



REVIEW

Academic detailing interventions for opioid-related outcomes: a scoping review

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Abstract

Background: Academic detailing (AD) is a tailored, interactive educational outreach intervention that may improve patient outcomes. Insight into the design of AD interventions and the extent to which they are effective can help inform future AD-based programmes. The objective of this scoping review was to characterize opioid-focused AD interventions and describe their findings.

Methods: A scoping review focused on AD interventions for opioids was conducted in PubMed, EMBASE and CINAHL databases through July 1, 2021. Studies were eligible for inclusion if written in English, included interactive opioid-focused educational interventions, and were conducted either in person, virtually or via telephone. Four independent reviewers reviewed titles and abstracts. Data extraction from full-text publications was completed using a standardized form.

Results: Of 6086 articles initially identified, 22 articles met the inclusion criteria and 20 unique interventions were identified. The AD intervention was either delivered one-on-one ($n=16$) or in a small, interactive group setting ($n=4$). AD interventions

varied in design. Effectiveness was evaluated in terms of opioid and naloxone prescribing rates, provider knowledge gaps, provider adherence to guidelines, and intervention feasibility. Sixteen (80%) interventions resulted in statistically significant improvement in one or more outcomes.

Conclusion: Generally, opioid-related AD was effective and programmes were primarily conducted one-on-one between pharmacists and primary care providers for 16–30 minutes. A variety of metrics and outcomes were used to assess the success/effectiveness of AD interventions, which is an important consideration in future studies as no single metric captures the effectiveness of an educational outreach-based intervention for pain management.

Keywords: academic detailing, continuing medical education, educational outreach, naloxone, opioids, prescribing.

Citation

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Introduction

In 2017, in response to the ongoing opioid epidemic, the United States Department of Health and Human Services (HHS) announced a five-point strategy presenting a strategic framework aimed to fight the opioid crisis.¹ Despite a slight decrease in opioid-related deaths seen in 2018, reports showed opioid-related deaths increased again in 2019 and 2020.^{2,3} One specific area of focus outlined by the five-point strategy is the recommendation to increase education related to appropriate opioid prescribing. Educational outreach can take various formats, such as didactic forums in a group setting or more individualized one-on-one sessions.⁴ However, group-based interventions have been found to be less effective at changing behaviour than more

personal educational outreach methods such as academic detailing.⁵

Educational outreach interventions like academic detailing (AD) have the potential to improve opioid prescribing and patient outcomes^{6,7} by providing unbiased, evidence-based recommendations to impact provider decision-making.⁸ A key characteristic of AD interventions is that it is delivered in a personalized (i.e. one-on-one or small group) setting.^{8–12} A 2007 Cochrane review examined the effect of educational outreach visits on health care practice and outcomes and found that the visits demonstrated small, yet consistent, positive effects on prescribing.¹³ The authors defined educational outreach visits as face-to-face educational visits between a healthcare provider and a trained person from

outside the practice focused on performance change. The review noted the educational outreach visit interventions varied widely across the 69 studies, limiting the ability to describe each intervention's characteristics in detail. Although the Cochrane review was thorough and supported the effectiveness of the visits, it was not specific to opioid-focused interventions and was limited to studies conducted before the emergence of the opioid epidemic starting in the mid-2000s.

Understanding the effectiveness of AD programmes and the designs of those interventions can help inform the many public health-based initiatives being undertaken across the United States. Several reviews have assessed interventions used to improve appropriate opioid prescribing.^{14,15} In 2019, Asamoah-Boaheng et al. conducted a systematic review and meta-analysis related to strategies on opioid prescribing for non-cancer pain, including the influence of education, audit, and feedback, interprofessional support, shared decision-making and reported that it was challenging to make conclusions about the effectiveness of such approaches because studies varied in study design and generally were of low methodologic quality.¹⁴ A 2020 systematic review by Liu et al. examined the effectiveness of AD and other interventions on opioid prescribing for non-cancer pain in an inpatient setting and reported that whilst the quality of evidence was low, AD and education followed by feedback increased appropriate opioid prescribing in agreement with guidelines.⁶ Overall, these reviews found that opioid-specific educational interventions varied by strategy, implementation and evaluation.^{14,15}

To elucidate the literature on AD with a focus on studies of providers conducted in both an outpatient and inpatient setting, we conducted a scoping review to help characterize programmes that have been implemented and summarize their findings. The literature surrounding AD is broad, leading us to conduct a scoping review rather than a systematic review.¹⁶ Thus, the purpose of our scoping review was to characterize different opioid-specific AD interventions and describe their respective effects on clinical practice.

Methods

Search strategy

We conducted a scoping literature review by identifying potential articles through several bibliographic databases. We queried PubMed, EMBASE and CINAHL to identify potentially relevant titles. The following search terms and their MeSH/Emtree terms were used: "academic detailing", "educational outreach", "opioids" and "pain management".

