-prescription of medications with buprenorphine:Benzodiazepines – NS1.74 (0.94 – 3.25)Clonidine – NS1.18 ( 0.58 – 2.37)Gabapentin – NS1.15 ( 0.64 – 2.06) Stimulants – NS1.34 (0.68 – 2.64)  |  |  |
| Mullen 2012 (73) | Retention at 12 months (60.7%)  | Retention at 12 monthsLogistic regression Odds Ratios (95% CI) | Gender (ref: female) – S 1.40(1.00-2.00) Age -NSU | - | Facility type (ref: primary care setting): Specialist treatment centre – S2.00(1.20-3.50) Community treatment centre – NS1.20(0.80-1.70)Average methadone dose (ref: 60mg or more):59mg or less – S3.0(2.2-4.0) | Injecting drug use - NSU-  | - | - | - |
| Nosyk 2009 (74) | Retention at 6 months (55.5%); at 12 months (42%); at 24 months (29.5%) | Proportional hazards frailty models to assess time to discontinuation from recurrent MMT episodesHazard Ratio (95% CI) | Gender (ref male) –NS0.987 (0.955-1.019)Age at treatment entry (ref <40 yrs)- S0.872 (0.842-0.902) |  | Mean daily dose methadone (ref 40-<60)<40 mg-S1.207 (1.161-1.255)60-<80-S0.70 (0.674-0.729)80-<100- S0.539 (0.514-0.564)100-<120-S0.441 (0.414-0.469)>120-S0.377 (0.351-0.405)Episode Number (ref. 1)2- S0.871 (0.843-0.901)3-S0.839 (0.803-0.878)4-S0.801 (0.754-0.850)5-S0.833 (0.77-0.902)>6-S0.791 (0.732-0.856)Adherence (ref >90%)70-90%- S2.289 (2.213-2.366)<70%-S6.835 (6.534-7.150) |  | Clark Chronic disease score (ref 1)2- S0.927(0.890-0.965)3-S0.901( 0.863-0.940)4-S0.904 (0.865-0.944) | Education –S1.004 (1.002-1.005)Employment-NS0.998 (0.994-1.001)Income-S1.003 (1.001-1.005) | Quartile of prescriber patient load (ref 1)2- NS0.976(0.938-1.015)3-S0.935 ( 0.898-0.974)4-S1.074 (1.030-1.121)Calendar year – S 0.98 (0.97-0.99) |
| Peles 2008 (75) | Retention at 6 months:Tel Aviv (83.5%); Las Vegas (78.5%)Retention at 1 year:Tel Aviv (74.4%); Las Vegas (61.6%) | Retention at 1 yearLogistic regression Odds Ratios (95% CI)Dropout (follow up 1-10 y in Tel-Aviv 1-4 y in Las Vegas)Cox PH modelHR (“OR”) | **Tel-Aviv Clinic** Older age – S1.80(1.10-2.90)Cox model**Tel-Aviv Clinic**Age – NS NR**Las Vegas Clinic**Age 30 years or more on admission – S2.2 (1.4–3.6) | **Las Vegas Clinic** No amphetamines on admission – S2.10(1.05-4.02)**Las Vegas Clinic**Amphetamines and cannabis use on admission – NS NR | Cox model**Tel-Aviv Clinic** Methadone dosage ≥ 100 mg/day after 1 year – S 2.1 (1.6–2.9) **Las Vegas Clinic**Methadone dosage ≥ 100 mg/day after 1 year –S1.8(1.3–2.5) | Cox model**Tel-Aviv Clinic**No urine illicit opiates after 1 year – S2.3 (1.7–3.1) No urine illicit benzodiazepines after 1 year – S 1.4 (1.0–2.0)**Las Vegas Clinic**No urine cocaine after 1 year – S 1.4 (1.0–1.9)No urine amphetamines after 1 year – S 1.7 (1.1–2.7) |  **Las Vegas Clinic** Sera-positive HCV – S2.40(1.10-5.30)TB +/- - N/A | **Las Vegas Clinic** Having Children – S1.90(1.10-3.30) | - |
