

TO WHAT EXTENT DO THE PUBLISHED ECONOMIC ANALYSES OF TREATMENTS FOR OPIOID USE DISORDER CAPTURE THE CHRONIC, RELAPSING NATURE AND IMPACT ON SOCIETY?

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OBJECTIVES

Opioid use disorder (OUD) is a global problem with enormous economic, personal and public health consequences. Current estimates suggest that there are approximately 32 million people globally misusing opioids (mainly heroin, morphine and non-medical use of prescription opioids).¹ We conducted a systematic literature review (SLR) to identify evidence of the effect of OUD treatment on the economic burden of the disease. The aim was to assess to what extent the current evidence captures the chronic, relapsing nature of opioid dependence and its impact on society.

METHODS

Using relevant key terms for economic evaluations and OUD (including opioid dependence/abuse, the terms used in DSM-5 and DSM-IV), we searched global electronic databases (MEDLINE and MEDLINE In-process, EconLit, EMBASE and the Cochrane Library), key international health technology assessment websites (AMNOG, CADTH, HAS, NICE, PBAC, SMC)*, conference proceedings (CPDD, Global Addiction, ICADTS, ISPOR, AMCP)* and reference lists from 1995 to 2015. Comparisons of costs and/or cost-effectiveness between two or more pharmacological maintenance interventions for OUD were included. Studies were not excluded by geographical region or language. Data quality was appraised using published checklists derived from Drummond et al. (2015) where the original checklist was used and expanded upon in order to address all potentially relevant quality criteria.²

* AMNOG, Arzneimittelmarktneuordnungsgesetz; AMCP Academy of Managed Care Pharmacy; CADTH, Canadian Agency for Drugs and Technologies in Health; CPDD, College on Problems of Drug Dependence; HAS, Haute Autorité de Santé; ICADTS, International Council on Alcohol, Drugs and Traffic Safety; ISPOR, International Society For Pharmacoeconomics and Outcomes Research; NICE, National Institute for Health and Care Excellence; PBAC, Pharmaceutical Benefits Advisory Committee; SMC, Scottish Medicines Consortium.

RESULTS

From 764 reviewed records, 39 studies met the inclusion criteria, including cost-effectiveness, cost-utility, cost-benefit and cost-minimisation analyses. One additional study was identified from reference lists. Of these, 10 considered a time horizon beyond 10 years, and only one considered retreatment for patients after relapse, despite the chronic nature of OUD. Twenty studies investigated a societal perspective: specifically, incarceration (n=12), cost of crime to society and the victim (n=14), diversion (n=1), and productivity and workforce (n=5). The majority of economic studies of OUD published after 2005 captured societal costs.

Thirteen economic models were identified from the 40 papers identified in the review; these were described across 17 papers. The Markov model was found to be the most common (n=5), followed by a decision tree structure (n=4), a dynamic model structure (n=3) and a semi-Markov approach (n=1). Eight of these models featured a time horizon of 10 years or beyond, although only three of these captured the effects of relapse over that time span. Only one of the three models incorporated the possibility of re-treatment among those who relapsed. Furthermore, in all of the models that considered relapse, the probability of relapse was estimated based on an assumption that the relapse rate stays constant for the entire duration of the model. A summary of each of the thirteen models is presented in Table 1.

The main outcomes associated with OUD were established to be cost per quality-adjusted life year (QALY) and cost per opioid-free day. None of the identified evaluations captured all relevant outcomes. However, two of the 13 models considered opioid overdose, and four of the 13 models considered relapse, where relapse was defined as moving from the state of abstinence or stopping treatment to heroin use. Furthermore, four of the 13 economic models considered outcomes associated with HIV (change in HIV prevalence or cost per HIV case averted) rather than outcomes specific to opioid dependence.