Inclusion and exclusion criteria

Our search criteria included unique, full-text articles published from January 1, 1973, through July 1, 2021. The search was limited to original research articles or articles in press. Articles were included if they were primary literature and

available in English. Additionally, articles were included if the AD intervention met the following criteria: (1) targeted for healthcare providers, (2) associated with opioid-related outcomes and non-cancer pain management, (3) allowed for interaction between the educator and participant and (4) were one-on-one or in small groups. Small groups were operationally defined as environments that allowed for an interactive discussion between providers and detailers. Multifaceted interventions (i.e. interventions that included more than one component) were included if they had an AD component. Additionally, the educational intervention could be administered either in-person, via telephone or virtually (e.g. web-based meeting). Articles were excluded if the educational intervention was not described, intended for patients, focused on cancer-related pain management or was designed for dental practitioners. Due to a lack of personalization and tailoring of key messages in didactic interventions, we also excluded articles describing lecture-style interventions. Curricula-based interventions (i.e. in a medical or residency programme) were also excluded as we wanted to focus on interventions aimed at practicing providers.

Review strategy

At the initial screening stage, article titles and abstracts were reviewed by at least two independent reviewers (VK, MM, MS, KH). From the initial list, the full text of articles that potentially met the inclusion criteria was retrieved. The full-text articles were evaluated against the inclusion and exclusion criteria by two reviewers (VK, KH). All four reviewers met to discuss and resolve selection discrepancies. The selected publications were then reviewed, data extraction was completed using a standardized form (see Supplemental Materials; available at: <https://www.drugsincontext.com/wp-content/uploads/2021/11/dic.2021-7-7-Suppl.pdf>), and verified by an independent reviewer. The standardized form included study citation, source, study method, information about the study populations, intervention characteristics, outcomes measured and main findings.

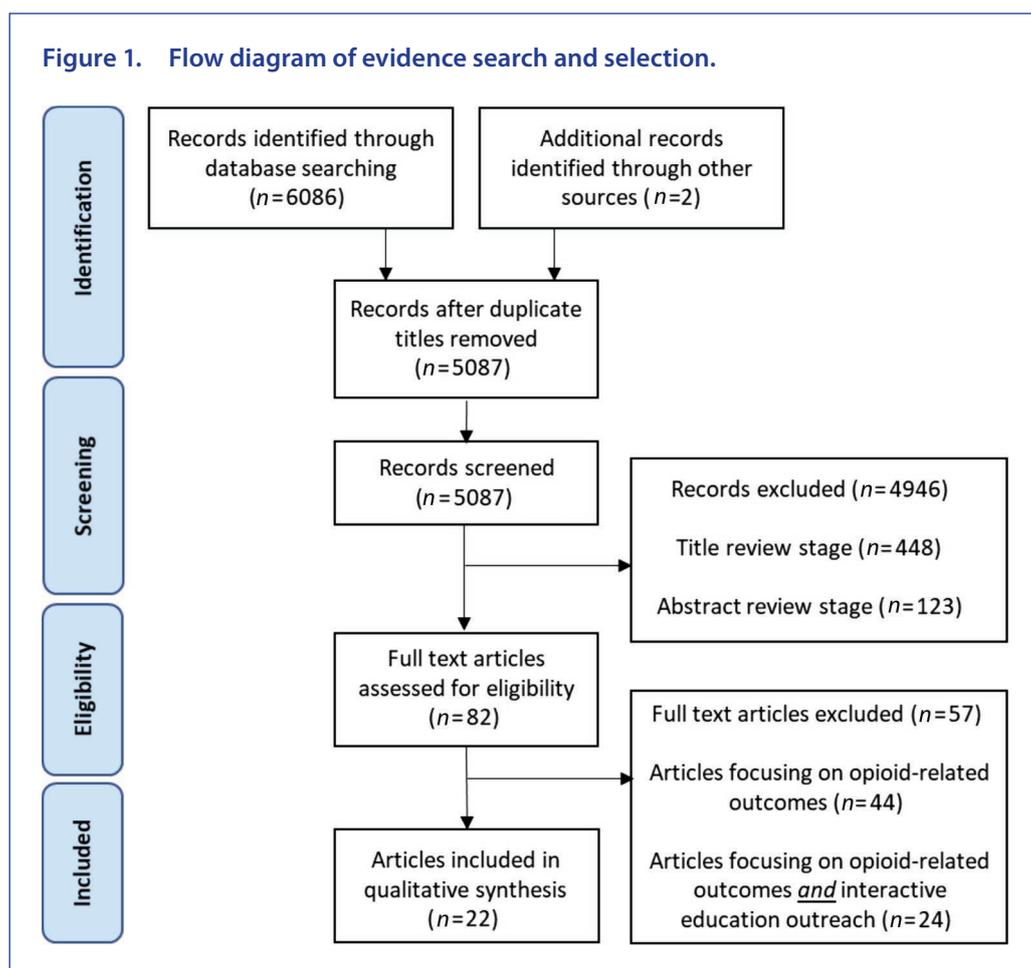
Results

Literature search

A total of 6086 citations were identified from all sources. There were 1001 duplicate titles removed, resulting in 5067 unique titles. After reviewing the titles and abstracts, 82 remaining articles were evaluated based on the inclusion and exclusion criteria. The resulting 22 articles were included for data extraction (Figure 1).