| Peles 2018 (76) | RetentionOverall length of retention in treatment – 7.9 years (95% CI 7.4 – 8.5) | Retention at 24 yearsCox multivariate analyses Hazard Ratios (95% CI) | Age ≥ 30 years (vs. < 30 years) – S1.4 (1.1 – 1.7) | No opiate abuse after 1 year (vs. opiate abuse) – S1.8 ( 1.5 – 2.1)No benzodiazepine abuse after 1 year (vs. benzodiazepine abuse) – S1.7 ( 1.4 – 2.1) | Methadone ≥ 100mg/day (vs. ≤ 100mg/day) – S1.8 (1.5 – 2.2) |  | Axis I psychiatric diagnosis or none (vs. Axis II only) – S1.9 ( 1.6 – 2.3)Not admitted from hospital (vs. admitted from hospital) – S1.6 (1.2 – 2.0)  |  |  |
| Perreault 2005 (78) | Retention at 6 months (72%)  | Dropout at 6 monthsCox proportional hazards modelHazard Ratios (95% CI) | Age - NSU-Gender (female) – NS1.69 (0.79-3.60)  | >8 days of cocaine consumption in 30 days before treatment - S2.17(1.02-4.64)Cocaine dependence – NS1.12(0.52-2.40)Duration of heroin consumption – NSU-Daily usage of heroin 30 days before treatment (yes/no) - NSU-Daily usage of heroin 30 days before treatment (in days) – NSU- | - | Working in the sex trade – NS1.70(0.85-3.35)Use of unclean needles – NSU-  | - | No stable income – NS2.07(0.65-6.54)Homelessness – NSU-Legal problems – NSU- | - |
| Perreault 2015 (77) | Retention at one year (78%)  | Retention at one year Logistic regression Odds Ratios (95% CI) | Age – NS1.01(0.94-1.09)Male – NS0.93(0.26-3.38) | - | Methadone dose – S1.04(1.01-1.07) | - | Clinical diagnosis:Psychological distress – NS1.05(0.97-1.13)  | Number of criminal charges – S0.97(0.96-0.99)  | Stages of change:Contemplation – NS1.10(0.33-3.64)Self-esteem – S0.85(0.74-0.97) |
| Proctor 2015 (79) | Retention at 6 months (46.8%); at 12 months (20.3%) | Dropout (treatment discharge) at 6 and 12 monthsLogistic regression Model 1( 6 months); Model 2 (12 Months)Odds Ratios (95% CI) | **Model 1: 6 month** Ethnicity - NR**Model 2: 12 months** Age- NRGender- NR | **Model 1: 6 month** Intake cannabinoids - NS0.91(0.67-1.23)Intake benzodiazepine - NS 1.33(0.98-1.80)Intake cocaine - S1.79(1.18-2.72)Intake amphetamines - NS1.57(0.92-2.69)**Model 2: 12 months** Intake cannabinoids - NS1.39(0.73-2.65) 6 month cannabinoids - NS1.78(0.78-2.64)Intake benzodiazepine - NS1.18(0.66-2.11)6 month Benzodiazepines - NS1.19(0.55-2.58)Intake cocaine - S3.71(1.35-10.17)6 month cocaine UDS+ - NS1.27(0.39-4.18)Intake amphetamines NS1.61 (0.50-5.24)6 month amphetamines - NS2.91(0.84-10.12)6 months opioids S 2.13 (1.10-4.12) | **Model 1: 6 month** Average daily methadone dosage - NR**Model 2: 12 months** Average daily methadone dosage - NR | - | - | **Model 1: 6 month** Employment status- NRMarital status- NR**Model 2: 12 months** Method of payment - NR | - |