Table 1: Summary of economic modelling approaches

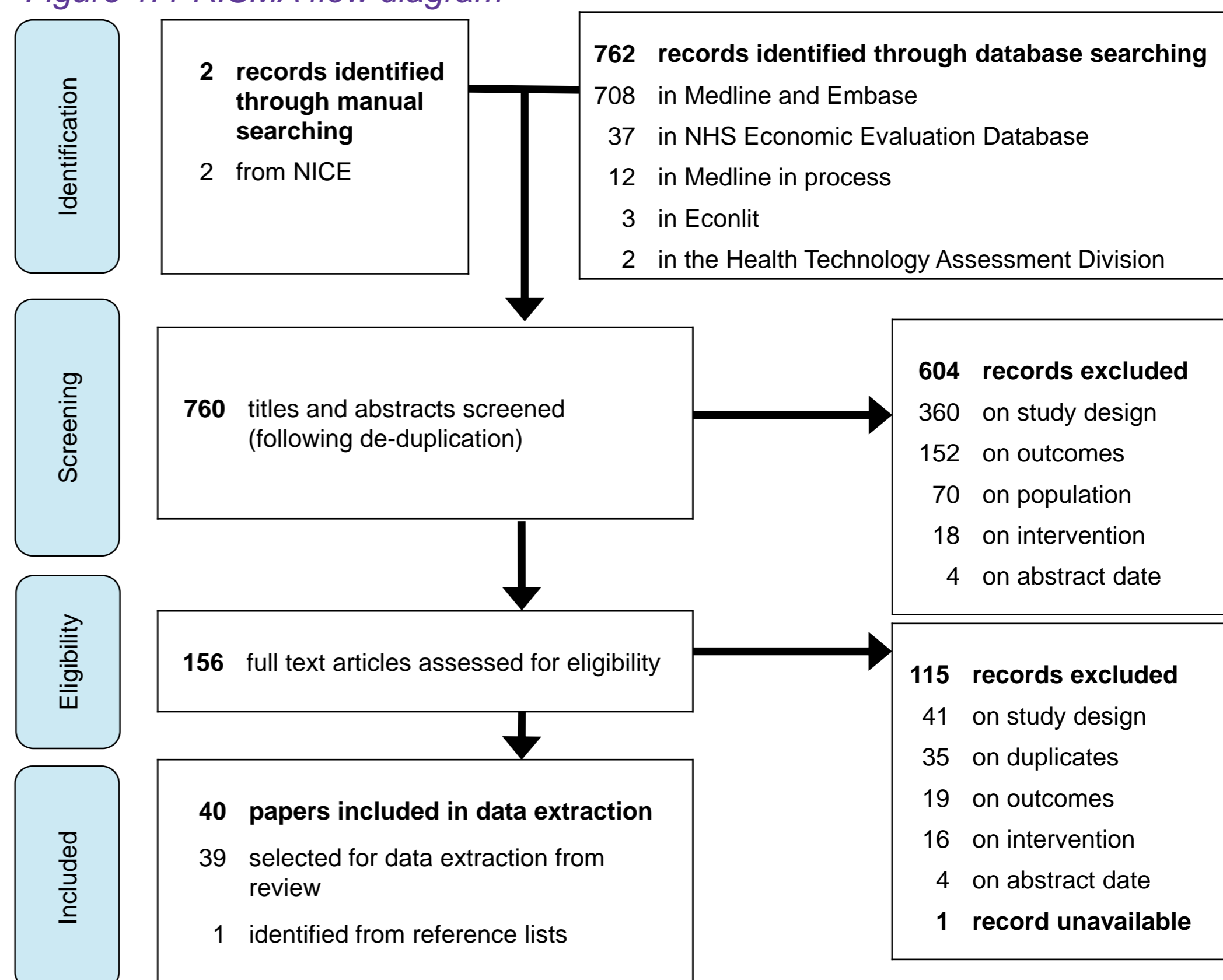
Year	Author et al.	Country	Setting	Model properties				Per-spective	Societal costs			
				Main outcome (cost per ...)	Re-lapse	Over-dose	Time horizon		Incar-ceration	Crime	Productivity of workforce	Travel
2013	Coffin ³	US	NAL distributed to heroin users at witnessed overdoses	Overdose deaths prevented; QALY	✓	✓	Lifetime	Payers'				
2013	Zhang ⁴	CN	Heroin addicts in MMT clinics enrolled to the extension MMT clinics	Life years gained; QALY			30 years	Payers'				
2012	Nosyk ⁵	CA	Diacetylmorphine compared with methadone in a hypothetical cohort of patients assigned the baseline characteristics of participants in the North American Opiate Medication Initiative Trial	QALY	✓		1, 5 & 10 years & lifetime	Payers' & crime	✓	✓		
2012	Schack-man ⁶	US	BUP-NAL in clinically stable OUD patients (already completed 6 months of office-based BUP-NAL treatment)	QALY			2 years	Societal				✓
2012	Stephen ⁷	US	Deep brain stimulation vs. MMT in heroin addicts without regular employment	Success rate of deep brain stimulation; QALY;	✓		6 months	Societal	✓	✓	✓	
2012	Tran ⁸	VN	MMT in OUD patients that were methadone naïve and did not have any severe health conditions	Averted HIV case			1 year	Payers'				
2011	Alistar ⁹	UA	MMT in injection drug users aged 15-49	QALY		✓	20 years	Payers'				
2007	Adi ¹⁰ , TA115 ¹¹	UK	Detoxified, formerly OUD patients with 10 days opiate free wanting to continue to a maintenance programme	QALY			1 year	Payers'	✓*	✓*		
2007	Connock ¹² , TA114 ¹³	UK	OUD patients (not further defined)	QALY			1 year	Payers'	✓*	✓*		
2005	Zarkin ¹⁴	US	MMT in five population subgroups defined by heroin use, whether patients are in treatment and incarceration	A cost-benefit analysis	✓		Lifetime	Societal	✓	✓	✓	
2004	Masson ¹⁵	US	MMT vs. detoxification in OUD patients (not further defined)	QALY			10 years	Payers'				
2000-2001	Barnett ¹⁶ , Zaric ^{17, 18}	US	Introduction of buprenorphine (Barnett et al. [2001]), MMT expansion (Zaric et al. [2000a]) and methadone (Zaric et al. [2000a]) in four populations aged 18-44, defined by injection drug user status and prevalence of HIV	QALY			10 years	Payers'				
1999	Barnett ¹⁹	US	MMT in opioid addicts (not further defined)	Life year			Lifetime	Payers'				

