**Appendix Table E5. Observational Studies of Long-Term Opioid Use and Endocrine Outcomes**

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| **Author, year** | **KQ** | **Type of Study, Setting** | **Eligibility Criteria** | **Comparison Groups** | **Population Characteristics** | **Method For Assessing Outcomes and Confounders** |
| Deyo, 2013 | KQ2a, b | Cross-sectional Integrated healthcare United States | Ambulatory males aged >18 years with diagnoses associated with low back pain Exclude: patients with evidence of systemic disease or trauma | 1. Patients prescribed medication for erectile dysfunction or testosterone replacement (n=909)
2. Patients not prescribed medication for erectile dysfunction or testosterone replacement (n=10,418)
 | **A vs. B**Mean age (years): 55.7 vs. 48.0Female sex: 0%Race: 89% White, 3% Black, 3% Asian/Pacific Islander, 1% American Indian, 3.9% other (among records with race/ethnicity data available, 59% of total sample)Sedative-hypnotic use: 24.4% vs. 15.6% Diagnosis of depression: 17.3% vs.11.3% | Review of medical and pharmacy records |
| Note: The references are located in Appendix C.KQ=key question; MED=morphine equivalent dose; NIH/NCRR=National Institutes of Health/National Center for Research |

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| **Author, year** | **Screened Eligible Enrolled Analyzed****Loss to Followup** | **Adjusted Variables For Statistical Analysis** | **Main Results** | **Funding Source** | **Quality** |
| Deyo, 2013 | Screened: NR Eligible: 11,327Enrolled: 11,327Analyzed: 11,327 | Age, comorbidity score, number of hospitalizations, sedative-hypnotic use, duration of opioid use, morphine dose at last dispensing, type of opioid (short- vs. long- acting), depression, and smoking status | No opioid use vs. short-term use vs. episodic use vs. long- term usePrescription for sildenafil, tadalafil, or vadenafil 6 months before or after index visit: 6.3% (294/4,655) vs. 6.9% (324/4,696) vs. 7.3% (12/164) vs. 11.3% (204/1,812); p<0.001Testosterone replacement 6 months before or after index visit: 0.5% (25/2,655) vs. 0.6% (30/4,696) vs. 1.2% (2/164) vs. 2.4% (44/1,812); p<0.001Testosterone replacement or erectile dysfunction treatment: 6.7% (312/4,655) vs. 7.4% (346/4,696) vs. 7.9% (13/164) vs.13.1% (238/1,812); p<0.001; OR 1.5, 95% CI 1.1 to 1.9DosingDaily opioid dose of >120 mg MED/day associated with increased risk of use of medications for erectile dysfunction or testosterone replacement versus 0 to <20 mg MED/day (OR 1.6, 95% CI 1.0 to 2.4) | NIH/NCRR | Fair |