**Appendix 3. Population demographics for all studies**

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| Author/ year of study | Tool(s) evaluated | Sample size & population | Pain type & opioids received | Sex, age, socio-economic status | Known physical or psychiatric comorbidities |
| 1. **Tools predicting aberrant drug related behaviours or future prescription opioid misuse**
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| Friedman and co-workers, 2003 | STAR (Screening Tool for Addiction Risk) | 14 subjects with substance abuse;34 subjects without substance abuse | No details of pain.Opioids for pain in all but one. Subjects with active substance abuse only treated with methadone.Subjects with addiction histories were treated with methadone as well as other sustained-release opioids. | Substance abuse (14): age range 27-78 (mean 53); opioid treatment 11; treatment failure 6; prescription problems 2; left pain center 8. No substance abuse (34): age range 34-67 (mean 45); opioid treatment 15; treatment failure 0; prescription problems 0; left pain center 5. | Those with addiction were hospitalized for treatment of chronic infections and/ or AIDS |
| Michna and co-workers, 2004  | POTQ (Prescription Opioid Therapy Questionnaire) | 145Secondary care, chronic pain | 31.5% lower back primary pain site. Pain for an average of 98.1 months (SD 94.44, range 6-492). Average pain intensity 6.98 (0-10 scale) (SD 1.65).Oxycodone with acetaminophen 32.7%; continuous release oxycodone 32.0%; continuous release morphine 20.4%; transdermal fentanyl 13.6%; oxycodone 10.9%; methadone 10.2%; hydrocodone 7.5%; other opioids 10.2%. 56 (38.1%) taking >1 opioid preparation. | Average age 43.2 (SD 8.46, range 21-69); 52.1% women | No serious progressive illness/ significant cardiac or respiratory disease. |
| Adams and co-workers, 2004 | PMQ (Pain Medication Questionnaire) | 184Secondary care, chronic pain | Lumbar spine (31.7%) & cervical spine (17.2%) back pain, and myofascialfibromyalgia (19.4%). Many had >1 diagnosis.Opioids | 66.3% women; 33.7% men. (mean age 48.83 (SD 14.11)/ range 17-84). 84.2% Caucasian; 10.3% African-American; 5.4% Hispanic, Asian, other. 61.4% married; 18.5% single; 14.1% separated/ divorced; 6.0% widowed. No significant differences in age, psychological functioning, disability measures between medical and interdisciplinary treatment groups. 24% receiving disability income; nearly 15% pending litigation. H-PMQ group - significantly more married (67.7%) or separated/ divorced (17.7%) than L-PMQ (54.5% & 10.6%). L-PMQ group - significantly more single (22.7%) or widowed (12.1%) than H-PMQ (12.9% & 1.6%). 39.0% of H-PMQ group collecting disability payments versus 15.9% of L-PMQ (significant). Significantly higher mean PMQ scores in patients not working due to pain/ injury compared to those working (or not working for unrelated reasons) | Not given |
| Holmes and co-workers, 2006 | PMQ | 271Secondary care, chronic pain | Mean length of pain 77.4 months (SD 96.2). Lumbar spine 51.3%, cervical spine 25.8%, myofascial/ fibromyalgia 33.5%. Lower extremity 24.7%, neuralgia/ neuritis 18.2%, upper extremity 16%, headache 10.9%, thoracic 9.5%, abdominal 6.9%.Opioids | 64.7% female; Mean age 50.97 (SD=13.84), range 17-70; 85.8% white, 9.5% African-Americans, 4.7% Hispanic, Asian & other; 63.3% married, 12.7% single, 17.8% separated, 6.2% widowed. >27% receiving disability income, 13% had pending litigation relating to pain | Not given |
| Dowling and co-workers, 2007 | PMQ | 249Secondary care, chronic pain | Divided into L-PMQ & H-PMQ scores:H=3.5%/ L=7.4% acute; H=5.2%/ L=6.6% subacute; H= 91.3%/ L=86.1% chronic. Pain duration: H- mo 118, m 83.93, SD 99.24; L - mo113, m 71.38, SD105.91. Pending litigation: H 8.1%; L 7.3%Opioids | H-PMQ=60.9%/ L-PMQ=64.5% female; H-PMQ=77.3%/ L-PMQ=90.4% white; H-PMQ=15.1%/ L-PMQ=5.2% African American; H-PMQ=5.0%/ L-PMQ=3.5% Hispanic; H-PMQ= 0.8%/ L-PMQ=0.9% Asian; H-PMQ-PMQ=1.7%/ L-PMQ=0% other. H-PMQ=54.8%/ L-PMQ=62.9% married; H-PMQ=22.6%/ L-PMQ=11.2% separated/ divorced; H-PMQ=16.1%/ L-PMQ=12.9% single; H-PMQ=6.8%/ L-PMQ=12.9% widowed. H-PMQ=32.8%/ L-PMQ=17.5% on disability payments. Age mean H-PMQ: 51.74, SD 14.81, range 15-87; L-PMQ:55.54, SD 16.84. Significant differences in marital status & disability status | Not given |