| Ren 2013 (80) |  | Dropout (follow-up 3 to 5 years)Cox proportional hazards regression Hazard Ratios (95% CI) | Age (ref: greater than or equal to 50 years): <30 – S1.41(1.16-1.71)30-39 - S1.37(1.15-1.63)40-49 - NS 1.15(0.98-1.38) | Urine test (ref: opiate-negative): positive – S1.69(1.51-1.89) | Average methadone dose at stable stage (ref: >65mg/day): ≤35mg – S1.39(1.19-1.63)36-50mg – S1.36(1.18-1.56)51-65mg - S1.20(1.03-1.39)Methadone dose change over time (ref: stable): tapering – NS1.07(0.90-1.27)Increasing – S 0.57(0.49-0.67)Unknown - S 12.77 (11.09-14.71) | Needle sharing (ref: no): yes – S1.29(1.06-1.58)  | - | Education (ref: senior high school and above):Elementary and below – S1.48(1.17-1.87)Junior high school – NS1.00(0.90-1.10) | - |
| Ruadze 2016 (81) | Retention at 6 months (86%); 9 months (85%); 12 months (83%) | Retention at 9 and 12 monthsLogistic regression of retention at 9 months (model 1); retention at 12 months (model 2) Odds Ratios (95% CI) | **Retention at 9 months:**  Age (>40 vs. ≤ 40 years) - S2.33(1.53-3.55) Age (cont. variable) - S 1.06(1.05-1.09)Gender (male vs. female) – S3.18(.1.26-8.00)**Retention at 12 months:** Age (>40 vs. <= 40 years) – S2.37(1.55-3.64)Age (cont. variable) - S 1.06(1.04-1.10)Gender (male vs. female) – NS2.48(0.95-6.48) | - | - | - | - |  - | - |
| Saloner 2017 (82) | Retained in treatment for at least 6 months (41%)  | Retention at 6 monthsLogistic RegressionOdds ratio (95% CI) | Age (ref: 18-34):35-49 yrs – S1.16(1.09-1.23)>50 yrs – NS1.04(0.96-1.13)Female – S0.88(0.84-0.93)State of pharmacy (ref: Arizona) (used for location of patient)California – NS1.47(0.93-2.32)Florida – NS1.31(0.82-2.08)Georgia – S1.77(1.12-2.79)Louisiana – S1.94(1.23-3.08)Maryland – S2.48(1.57-3.9)New jersey – S2.37(1.44-3.91)New York – S2.79(1.8-4.33)Pennsylvania – S2.2(1.41-3.43)Texas – S1.81(1.15-2.84)Washington – S2.17(1.38-3.39)Other states – S1.86(1.19-2.9) Non-minority population (standardised) - NS1.10(1.04-1.16) | - | Majority payer (ref: cash)Medicaid fee-for-service – S0.35 (0.31-0.39) Medicare part D – S0.33(0.30–0.37) Third-party commercial – S0.41(0.39-0.44)Majority prescriber (ref: Primary care physician):Psychiatrist – NS1.00(0.92-1.10)Other provider - S 0.73(0.68-0.79) | - | - | County median income (standardised) – NS1.02(0.98-1.07) | Metropolitan status (ref: non-metro)Large (>1 million people) – NS0.90(0.79-1.03)Medium (>250k-1 million) – NS0.95(0.83-1.09)Small (100-250k) - NS 1.1(0.95-1.27)County opioid overdose death rate (ref: >18.1 per 100K):<10 deaths per 100k – NS0.93(0.83-1.03)10.1-14 deaths per 100k – NS0.93(0.83-1.04)14.1-17.9 deaths per 100k – NS1.01(0.91-1.12)Crossed county lines for treatment – S0.92(0.87-0.97)Primary care physician to population ratio (standardized) – NS1.03(0.98-1.08)DEA waivered ratio (standardized) – NS1.00(0.96-1.04) |
| Sarasvita 2012 (83) | Retention at 6 months (61.3%)  | Dropout (follow-up 6 months)Cox proportional hazards modelHazard Ratios (95% CI) | Age – S0.91(0.85-0.97) | Lifetime heroin use – NSU- | Dose – S0.49(0.28-0.84)Take Home Dose (THD) – S0.91(0.85-0.97)Previous Clinical experience – NS0.60(.32-1.13)Interaction between clinic and experience and THD – S1.07(1.00-1.15)Perceived accessibility - S 0.95(0.92-0.98)Expense of methadone treatment – NSU-Treatment need - NSU-Pressure for treatment – NSU-Self-efficacy - NSU-Treatment participation – NSU- | - | - | Perceived peer support – S 1.10(1.02- 1.19)Family support - NSU-Imprisonment – NSU-  | Belief to the program – S0.93(0.87-0.98) |