Study characteristics

Of the 22 full-text articles included, we identified 20 unique interventions (Tables 1 and 2).^{6,7,17–35} Sixteen (80%) of the interventions were published in the last 5 years. Interventions



were carried out in two countries, the United States ($n=17$) and Australia ($n=3$). Interventions were implemented in primary care settings, large health systems and community clinics. Physicians were the most common healthcare provider to receive AD ($n=19$). Sample sizes varied considerably amongst studies, ranging from 19 to 5452 participants, and appeared unrelated to site setting (i.e. a single hospital *versus* a health system). In general, most academic detailers were pharmacists or student pharmacists ($n=10$), followed by physicians ($n=8$), nurse care managers ($n=1$) and health department representatives ($n=1$).

One-on-one *versus* group type interventions

The AD interventions were designed to deliver key messages to providers, either one-on-one or in a small group setting.

Sixteen (80%) AD interventions were described as one-on-one opioid-related educational outreach (Table 1).^{6,17–32}

Amongst the one-on-one type interventions reporting AD visit duration ($n=13$), visit length ranged from less than 15 minutes to longer than an hour, with most interventions falling in the less than 15 minutes range ($n=6$). The interventions varied in the number of AD visits each provider received. Of the 16 one-on-one interventions considered, 9 utilized 1 AD visit per provider, 1 did not report the number of visits per provider

and 6 interventions used a multi-visit approach. All of the AD interventions included face-to-face interactions with the provider, whilst three interventions also included a subset of AD visits conducted via telephone or virtual platform.

The measures of the effectiveness of the AD programmes included provider satisfaction, provider knowledge, changes in opioid prescribing, implementation of the programme and opioid use disorder treatment. Eight one-on-one interventions administered a survey focused on provider satisfaction or knowledge of the AD material. Other outcomes evaluated included the number of opioid prescriptions dispensed ($n=7$), number of naloxone prescriptions ($n=3$), percentage of AD visit uptake amongst eligible providers ($n=2$), number of urine drug tests ($n=2$) and number of early opioid refills ($n=2$).

Four AD interventions were conducted in a small group setting, rather than one-on-one (Table 2).^{7,33–35} The group AD intervention duration ranged from less than 15 minutes to over an hour. Two of the interventions were single visits, whilst the other two studies involved multiple AD visits per provider ranging from 2 to 6 visits. Like the one-on-one type interventions, all were conducted in person. However, one intervention included additional conference telephone calls within their small groups.³⁴ Three out of four interventions that described group AD used a provider survey to assess provider

Table 1. Studies with one-on-one academic detailing.

First Author (Year)	Study setting	Country	Providers detailed	Detailer description	AD administration	Number of AD visits	Duration of AD (minutes)	Outcomes; measurement approach	Main findings
Barth et al. (2017) ¹⁷ Larson et al. (2018) ¹⁸	VHA, Community clinic ¹⁸ VHA ¹⁹	USA	Physicians (n=93) ¹⁸ Physicians (n=87) ¹⁹	Pharmacist	In-person	1	≥60 ¹⁸ 31–60 ¹⁹	Feasibility, ¹⁸ physician characteristics survey, academic detailer survey to characterize AD visit information and identify barriers to PMP use Knowledge gaps ¹⁹ Number of new PMP accounts and/or reactivation of inactive accounts, pre-intervention provider survey assessing PMP use	– 92% providers completed PMP logon after AD intervention ¹⁸ – Percentage of providers reporting barrier: 25% time, 8% difficulty using – 85% of providers newly registered or re-activated accounts ¹⁹ – Presurvey: 63% reported not using PMP in past month versus 26% reported past month PMP use – Postsurvey showed 10% reported PMP non-use, 66% reported PMP self-use, and 24% reported relying on others
Bounthavong et al. (2017) ¹⁹ Bounthavong et al. (2019) ²⁰	VHA	USA	Providers (Unspecified) (n=3313) ²² Physicians, NPs, PAs (n=5452) ²⁶	Pharmacist	In-person	Not specified	Not specified	Naloxone, feasibility, ²⁰ number naloxone prescriptions per month compared in providers AD exposed versus AD unexposed	– 23% of providers received ≥1 AD visit ²⁰ – Average number of naloxone prescriptions were 3.2 times greater in AD exposed versus unexposed providers (95% CI 2.0–5.3) – After 2 years: Average number of naloxone prescriptions were seven times greater in exposed versus unexposed providers (95% CI 3.0–17.9)

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Table 1. (Continued)