| Buelow and co-workers, 2009 | PMQ (reduced-item) | 1813Secondary care, chronic pain | Not given | 64.7% female. Mean age 51.89 (SD 19.1) Age range 14-98. 79.4% Caucasian; 12.4% African-Americans; 8.2% Asian, Hispanic or other races. Significant differences found for age variable on L-PMQ, M-PMQ & H-PMQ | Not given |
| Hojsted and co-workers, 2011 | PMQ | 209Secondary care, chronic noncancer pain or cancer pain | 30% nociceptive; 31% neuropathic; 39% mixed. 28% only 1 pain location, 21% >3. Non-malignant pain 93%.Opioids | No significant differences age, gender, opioid use between participants and non-participants. 45 (17.7%) did not return questionnaires - so total response rate 78%. Non-returners younger 45.8 (SD 12.0) versus 53.1 (SD 13.2) p=0.001; and higher opioid doses (p=0.026). More non-responders rated as addicted (PC)(p<0.001). Of 209: 40% lived alone; 34% had>10 years schooling; 84% had a vocational training; 77% unemployed | Not given |
| Butler and co-workers, 2004.  | SOAPP (Screener and Opioid Assessment for Patients with Pain, Version 1.0) | 175 Secondary care, chronic pain | 39.8% low back pain, and 31.2% of others multiple pain sitesOpioids. Immediate release (Oxycodone with acetaminophen; hydrocodone; oxycodone; morphine; hydromorphine; codeine; propoxyphene). Sustained release (oxycodone; methadone; transdermal fentanyl; morphine). | Average age 47.7 (SD = 11.2, range 23-88). 54.3% women; 90.9% Caucasian. Of final 95, average age 47.5 (SD = 9.2, range 27-74); 50.5% women; 93.5% Caucasian | Not given |
| Akbik and co-workers, 2006  | SOAPP | 397 Secondary care, chronic pain (238) Veterans Administration Pain Center (159)  | Center A: 43.9% low back pain primary. Center B: 33.5% low back pain primary; 66% with service-connected injuryOpioids | Center A: 18-88 (mean 45.7 plus/minus 10.6); 87.4% Caucasian; 47.1% male.Center B: 27-86 (mean 59.4 plus/minus 12.5); 98.1% male; estimate 70% Caucasian, 25% black, 5% Hispanic | Not given |
| Butler and co-workers, 2008 | Revised Screener and Opioid Assessment for Patients with Pain (SOAPP-R) | 283 (for testing of beta version)(85 for original empirical testing of alpha version) Secondary care, chronic pain | Beta: 66.8% primary low back painImmediate release and sustained release opioids.27% taking both long and short acting | Alpha (n=85): 47% men. Average age 48.8 (SD 11.44, range 22-84, median 47). 77% Caucasian, 10% African-American, 5% Hispanic, 5% Native American, 3% Asian or other. 85%high school education. Most quite disabled. 16.5% working, 41% on disability. Beta (n=283): 44.4% women. Average age 49.8. 85.1% Caucasian | Not given |
| Butler and co-workers, 2009  | SOAPP-R | 302Secondary care, chronic pain | 59.6% primary low back painOpioids | Average age 51.3 (SD 13.2, range 22-83); 50% women: 79.8% Caucasian. Of retest sample completers, average age 50.3 (SD 12.6, range 25-77); 68.8% women; 64.1% Caucasian | Not given |
| Brown and co-workers, 2011 | SOAPP-R, as part of UP (universal precautions) approach. | 1487Primary care, chronic pain | Morphine sulfate extended release (MSER) capsules | Across 34 states in US and Puerto Rico. Of safety population - 57% women; 87% white; mean age 53 (range 21-92). 2% had participated in a drug treatment programme. 2% had participated in a 12-step programme. 5% reported history of using illicit substances | Not given |
| Webster and co-workers, 2005 | ORT (Opioid Risk Tool) | 185Secondary care, chronic pain | Lumbar spine pain most common; headache, neuropathic, musculoskeletal pain fairly evenly distributed; cervical spine pain least common.Opioids | Females 108; males 77. Patient characteristics tabulated for 3 risk groups (low, moderate and high). No differences between groups for age (p=0.067), gender (p=0.540) | Not given |
| Witkin and co-workers, 2013  | ORT | 125Secondary care, chronic pain | No details of painOpioids | Mean age 51; 41.6% female; 56% white; 33.6% African American; 36% single; 44% married; 15.2% separated or divorced; 4.8% widowed | Not given |
| Jones and co-workers, 2013 | BRI (Brief Risk Interview) | 196Secondary care, chronic pain | 60% had primary pain complaint of low back pain; 18% neck painOpioids. 31% long acting, 40% short acting. | 58% female. Age 22-91 (mean 50.2). 36% had Medicare, 31% had private insurance, 22% had TennCare (Medicaid). | Not given |