| Schuman-Olivier 2013 (84) | Retention at 12 months (40%) | Retention at 12 monthsLogistic regression Odds ratios (95% CI) | age - NR |  No difference in 12 month retention based on past-year BZD misuse; BZD prescription; or combination (OR not reported) | - | - | - | - | - |
| Shakira 2017 (85) | 60.1% retention at 1 year  | Dropout at 1 yearCox proportional regression Hazard Ratios (95% CI) | Sex -NSU | Lifetime on illicit drugs – NSURelapse on illicit drugs during MMT - NSU | Level of maintenance dose (ref: low dose <30 mg)Intermediate dose 30-59mg – NS0.55 ( 0.25 – 1.21)High dose > 60 mg – S0.24 ( 0.09 – 0.63)Take away dose (ref: no) – S0.18 ( 0.11 – 0.30) |  |  | Employment status (ref: none)Part time – NS 0.68 (0.39 – 1.20)Full time – S0.50 ( 0.27 – 0.94) |  |
| Shcherbakova 2018 (86) | Retention at 6 months (53.6%); at one year (40.4%) | Retention at 1 yearLogistic regression analysisOdds Ratios (95% CI) | Age – S 1.04 (1.01 – 1.06)Male – NS 0.83 ( 0.44 – 1.58) | Non – opioid substance use disorder – NS0.85 ( 0.44 – 1.63)Addiction treatment specialist (ref: yes) – S0.40 (0.21 – 0.76)Pre-index exposure to prescription opioids – NS1.44 (0.78 – 2.63) | Year of therapy initiation (ref: 2013):2010 – NS1.89 (0.69 – 5.14)2011 – NS1.39 (0.57 – 3.39)2012 – NS0.98 ( 0.49 – 1.98)2014 – NS1.09 (0.46 – 2.60) |  | Charlson Comorbidity Index ≥ 1 – NS0.73 ( 0.35 – 1.54)Mental health disorder – NS1.36 (0.66 – 2.80)Concomitant antidepressants – NS1.04 (.056 – 1.94)Concomitant benzodiazepines – NS1.17 (0.57 – 2.41)Concomitant clonidine – NS0.78 (0.36 – 1.69)Concomitant prescription opioids – S0.25 (0.12 – 0.51)Concomitant anticonvulsants – NS0.81 (0.35 – 1.89)Concomitant antipsychotics – NS1.05 (0.36 – 3.10)Concomitant stimulants – NS0.33 (0.11 – 1.01)Concomitant hypnotics – NS1.97 (0.42 – 9.28)All-cause ER admissions – NS0.59 (0.31 – 1.12)All-cause inpatient hospitalisation – S0.34 (0.12 – 0.76) |  | Insurance (ref: Medicaid) – S0.33 ( 0.13 – 0.84) |
| Socias 2018 (87) | Retention at 6 months (52.6%); 12 months (38.5%); and 18 months (31.5%) | Retention at 6 monthsGeneral linear mixed effects analyses of association between ≥daily cannabis use and retentionOdds Ratios (95% CI)  | Age (per year older) – S1.05 (1.04 – 1.06)Gender (male) – NSUEthnicity (Caucasian) – NSU | ≥ Cannabis use – S1.21 (1.04 – 1.41)≥ daily heroin injection – S0.25 (0.22 – 0.29)≥ Daily prescription opioid use – S0.37 (0.29 – 0.47)≥ Daily cocaine injection – NSU≥ Daily crack use – NSUHeavy alcohol use – S1.13 (1.00 – 1.26) | Calendar year of OAT initiation – NSU  |  | HIV positive - NSU | ≥ High school education – NSUHomeless – NSUIncarceration – NSU |  |
