

Supplementary Table 2. Excluded studies and reasons for exclusion

Study	Reason for Exclusion
Andreucci 2004	No original data
Arboleya 2003	No original data
Atalay 2013	Unable to determine prevalence
Awdishu 2016	Does not meet analgesic use criteria
Bilge 2013	Only reports prevalence of inappropriate use
Biyik 2013	Unable to determine prevalence
Bouck 2018	Population selected for CKD related diagnosis does not specify stage
Brookhart 2015	Poster
Butler 2013	Letter to the editor
Butler 2014	Letter to the editor
Calls 2009	Duplicate study population
Caravaca 2016	Unable to determine prevalence: no raw data on prevalence
Chater 2006	Does not meet population inclusion criteria: discontinued dialysis only (end of life)
Clark 2002	Does not meet population inclusion criteria: general medical population
Cohen 2000	Does not meet population inclusion criteria: discontinued dialysis only (end of life)
Coluzzi 2018	Review article
Cortés-Sanabria 2008.	Does not meet population inclusion criteria: patients selected based on diagnosis of diabetes
Dabers 2017	Review article
Daubresse 2018	Abstract
Davison 2008	Unable to determine prevalence: 100% prevalence required
Davison 2015	No original data
Desmedt 2018	Prevalence of inappropriate drug dosages/prescriptions and population includes CKD stage 2
Droney 2007	Does not meet analgesic use criteria: prescriber prevalence
Eppenga 2015	Study protocol
Fox 2008	Initial chart audit selected patients with diabetes mellitus and/or hypertension to identify CKD patients
Gamondi 2010	Abstract
Gardiner 2012	Does not meet population inclusion criteria
Gottesdiener 2003	Unable to determine prevalence: 100% prevalence required
Graczyk 2006	Unable to determine prevalence: 100% prevalence required
Green 2012	No analgesic data
Heleniak 2013	Abstract
Hinton 2006	Unable to determine prevalence
Ishida 2018 (JASN)	Unable to determine prevalence
Jankovic 2009	Does not meet population inclusion criteria: patients selected based on at least one incident of a gastrointestinal bleed
Kuo 2010	Risk association and progression of chronic kidney disease
Kurella Tamura 2010	Does not meet analgesic use criteria
Lentine 2015	Does not meet analgesic use criteria: does not separate acute pain from chronic pain

Liang 2014	Does not meet population inclusion criteria: patient selected based diagnoses of peptic ulcers
Maldonado 2015	No original data
Manias2008	Unable to determine prevalence
Meghani 2014	Does not meet population inclusion criteria: selected based on diagnosis of cancer
Mercadante 2005	Letter to editor
Meuwesen 2016	Unable to determine prevalence: only included patients with NSAID claims
Micozkadioglu 2004	Gabapentin/levodopa trial for restless legs
Narvaez Tamayo 2015	No original data
Nderitu 2014	Does not meet population inclusion criteria: general practice patient population
Novick 2018	Research letter
Nuckols 2013	Systematic review
Olivo 2015	Unable to determine prevalence: 100% prevalence required
Paramanandam 2011	Unable to determine prevalence
Patel 2013	Systematic review
Perlman 2013 (Annual Conference of the Canadian Pain Society)	Abstract
Perlman 2013 (Pain)	Does not meet analgesic use criteria: does not separate acute pain from chronic pain
Pham 2010	Does not meet population criteria: data for CKD stages 1-2 not separate from 3-5
Pham 2017	Review article
Quartarolo 2007	Does not meet analgesic use criteria
Quintana-Bárcena 2018	Prevalence of baseline drug-related problem calculated from data a year prior to recruitment. Some participants may have been CKD Stage 2 a year prior to recruitment.
Rebollo 2014	Abstract
Rodríguez Calero 2009	Duplicate study population
Ruchi 2017	Abstract
Saad 2018	Residents' awareness of dose adjustments
Salisbury 2009	Unable to determine prevalence
Samolsky Dekel 2016	Unable to determine prevalence: 100% prevalence required
Shah 2014	Does not meet analgesic use criteria
Simsek 2016	Abstract
Solak 2012	Unable to determine prevalence
Su 2009	Case report
Surana 2017	Awareness of dose adjustments
Unruh 2006	Data collected prior to 2000
Williams 2007 (Journal of Evaluation in Clinical Practice)	Does not meet analgesic use criteria: nurses' analgesic preferences
Williams 2007 (Renal Society of Australasia Journal)	Does not separate surgery pain from chronic pain
Williams 2008	Systematic review

Williams 2009	Qualitative data
Wittmann 2015	No original data
Wyne 2011	Systematic review
Yang 2016	Abstract
Zhao 2015	Abstract