| Jones and co-workers, 2014 | Prospective cohort study BRI | 124Secondary care, chronic pain | Low back pain 44%; neck pain 26%; headache 13%75/124 patients (60%) prescribed opioid. 100% short acting; 7 (9%) long acting as well | Age 19-85 (32% 40-49).Race not recorded in 32%. Where race recorded, 80% Caucasian. 67% female.Marital status not recorded in 30 patients; where recorded, 55% married, 21% single, 19% divorced, 5% separated or widowed. | Not given |
| Jones and co-workers, 2015 | BRQ (Brief Risk Questionnaire) | 257 prescribed opioid for > 1 month & FU visitSecondary care, chronic pain (psychology)  | 80% prescribed short acting opioid; 48% prescribed long acting opioid. | 96% Caucasian; 49% female; mean age 54.6 (range 21-82). 23% were ≥65 | Not given |
| 1. **Tools screening for current aberrant drug related behaviours or opioid misuse**
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| Manchikanti and co-workers, 2003 | Unnamed tool | 500 Secondary care, chronic pain (400 without and 100 with a history of drug abuse | Pain >6 months. No differences between groups as regards duration of pain & history of previous spine surgeryAll on opiates at start | No differences between groups as regards gender (more women than men), height, weight.  | Not given |
| Butler and co-workers, 2007 | COMM (Current Opioid Misuse Measure) | 227Secondary care, chronic pain | 67.9% low back painOpioids | 62% women; 35.7% men (missing info for 6). 14.1% minorities. Mean age 50.8 (SD + 12.4, range 21-89). 83.3% Caucasian. 43% married. 87.3% high school graduate | Not given |
| Butler and co-workers, 2010 | COMM | 226Secondary care, chronic pain | Pain relief from medication and pain interference with activity both less than in original validation sampleOpioids | 48.2% women (significantly fewer than in original validation sample). 56.5% married (significantly more than in original validation sample). Race, education level and age included, not significantly different from original sample | Not given |
| Meltzer and co-workers, 2011  | COMM | 238Primary care, chronic pain | Chronic pain≥3 monthsOpioids | Few differences between 2 groups as regards gender, race, educational level. Mean age in 40s, largely African American, majority had 12 or more years education. At least 50% of those with and without PDD were receiving disability payments.  | Nearly 1/3 of each group had lifetime PTSD. Those with PDD more likely to have current depression, smoke or have past year other drug disorder |
| Knisely and co-workers, 2008 | POMI (Prescription Opioid Misuse Index) | 74 Recruited from community substance abuse treatment programs, regional jails, pain clinics & private internal medicine practices | No details regarding pain.All prescribed OxyContin | No group differences between those with substance abuse and pain regarding gender, ethnicity or education. Substance abuse 92% Caucasian; pain 97% Caucasian. Substance abuse mean high school education 12.6 years; pain 13 years. Pain 56% females; substance abuse 35% females (no statistical significance). Substance abuse group significantly younger (M=33.8 years) than pain (M=43.9 years, p<.0001). Substance abuse group less likely to be married than pain group (30% versus 53%, p<.01) | ASI: rates for depression and anxiety greater than 68% for both groups. |
| 1. **Tools screening for and predicting both current *and* future aberrant drug related behaviours or prescription opioid misuse**
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| Compton and co-workers, 1998 | Prescription Drug Use Questionnaire (PDUQ) | 52Secondary care, chronic pain (referred for psychiatric evaluation) | 65% > one pain conditionOpioids | 60& female. Age 20-66 (mean 41.4, SD 9.55). 58% married. 92% white | 67% psychiatric morbidity (did not distinguish addicted from non-addicted). History of sexual or physical abuse in 31% ( not more in addicted group) |
| Compton and co-workers, 2008.  | PDUQp (Prescription Drug Use Questionnaire p) | 135Secondary care, chronic pain (veterans) | 104 primary musculoskeletal pain; 26 primary neuropathic pain; remaining 5 multi-category or unclearOpioids | Mean age 53 (25-65). 127 male, 8 female. 53 (39%) married or cohabiting; 18 (13%) never married; 54 (40%) divorced or separated; 8 (6%) widowed. 17 (13%) working FT; 8 (6%) working PT; remainder (81%) not working. Of 105 not working, 47 (45%) unemployed or unable to work due to pain | Not given |