| Stein 2005 (88) | Retention at 6 months (58%) | Dropout at 6 monthsLog-rank test  | Race (Caucasian) – NSP=.095Age –NSGender – NS | Cannabis use in last 30 days – NSp=.151Benzodiazepine use – NS p=1.00 Cocaine use in last 30 days - NS p=.714Primary drug heroin– NSp=.195 Alcohol use in last 30 days - NS p=.476 | Current methadone – NSp=1.00Methadone dose – Nsp=.696Mean counselling session/week – Sp=.001 Attended any counselling – Sp=.005  | - | HIV+ - NSp=.290Week 1 positive opiate test (positive) – Sp=.002 Mean percentage opiate test – Sp=.002  | Marital Status – N/AEmployed (part or full time) less likely to drop out 30% vs 72.7% – Sp=.029 Lives with active user – NS p= 1.00Lives with children – NSp=.125Insurance type – private – NSP= .378 | - |
| Strike 2005 (89) | Retention at 2 years (49.8%) | Retention at 2 yearsLogistic regression Odds Ratios (95% CI) | Age - S1.09(1.05-1.13)Age squared - S0.999(0.98-0.99)Age x group practice – S 0.98(0.98-0.99) | - | Group practice – S  4.19(2.76-6.35)Group practice and correctional - S5.57(4.25-7.30)Group practice and individual practitioner - S6.16(4.89-7.74)Individual practitioner and correctional - S3.09(2.41-3.95)Group practice, individual practitioner and correctional - S7.51(5.49-10.28) Clinic x South region - S2.43(1.07-5.55)Clinic x East region - S3.41(2.32-5.22)Clinic x North region - S0.39(0.17-0.89) | - | - | - | Central East – S 0.80(0.71-0.91)Central South – S0.79(0.67-0.93Central West - S1.27(1.09-1.47) East - S0.53(0.42-0.65)North - S1.76(1.31-2.36)Episode - S0.79(0.74-0.86)Sex x group practice/independent – S2.38(1.09-5.21)Sex x group practice/correctional/independent – S1.54(1.05-2.27) |
| Sullivan 2013 (90) | Dropout at 6 months (53%); at 12 months (66%) and 24 months (77%) | Retention (time on treatment – follow-up 2 years)Accelerated failure time frailty modelsTimes Ratios (95% CI) | Gender (ref: female) – S0.80(0.77-0.83)Gender x dose (greater than or equal to 60mg) – S  0.92(0.86-0.98)Ethnicity (ref: Han): non-Han – NS1.03(0.99-1.08)  | No of years using drugs – NS1(1.0-1.0)Drugs used (ref: heroin only) Other/mixed – S1.35(1.24-1.46) | Median dose in final week (ref: <60 mg): >= 60mg/day – S2.12(1.96-2.30)Age started MMT - S 1.02(1.01-1.02)Mean attendance (ref: 2 days or less per week (p/w)) 3 or 4 days p/w – S0.67(0.58-0.76)5 or more days p/w – S0.26(0.24-0.29)Dose x attendanceDose >= 60mg/day x 3 or 4 days/week – NS1.05(0.99-1.13)Dose >= x >= 5 days/week – S 1.36(1.27-1.45)Opiate test result prior to dropout or censoring (ref: positive) – S2.15(2.03-2.27)Dose x opiate test result – S0.93(0.88-0.98)Opiate test result x attendance (3 or 4 days p/w) – S1.51(1.42-1.62)Opiate test result x attendance (more than or equal to 5 days p/w) – S4.45(4.15-4.76)Counsellor on staff – NS1.05(0.99-1.10) | Injection drug use in 6 