Key: BUP-NAL, buprenorphine-naloxone; MMT, methadone maintenance therapy; NAL, naloxone; OUD, opioid use disorder; QALY, quality-adjusted life year. Note: *Cost included in sensitivity analysis.

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Figure 1: PRISMA flow diagram



Key: NICE, National Institute for Health and Care Excellence.

DISCUSSION

The SLR highlights that there has been increasing interest in analysing the costs and effectiveness associated with OUD treatments – demonstrated by the increasing number of studies from 1995 to 2015. This review established that there is no general consensus for the best approach to economic modelling in OUD.

Although 20 papers considered a broader societal perspective, none of these studies included all costs relevant to a societal perspective: costs associated with incarceration, criminal activity, productivity losses and travel costs. Similarly, the consequences of treatment on HIV/HCV prevalence were often ignored due to the lack of outcome data among these populations. It is clear from the identified literature that economic outcomes including these aspects are becoming increasingly important. Many of the studies discuss the lack of data as the reason for exclusion of these aspects.

CONCLUSIONS

Despite an increasing interest towards understanding the societal impact of OUD treatments, the evidence to assess the long-term effects of the interventions is scarce. Only a few studies captured the long-term effect of treatment, and only one study was found to capture the relapsing nature of the disease with respect to re-entering treatment after relapse. Published long-term models relied heavily on assumptions to extrapolate short-term data over the model time horizon. Further studies to capture long-term societal factors are needed to quantify the full economic impact of OUD treatments.