First Author (Year)	Study setting	Country	Providers detailed	Detailer description	AD administration	Number of AD visits	Duration of AD (minutes)	Outcomes; measurement approach	Main findings
Bounthavong et al. (2017) ¹⁹ Bounthavong et al. (2019) ²⁰ (Cont.)								Naloxone, feasibility ²¹ Count of naloxone prescriptions and prevalence of naloxone prescriptions per 1000 population compared in providers AD exposed versus AD unexposed Proportion of providers that received AD at each VA station each month	<ul style="list-style-type: none"> – Average difference in naloxone prescribing from baseline to 2 years was 7.1% greater in AD exposed versus unexposed providers (95% CI 2.0–12.5%) – Average station-level proportion of providers exposed to AD was 0.14 (SD 0.23)²¹ – Average number of naloxone prescriptions increased from 0.03/1000 population to 5.12/1000 – 18,603 naloxone prescriptions in exposed group versus 3811 in unexposed group: – Station with 100% of providers exposed to AD experienced 5.52 times the incidence rate of naloxone prescribing compared with stations not exposed to AD (95% CI 1.87–16.27)
Liebschutz et al. (2017) ²¹	Boston Medical Center and affiliated community health centres	USA	Physicians, NPs, PAs (n=53)	Expert in addiction and pain medication management	In-person	1	31–60	Provider adherence to guidelines; patient has signed CSA, ≥1 urine drug testing per patient and ≥2 early opioid refills within 12 months to assess provider adherence to chronic opioid guidelines	<ul style="list-style-type: none"> – TOPCARE intervention resulted in significant odds ratios (95% CI) in all outcomes except early refills – Patient has signed CSA: 2.5 (1.4–4.5) <i>p</i><0.01 – ≥1 urine drug testing per patient: 2.4 (1.3–4.4) <i>p</i><0.01 – ≥2 early opioid refills within 12 month: 1.1 (0.6–1.9) <i>p</i>=0.82

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Table 1. (Continued)

First Author (Year)	Study setting	Country	Providers detailed	Detailer description	AD administration	Number of AD visits	Duration of AD (minutes)	Outcomes; measurement approach	Main findings
Samet et al. (2020) ²²	Boston Medical Center, Emory University/Grady Hospital	USA	Physicians, NPs, PAs (n=41)	Opioid prescribing expert, nurse care manager, or co-investigator	In-person	Multiple	16–30	Provider adherence to guidelines; ≥2 urine drug tests, percent of patients with and any early COT refills at 12 months	– TEACH intervention versus usual care ≥2 urine drug tests: 71% versus 20% (AOR: 13.38; 95% CI 5.85–30.60; <i>p</i> <0.01) Early refills: 22% versus 30% (AOR: 0.55; 95% CI 0.26–1.15; <i>p</i> =0.11)
Saffore et al. (2020) ⁶	Large independent health system in Chicago Metropolitan area	USA	Physicians, NPs, PAs (n=149)	Pharmacist or student pharmacist	In-person	Multiple	≤15	Opioid prescribing; mean total opioid prescriptions and high-dose opioid prescriptions per clinician per month	– Difference-in-difference (95% CI) between intention to change and no-to-moderate intention to change groups: Total opioid prescriptions: –1.48 (–2.48 to –0.47) High-dose opioid prescriptions: –0.50 (–0.69 to –0.31)
Smart et al. (2021) ²³	Health care providers in Southern Illinois	USA	Physicians, NPs, PAs	Pharmacists	In-person, virtual	Multiple	16–30	Feasibility; number of first visits completed, number of virtual follow-up visits completed, provider survey measuring satisfaction in AD, detailer survey assessing feasibility	– First in-person visits completed 127/141 (90%), first provider survey response rate of 96% – Second virtual visits completed 92/120 (77%), second provider survey response rate of 61% – High level of satisfaction amongst providers, with first visit resulting in slightly higher satisfaction scores (mean difference –2.94, 95% CI –4.38 to –1.50; <i>p</i> <0.01) – No significant difference in provider satisfaction between WebEx versus telephone visits (–1.47 (–4.99 to 2.05; <i>p</i> =0.82)

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Table 1. (Continued)

First Author (Year)	Study setting	Country	Providers detailed	Detailer description	AD administration	Number of AD visits	Duration of AD (minutes)	Outcomes; measurement approach	Main findings
Smart et al. (2021) ²³ (Cont.)									<ul style="list-style-type: none"> - No significant difference in satisfaction caused by technical difficulties (-0.04, -3.30 to 3.38, $p=0.98$) - No significant difference in detailer perception of feasibility: Summary score of Detailer Assessment of Effectiveness (DAVE) instrument (0.05, -0.56 to 0.66; $p=0.86$) Individually reported items related to: Feasibility (0.07, -0.29 to 0.42; $p=0.72$) Conversation (0.05, -0.28 to 0.17; $p=0.63$)
Shaw et al. (2003) ²⁴	Australian hospitals	Australia	Physicians (n=49)	Pharmacist	In-person	Multiple	≤15	<p>Opioid prescribing; percent of incorrect opioid prescriptions written over 4 weeks per provider, pre-intervention</p> <p>provider survey assessing provider confidence in writing prescriptions correctly</p>	<ul style="list-style-type: none"> - Significant decrease in error rate (from 41% to 24%, $p<0.01$) - Self-rating of confidence in complying with the drugs of addiction requirements: increase in confidence from a mean of 3.25 (95% CI 2.92-3.58) to 4.14 (95% CI 3.90-4.38) after the AD intervention ($p=0.03$)