months prior to MMT (ref: no) – NS0.98 (0.96-1.01) | HIV status (ref: negative) – NS0.95(0.90-1.01)Positive on ART- NS1.15(0.98-1.36)HCV status (ref: negative) – NS0.99(0.97-1.02) | Marital status (ref: single) Married/cohabit – S1.06(1.03-1.09) Divorced – NS0.99(0.95-1.03) Widowed – NS0.91(0.75-1.09) Other - NS 1.06(.80-1.41)Employment status (ref: unemployed) – NS1.02(0.99-1.05) Education (ref: illiterate) Primary – NS1.03(0.95-1.12)Junior high - S 1.15(1.06-1.25)Middle or high school – S1.28(1.17-1.39) Junior college or higher – S1.40(1.25-1.56) Dwelling (ref: family) Friends – S0.92(0.87-0.97)Alone – S0.91(0.88-0.94)Other – NS0.76(0.53-1.08)Engagement in drug related crimes (ref: none reported)Any – S0.94(0.90-0.98) | Commute (less than or equal to 10 mins=0)10-30 – NS0.97(0.92-1.03)31-60 – S0.89(0.83-0.96)>60 – S0.83(0.75-0.91)Commute x Attendance: Less than or equal to 10 mins x 3-4 days p/w – S1.48(1.25-1.75)10-30 mins x 3-4 d/w or less than 10 mins x 5 d/w – S1.43(1.27-1.63)31-60min x 3-4 d/w – S1.36(1.18-1.58)Greater than 60 min x 3-4 d/w S1.27(1.16-1.40)31-60 x 5 d/w – S1.23(1.10-1.37) |
| Teoh 2017(91)  | Retention at 1 year (94%) and 3 years (82%)  | Dropout (follow-up 10 years)Cox proportional hazards regression Hazard Ratio (95% CI) | Age – NSUEthnicity – NSU | Other substance use in the month prior to MMT (ref: no): - NS1.90 (0.97 – 3.73)Quantity/frequency of heroin use in the month prior to MMT (OTI score) – NSU | Methadone dose (ref: < 40mg/day):40 – 79mg/day – NS 0.79(0.33 – 1.89)≥ 80mg/day – S0.23 (0.09 - 0.55)Frequency of urine positivity within a year after initiation of MMT - NSU | Sexual partner – NSUHIV risk-taking behaviour (OTI score) – S1.06 (1.01 – 1.12) | HIV positive – NSUHepatitis C – NSUHepatitis B – NSUOther medical illness – NSUHealth (OTI score) – NSU Physical health (WHOQOL – BREF score) – NS Psychological (WHOQOL – BREF score) – NS0.97 ( 0.86 – 1.08)Overall quality of life and general health (WHOQOL – BREF score) - NSU  | Social functioning (OTI score)- NSUEducation level – NSUEmployment – NSUCrime (OTI score) – NSUSocial relationships (WHOQOL – BREF score) – NSU Environment (WHOQOL – BREF score) - NS0.97 (0.88 – 1.08) |  |
| Wei 2013(92) | Cumulative retention rates at 1 year (87%); at 2 years (76%); at 3 years (66%); at 4 years (59%); at 5 years (49%); at 6 years (43%) | DropoutCox proportional hazard regression (adjusted for difference across clinics)Odds Ratio (95% CI) | Female-S0.75 (0.67-0.84)Age – S0.86 (0.80-0.91) | Drug use history of > 6 years- S0.92 (0.88-0.97)Positive urine tests (morphine)-S0.34 (0.31-0.37) | Year of entry into treatment (ref 2006)2007-S1.58 (1.37-1.82)2008-S2.57 (2.22-2.99)2009-S3.36 (2.84-3.99)2010-S4.74 (3.84-5.84)2011-S5.46 (3.99-7.48)Therapeutic dose (ref dose <30)Dose >30- S0.81 (0.76-0.87) | Needle sharing-S0.86 (0.76-0.99) |  | Living status (ref with family)With friends-S1.45 (1.14-1.84)Living alone-S1.12 (1.00-1.26)Being employed-S0.93 (0.87-0.98) |  |