| Jamison and co-workers, 2014  | OCC (Opioid Compliance Checklist) | 157Secondary care, chronic pain | Pain> 6 months; average 4 or more on pain intensity scale 1-10. 24.8% primary lower back pain Opioids | Average age 49.3 (SD 8.4, range 24-81). 59.7% women; 72.5% white | Exclusions: cancer; acute bone disease; DSM mental disorder that would interfere; pregnancy; clinically unstable systemic illness; pain condition requiring urgent surgery; active addiction disorder that would interfere. |
| Jamison and co-workers, 2015  | OCC | 253Primary care, chronic pain | Most back pain. 78% multiple pain sitesOpioids | 106 (59.9%) female; 74.4% Caucasians | Exclusions: cancer; acute bone disease; DSM mental disorder that would interfere; pregnancy; clinically unstable systemic illness; pain condition requiring urgent surgery; active addiction disorder that would interfere |
| 1. **Studies comparing different tools**
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| Jones and co-workers, 2012 | * SOAPP-R
* PMQ
* ORT
 | 132 (study 1). 263 (study 2)Secondary care, chronic pain | Study 1: 47% low back pain; 14% pervasive pain; 12% neck pain; 10% lower extremity pain.Study 2: 45% low back pain; 21% pervasive pain; 14% joint pain; 10% pelvic or abdominal pain; 7% neck or upper back pain | Study 1: ≥18; mean age 42.7 (SD = 12.0, range 19-76). 51% female. 42% married; 31% divorced; 20% single. Study 2: (Of 263 used for final prediction analysis) Mean age 47.5 (SD 12.7); 96% white; 56% female; 53% married; 28% divirced; 73% unemployed/ disabled; 19% working FT | Not given |
| Ferrari and co-workers, 2014 | * PMQ
* DIRE (Diagnosis Intractability Risk and Efficacy Score)
 |  75Secondary care, chronic pain | 50.7% oral oxycodone40% fentanyl | Age mean 51.5 (SD 11.7); 76% female; 74.6% married, 15.3% single, 9.3% separated, 1% widowedYears of education provided; 37.3% employed, 2.7% unemployed, 29.3% housewife, 30.7% retired |  |
| Moore and co-workers, 2009 | * SOAPP
* DIRE
* ORT
 | 48Secondary care, chronic pain | Not given | 29 (60.4%) female, 19 (39.6%) male. Mean age 43.9 (SD 10.7); 19 (39.6%) married; 19 (39.6%) divorced.  | Not given |
|  | 1. **Tools used to monitor aberrant drug related behaviours or prescription opioid misuse**
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| Passik and co-workers, 2004  | Pain Assessment and Documentation Tool (PADT) | 388Primary & secondary care, chronic pain | All prescribed opioids | 36.3% men; 63.7% women(Of 383): 84.1% white; 7.6% black; 6.0% Hispanic; 0.5% Asian(Of 377): 3.4% Grades 1-8; 10.9% some high school; 24.7% high school degree; 30.5% some college; 16.7% college degree; 6.4% post college work; 7.4% advanced degree(Of 388): 20.6% work FT; 8.0% PT; 6.4% homemaker; 41.2% disabled; 6.7% unemployed; 15.5% retired; 1.6% student(Of 371): (Prior to pain diagnosis) 67.4% worked FT 67.4%; 8.6% PT; 6.7% homemaker; 6.7% disabled; 2.2% retired; 6.5% retired; 1.9% student | Not given |
| Wu and co-workers, 2006 | ABC (Addiction Behaviors Checklist) | 136Secondary care, chronic pain (veterans) |  | Mean age 53 (25-65). 8 (5.9%) female, 128 (94.1%) male. 53 (39%) married or cohabiting; 19 (14%) never married; 55 (41%) divorced or separated; 8 (6%) widowed. 17 (13%) working FT; 8 (6%) working PT; 107 (81%) not working (of these, 46% unable to work due to pain) | Not given |
| 1. **Systematic Reviews**
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| Turk and co-workers, 2008 | * SISAP
* PDUQ
* STAR
* POTQ
* PMQ
* SOAPP
* ORT
* ABC
* COMM
 | Individual studies | Individual studies | Individual studies | Individual studies |
| Chou and co-workers, 2009 | **Tools predicting ADRB**: * SOAPP V.1
* SOAPP-R
* ORT (Opioid Risk Tool)

**Screening instruments identifying current ADRB**: * PMQ
* 6-item instrument (Atluri, 2004)
* COMM
* PDUQ
* 4 item instrument (Manchikanti, 2004)
* Michna (2004)
* PDUQ (psychiatric items, Wasan, 2007)
* ABC
 | Individual studies | Individual studies | Individual studies | Individual studies |
| Becker and co-workers, 2013  | * PADT
* COMM
* PDUQ-p
* mPMQ
* POMI
* PODS
 | Individual studies | Individual studies | Individual studies | Individual studies |