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Table 1. (Continued)

First Author (Year)	Study setting	Country	Providers detailed	Detailer description	AD administration	Number of AD visits	Duration of AD (minutes)	Outcomes; measurement approach	Main findings
May et al. (2009) ²⁵	Fayette County of Kentucky	USA	Physicians, NPs, PAs (n=102)	Pharmacist	In-person	Multiple	16–30	Feasibility; Percentage of AD visit uptake, percentage of visit retention and description of visit characteristic	<ul style="list-style-type: none"> – 78% eligible primary care physicians participated in the service – 72% of providers received first visit for the type 2 diabetes management programme – 58% of providers received first visit for chronic non-malignant pain programme Retention rates: type 2 diabetes 76/94 = 81% retention from first to second visit Chronic non-malignant pain 54/76 = 71% retention from first to second visit <ul style="list-style-type: none"> – All participants expressed willingness to participate in subsequent encounters
Kattan et al. (2016) ²⁶	Community clinic	USA	Physicians, NPs, PAs (n=1069 at visit #1, n=866 at visit #2)	Health Department Representatives	In-person	Multiple	≤15	Knowledge gaps, opioid prescriptions; pre-intervention provider survey to evaluate knowledge; changes in opioid prescribing patterns	<ul style="list-style-type: none"> – Survey results found statistically significant increase in knowledge of three key concepts: <ol style="list-style-type: none"> (1) a 3-day supply of opioids is usually sufficient for acute pain (2) avoid prescribing opioids for chronic non-cancer pain (3) avoid high-dose opioid prescriptions ($p<0.01$) – DID analysis showed no significant difference in overall opioid prescribing trends between Staten Island and other boroughs – DID analysis showed that prescribing rates of high-dose opioid decreased in Staten Island compared with other boroughs ($p<0.01$)

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Table 1. (Continued)

First Author (Year)	Study setting	Country	Providers detailed	Detailer description	AD administration	Number of AD visits	Duration of AD (minutes)	Outcomes; measurement approach	Main findings
Donaldson et al. (2017) ²⁷	Single hospital	Australia	ED prescribers (n=30)	Physician or Pharmacist	In-person	1	≤15	Opioid prescribing, feasibility; Median total amount of oxycodone prescribed per patient; percentage of patients receiving opioid use information upon discharge from ED, percentage of patients advice regarding appropriate postdischarge follow-up; percentage of patients receiving general practitioner notification that oxycodone had been prescribed; postintervention survey to assess provider satisfaction and intervention effectiveness	<ul style="list-style-type: none"> – Median total amount of oxycodone prescribed per patient decreased from 100 to 50 mg ($p=0.04$) – Differences in quality of oxycodone prescribing postintervention: given written information about oxycodone 12% increase ($p=0.04$); advised to follow-up with GP if more analgesia needed: 33% increase ($p<0.01$); discharge summary for GP stated oxycodone product: 73% increase ($p<0.01$); all three of the above parameters (primary endpoint): 16% increase ($p<0.01$) – Overall, providers either agreed or strongly agreed that the educational intervention would change their oxycodone prescribing

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Table 1. (Continued)

First Author (Year)	Study setting	Country	Providers detailed	Detailer description	AD administration	Number of AD visits	Duration of AD (minutes)	Outcomes; measurement approach	Main findings
Behar et al. (2017) ²⁸	Unspecified	USA	Physicians, NPs, PAs (n=40)	Not specified	In-person	1	16–30	Naloxone, feasibility; Characteristics of AD visit, change in naloxone prescribing assessed by number of naloxone prescription issued by each provider 4 months prior to and after intervention	<ul style="list-style-type: none"> – 84% of providers accepted intervention – 17% provider refused AD and cited insufficient time and disinterest – Successful means of contact were made through telephone (50%), email (48%) and direct in-person visit (2%) – Those receiving AD had a significantly greater increase in naloxone prescriptions (IRR 11.0, 95% CI 1.8–67.8; p=0.01) – Amongst detailed providers, naloxone prescriptions filled increased from 0 to 10 versus no change in non-AD – Amongst 24 detailed at 9 months, 12 reported writing ≥ 1 prescription for naloxone
Clark et al. (2019) ²⁹	Health System	USA	Physicians, NPs, PAs (n=27 clinics)	Physicians	In-person, telephone	1	Not specified	Knowledge gaps; Pre-intervention survey to assess provider knowledge and beliefs about buprenorphine, the number of new uptake clinics where at least 1 provider obtained a DATA waiver, the number of new physicians with DATA waivers	<ul style="list-style-type: none"> – 66% of clinics implemented intervention (620 providers) – Increase in DATA waivers from 0.8% to 7.1% – Increase in having ≥1 buprenorphine prescribers per clinic from 7.3% to 41.5% – MOUD treatment with buprenorphine increased from 7 to 41 patients, including 23 from providers with DATA waivers (16.4%) and 18 from providers without DATA waivers (3.5%) (OR 4.61, 95% CI 2.32–10.51)