| Weinstein 2017 (93) | Retention for ≥ 1 year (45.7%) | Retained in treatment for ≥ 1 yearGeneralized estimating equations (GEE) Logistic regression modelOdds ratio (95% CI) | Age at enrolment – S1.19(1.05-1.34) per 10 year increase Gender (ref: male) – S1.55 (1.20-2.00) Ethnicity (ref: white) – S Black - S0.53 (0.36- 0.78)Hispanic - S0.66 (0.48-0.92) Other – NS2.03(0.57-7.17) | Benzodiazepine (illicit) use at enrolment – NSUCocaine use at enrolment – NS0.86(0.61-1.22)History of ever heroin use – NS0.90(0.61-1.32)Alcohol use at enrolment – NS 0.88(0.63-1.23)  | Past buprenorphine treatment – NS1.14(0.88-1.48)Calendar year of treatment (ref:2003-2007):2008-2010 – NS0.91(0.70-1.18)2011-2014 – S0.62(0.42-0.90) Number OBOT period (ref: 1):2nd – S0.39(0.28-0.53) 3rd – S0.34(0.18-0.64) >4th – NS0.45(0.16-1.32) | - | Any Psychiatric diagnosis – S 1.75 (1.35- 2.27) HCV antibody positive – S0.59 (0.45-0.76)  | Unemployment - S 0.72(0.56-0.92) |  - |
| Yang 2013 (94) | Cumulative retention rate at 1 year (53%); 2 years (35%); 3 years (20%) | Dropout (Follow-up 5 years)Cox proportional hazard modelsHazard Ratios (95% CI) | Age group (ref: ≤ 30) >30 – S 0.78(.69-.88)Residence (ref: urban): rural – S1.12(1.01-1.25) | Daily expense for drugs prior to MMT (ref:>300): ≤ 300 – S0.80(0.71-0.90)Drug use years prior to admission - NSU | Daily treatment dose (ref: >50): ≤ 30 - S 1.44(1.29-1.61)31-50 – S1.33(1.21-1.48)Re-enrolled (no=0): yes – S1.41(1.34-1.49) | Sharing needles (ref: no): yes – S1.23(1.08-1.40) | - | Income (ref: other): Family and friends – S0.40(0.31-0.52) Fixed income – S0.40(0.30-0.54) Temporary income – S0.43(0.33-0.55) Social welfare – S0.41(0.23-0.72) Relationship with family (ref: bad): Good – S 0.68(0.58-0.80)Communication with former drug taking peers last month(ref: yes): No – S0.90(0.84-0.98)History of being arrested (ref: no): Yes – S1.35(1.08-1.69)Living with family - NSU | Considering treatment cost suitable (ref: no): yes – S0.71(0.60-0.84)Considering treatment operation time suitable (ref: no): yes - S 0.73(0.62-0.87) |
| Zhang 2015 (95) | Dropout at 1 year (46.3%); 2 years (58.8%); 7 years (87.6%)  | Dropout at 7 yearsCox Regression Hazard Ratios (95% CI) | Age (10 years) – S0.79 (0.72-0.87)Gender – NSU | - | Low methadone dosage during the first treatment episode (<50 ml versus >50 ml – S1.84 (1.64–2.06)Higher proportion of positive urine test in first treatment episode (>50% versus<50%) – S3.72 (3.30–4.20) Last methadone dose - NSU | - | - | Married – NSU Low education level (junior high or below versus otherwise) - S1.21(1.05–1.40)  | - |