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Table 1. (Continued)

First Author (Year)	Study setting	Country	Providers detailed	Detailer description	AD administration	Number of AD visits	Duration of AD (minutes)	Outcomes; measurement approach	Main findings
Stevens et al. (2019) ³⁰	St Vincent's Public Hospital, Sydney, Australia	Australia	Physicians	Senior anaesthetic/pain medicine consultant	In-person	1	16–30	Opioid prescribing; Change in the number of postoperative oxycodone immediate-release tablets dispensed at discharge	Audit-feedback plus AD decreased the average number of oxycodone tablets by 77 tablets/100 surgical cases (95% CI 39–115) The postintervention linear trend showed a monthly reduction of 3.2 tablets/100 surgical admissions (coefficient –3.2, 95% CI –4.5 to 1.8; $p < 0.01$)
Dieujouste et al. (2020) ³¹	VHA	USA	Physicians, NPs, PAs (n=61)	Pharmacist	In-person	1	Not specified	Opioid prescribing; change in average opioid prescribing rates pre- and postintervention	– 47.2% decrease in ED opioid prescribing rate after implementation of programme In the postintervention period rate, opioid prescribing decreased on average 0.87 times per quarter (95% CI 0.84–0.89)
Evoy et al. (2020) ³²	Community pharmacy	USA	Pharmacists (n=49)	Student pharmacist	In-person	1	≤15	Naloxone; pre-postintervention survey assessing pharmacist knowledge of naloxone dispensing	Amongst initial 49 pharmacies initially informing they would not dispense naloxone without a prescription, 37 responded they would dispense naloxone without a prescription after the intervention – 51% pre versus 71% post reported stocked naloxone ($p < 0.01$) – 43% pre versus 71% post would dispense naloxone to third party customer ($p < 0.01$) – 12% pre versus 37% post would submit an insurance claim of third-party customer ($p < 0.01$)

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Table 1. (Continued)

First Author (Year)	Study setting	Country	Providers detailed	Detailer description	AD administration	Number of AD visits	Duration of AD (minutes)	Outcomes; measurement approach	Main findings
Kennedy et al. (2021) ³⁶	Ambulatory care pharmacists in Vermont	USA	Pharmacists (n=33)	Pharmacist	In-person, virtual	1	≤15	Intervention feasibility; postintervention survey assessing the pharmacist's thoughts of the programme and likelihood of behaviour change	<ul style="list-style-type: none"> – 96% of pharmacists reported that the information would influence their practice – Of the pharmacists that completed a second survey a median 11.8 weeks after the AD session (33%): <ul style="list-style-type: none"> 100% reported that the AD session impacted their patient counselling and practice Pharmacists did not self-report behaviour change in regards to checking the prescription drug monitoring programme, offering non-opioid alternatives, and dispensing naloxone Pharmacists did self-report improvements in naloxone counselling

AOR, adjusted odds ratio; COT, chronic opioid therapy; AD, academic detailing; CSA, controlled substance agreement; DATA, Drug Addiction Treatment Act; DID, difference in differences; ED, emergency department; IRR, incidence rate ratio; MOUD, medication for opioid use disorder; NPs, nurse practitioners; PAs, physician assistants; PMP, prescription monitoring programme; USA, United States of America; VHA, Veterans Health Administration.

Table 2. Studies with group academic detailing.

First author (Year)	Study setting	Country	Provider description	Detailer description	AD administration	Number of AD visits	Duration of AD (minutes)	Outcomes; measurement approach	Main findings
Cochella (2011) ⁷	Rural and urban clinics	USA	Physicians, other HCP in attendance (n=581)	Physicians	In-person	1	≥60	Feasibility; presentation audience surveys at 1 and 6 months post-presentation measuring confidence to implement guidelines; change in unintentional overdose deaths	Follow-up surveys completed by 366 participants at 0 months, 82 participants at 1 month and 29 participants at 6 months – 85% of responding providers reported confidence in ability to describe and implement state guidelines 60–80% of responding providers reported no longer prescribing long-acting opioids Close to 50% responding providers noted using PMP during patient care and utilizing lower doses – 30–50% of responding providers reported obtaining EKG and sleep studies, using patient education tools and implementing guidelines – Utah OD deaths decreased 14.0% (301–259) in 2008 versus 2007 and rose in 2009 (259–265)
Abd-Elsayed (2018) ³³	Health System	USA	Physicians, RN, RPh, MA, student, other (n=138)	Not specified	In-person	1	≤15	Feasibility, naloxone;	Survey results: Response rate: 36%; 20% increase in understanding local statistics, improved understanding of CDC recommendations and likelihood to identify target patients,

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Table 2. (Continued)

First author (Year)	Study setting	Country	Provider description	Detailer description	AD administration	Number of AD visits	Duration of AD (minutes)	Outcomes; measurement approach	Main findings
Abd-Elsayed (2018) ³³ (cont.)								pre-postintervention survey measuring improved understanding of local statistics, knowledge of CDC naloxone prescribing recommendations, identification of patients needing naloxone, provider attitude on opioid antagonists, overall provider satisfaction; change in naloxone prescribing through EMR 3 months postintervention	86% of respondents indicate a plan to provide naloxone – Average satisfaction rating: 84/100 – 17.7% increase in overall naloxone prescribing through EMR – 300% increase in naloxone dispensed by ambulatory care pharmacist (9 versus 30)
Quanbeck (2018) ³⁴	Primary care clinics of University of Wisconsin Madison	USA	Physicians, nurses, medical assistants or licensed practical nurses, and administrative staff members administrative staff member, such as a receptionist (4 intervention clinics, 2 control clinics)	Family and addiction medicine physician	In-person and phone	Multiple	31–60	Feasibility, provider adherence to guidelines; multiple opioid-prescribing outcomes, postintervention survey measuring provider satisfaction	6 months statistically significant outcomes; slope of intervention minus control (95% CI) Percentage of patients with mental health screening: 0.029 (0.053–0.005; $p < 0.03$); up-to-date treatment agreements: 0.03 (0.051, 0.008; $p < 0.02$); urine drug screening: 0.029 (0.050, 0.008; $p < 0.02$); rates of opioid-benzodiazepine co-prescribing: – 0.002 (0.000 to – 0.003; $p < 0.02$); – 6 months not statistically significant outcomes

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Table 2. (Continued)

First author (Year)	Study setting	Country	Provider description	Detailer description	AD administration	Number of AD visits	Duration of AD (minutes)	Outcomes; measurement approach	Main findings
Quanbeck (2018) ³⁴ (Cont.)									Slope of intervention minus control (95% CI): Proportion of patients with consistent opioid prescription: -0.0001 (0.0000 to -0.0002 ; $p=0.237$); average MEDD: -0.581 (0.75 to -1.92 ; $p=0.425$); proportion with MEDD >120 : -0.001 (0.003 to -0.006 ; $p=0.624$) Postintervention survey: 89% of consented staff responded; overall positive results, leading authors to believe the intervention was adequate for the staff members
Voelker (2018) ³⁵	Gundersen Medical Center	USA	Obstetricians, nurse-midwives and family medicine physicians ($n=19$)	Senior physician	In-person	Multiple	≤ 15 , 16–30, 31–60	Opioid prescribing; change in the percentage and size of opioid prescriptions	The overall percentage of women who received prescriptions for opioid medications decreased from 100% to 93% in caesarean sections ($p=0.054$) and 15% to 9% in vaginal deliveries ($p=0.03$) The average prescription size decreased by five tablets ($p<0.01$)

AD, academic detailing; EMR, electronic medical record; HCP, healthcare provider; MA, medical assistant; MEDD, morphine equivalent daily dose; OD, opioid overdose; PMP, prescription monitoring programme; RN, registered nurse; RPh, registered pharmacist.

self-reported change, knowledge and intervention satisfaction. Change in the number of opioid prescriptions ($n=2$), change in unintentional overdose deaths ($n=1$) and change in naloxone prescriptions ($n=1$) were examples of outcome measurements seen in the group AD setting.

Opioid prescribing

Seven interventions used different approaches to examine opioid prescribing or prescribing activities after the AD interventions.^{6,24,26,27,30,31,35} In providers that self-reported an intention to change *versus* none-to-moderate intention to change, Saffore et al. compared mean total opioid and high-dose opioid prescriptions per clinician per month before and after the AD intervention.⁶ The authors found significantly fewer mean total opioid (-1.48 , 95% CI -2.48 to -0.47) and high-dose opioid (-0.50 , 95% CI -0.69 to -0.31) prescriptions per clinician per month in the intention to change group compared with the no-to-moderate intention to change group. Kattan et al. studied the effect of AD on Staten Island, New York City (NYC), providers' opioid prescribing rates compared with providers from four other NYC boroughs that did not receive AD.²⁶ Following the AD intervention, the investigators did not find a significant difference in overall opioid prescribing rates. However, they did find that, in comparison to the other NYC boroughs, Staten Island providers' high-dose opioid prescribing rates decreased and significantly differed from the four other NYC borough providers by 0.05 prescriptions per 10,000 residents in postcampaign period two ($\beta=0.05$, 95% CI 0.02–0.08).