| Zhou 2017(96) | Dropout At 2 years (43.5% | Dropout at 2 yearsCox regression analysis to Hazard ratios (95% CI) | Age – NRGender – NR | Drug using methods for past 6 months (ref Oral) - NRAge at initial drug use (ref <= 20y) –NRInitial morphine urine test result (ref Pos)Repeated terminations (ref Yes)Past treatment time (ref <1 year) | Detoxification prior to MMT – NRAge at initial treatment (ref <=30y) | Sharing needles – NR | Clinical diagnosis:SF-36v2MCS (HRQoL, mental health component – self reported, ref: ≤ 42) > 42 – NS0.84(0.71-1.00)SF-36v2PCS (HRQoL, physical health component – self reported, ref: ≤49)> 49 – S0.83(0.69-0.98) | Marital Status – NREmployment status – NR Education – NR | QOL-DAv2.0 (QoL component – self reported) (ref: ≤66): > 66 – NS0.86(0.72-1.03)  |
| Zhou 2017(97) |  | Dropout (Follow-up to 7 years)Cox PH regression Hazard Ratios (95% CI) | Age (ref ≤ 30 years)- S0.85(0.78-0.92)41-50 yrs0.80(0.73-0.88)>50 yrs 0.74(0.60-0.91)Gender (ref: male) – S0.89(0.82-0.96) | Drug use type (ref: heroin) – S other 1.55(1.06-2.29)Unauthorized drug use during MMT (ref: occasionally): Intermittently – S 1.73(1.59-1.87)Usually – S3.89(3.60-4.20) | Average daily methadone dose (ref: >20 mg):21-60mg – S 0.52(0.45-0.60)>60 0.36(0.31-0.43)Readmission (ref: yes) – S1.18(1.12 -1.25) | Needle sharing experience (ref: yes) – S0.89(0.81-0.99) | Initial morphine urine test (ref: positive) – S0.58(0.55-0.62) | Marital Status (ref: Married):Other – S1.08(1.02-1.14)Employment status (ref: unemployed)– S1.14(1.07-1.21)Stable Income (ref: yes) – S1.11(1.04-1.20)Living with family (ref: yes) – S1.11(1.04-1.19)Contact with peer drug users over the past month (ref: yes) – S0.72(0.67-0.77)  | Time-taken to go to MMT clinic (ref: <30 min):31-60 mins – S1.16(1.07-1.25)>60 mins – S1.44(1.14-1.80)Convenient MMT service time (ref: yes) – S1.88(1.75-2.01)Satisfaction with MMT service (ref: yes) – S3.49(3.24-3.76) |
| Abbreviations: NSU = Not significant in unadjusted analysis and hence not included in adjusted analysisNS = Non statistically significantS = Statistically significant NR = Adjusted for in the model but results not reported in paperCoefficients reportedCI = Confidence interval Substance use MMT = Methadone maintenance treatment UDS+ = Urine drug screen positiveUDS- = Urine drug screen negative Treatment Factors Mg = Milligrams OBOT = Office based opioid treatmentTHD = Take home dose Health Risk Behaviour IDU = Injecting drug use Health Symptoms SF-36vMCS = Short form health survey: mental component summaryHRQoL = Health related quality of life SF36vPCS = Short form health survey: physical component summaryHCV = Hepatitis C virus HIV = Human immunodeficiency virusTB = TuberculosisART = Antiretroviral therapySocial Functioning APGAR = Adaptation, Partnership, Growth, Affection, ResolveTANF = Temporary aid to needy familiesGAX = General assistance presumptive disabilityGAU = Financial assistance for low-income people without childrenOther variables investigated in included studiesQOL – Dav2.0 = Quality of Life Scale for Drug AddictsMins = MinutesD/W = days per weekRCQ-12 = Readiness to change questionnaire  |