Donaldson et al. conducted AD focused on oxycodone prescribing practices upon patient discharge within a group of emergency department (ED) providers.²⁷ After the AD intervention, 16% (95% CI 6–26) more providers gave patients written information about oxycodone, advised patients to follow-up with primary care provider if more analgesia was needed, and gave patients a discharge summary with oxycodone dose and indication. Dieujeste et al. reported that their multifaceted intervention of AD, audit, feedback and addition of electronic medical record prescribing resources resulted in the ED opioid prescribing rate decreasing by 47% over 21 months.³¹

Furthermore, investigators at St. Vincent's Public Hospital in Australia carried out several opioid-focused interventions but only found that AD, in addition to audit and feedback, decreased the number of postoperative oxycodone tablets prescribed by 77 tablets per 100 surgical cases (95% CI 39–115).³⁰ Other researchers in Australia focused their AD intervention on reducing the percent of incorrectly written opioid prescriptions.²⁴ They found that physicians had a significant decrease in error rate (from 41% to 24%, $p<0.01$) after an AD session with a pharmacist.

Voelker et al. studied the effects of AD on opioid prescribing for obstetric patients after childbirth. Whilst the average opioid prescription quantity decreased by five tablets ($p<0.01$) and the percentage of women who received opioid prescriptions

after vaginal delivery decreased from 15% to 9% ($p=0.03$), the percentage of women who received opioid prescriptions after caesarean sections were not statistically different after the AD intervention.³⁵

Naloxone

Four interventions were focused on naloxone, an opioid antagonist, rather than opioid-specific outcomes.^{19,20,28,32,33} Bounthavong et al. studied the effects of AD on naloxone prescribing in Veterans Health Administration (VHA) providers participating in the Opioid Overdose Education and Naloxone Distribution (OEND) programme and found a significant increase in the average number of naloxone prescriptions amongst providers.^{19,20} Behar et al. conducted a study in the San Francisco area that looked at the effects of naloxone-focused AD amongst 48 primary care providers and found a significant increase in naloxone prescriptions amongst those who received AD *versus* those who did not (incidence rate ratio (IRR) 11.0, 95% CI 1.8–67.8; $p=0.01$).²⁸ A pre–post quasi-experimental study by Evoy et al. examined the effects of a student-led naloxone AD intervention. The authors found a positive percent change in pharmacists reporting to stock naloxone (51% *versus* 71%; $p<0.01$), dispensing naloxone without a prescription (43% *versus* 71%; $p<0.01$) and submitting an insurance claim for naloxone (12% *versus* 37%; $p<0.01$).³² Abd-Elseyed et al. examined how naloxone-focused AD in small group settings affected knowledge of CDC naloxone prescribing recommendations, identifying patients needing naloxone, naloxone prescribing and naloxone dispensing. Although there was a low response rate to the AD participant survey (36%), there was a 20% improvement in understanding CDC recommendations and recognizing naloxone-eligible patients as those using benzodiazepines and taking 60 morphine milligram equivalents per day. The authors also found that there was an 18% increase in naloxone prescribing and dispensing.

Provider knowledge gaps

Three interventions measured the impact of AD on knowledge of opioid prescribing, the prescription monitoring programme (PMP) and opioid use disorder (OUD) treatment.^{18,26,29} Kattan et al. used verbal pre–postintervention provider surveys to assess knowledge related to opioid treatment of non-cancer pain.²⁶ The authors found that after the AD intervention, there were statistically significant increases in correct responses ($p<0.01$) for each of the three survey questions. Larson et al. aimed to increase PMP use in South Carolina by using AD sessions to register prescribers to the PMP and describe how to use it appropriately to monitor patients.¹⁸ This intervention increased monthly provider-reported PMP use from 37% to 88% ($p<0.01$) within a group of providers who self-reported PMP use and who relied on others to check the PMP for them. Moreover, a study by Clark et al. initially assessed provider knowledge, beliefs and barriers to the buprenorphine prescribing process.²⁹

The top concerns of physicians were challenges around the treatment of OUD patients, limited outpatient counselling options for substance use, the time needed to manage OUD patients and insufficient personal knowledge about prescribing buprenorphine. After the multifaceted intervention with AD, there was an increase in buprenorphine prescribers and patients receiving OUD treatment.

Provider adherence to guidelines

In our review, three interventions aimed to increase provider adherence to opioid prescribing guidelines.^{21,22,34} Each intervention was multifaceted and included components in addition to AD. The Transforming Opioid Prescribing in Primary Care (TOPCARE) intervention was described by Liebschutz et al.²¹ The primary outcome was an assessment of provider adherence to chronic opioid prescribing guidelines by the following: the presence of a Controlled Substance Agreement (CSA) with a patient, ≥ 1 urine drug testing per patient and ≥ 2 early opioid refills within 12 months. Liebschutz et al. found that the TOPCARE intervention resulted in a statistically significant increase in odds of all outcomes, except early refills. Another intervention based out of Boston Medical Center, Targeting Effective Analgesia in Clinics for HIV (TEACH), was described by Samet et al. with similar primary outcomes as the TOPCARE intervention.²² Provider adherence to opioid prescribing guidelines was assessed by having ≥ 2 urine drug tests per patient and percent of patients with any early chronic opioid therapy refills at 12 months. Samet et al. found that the odds of patients receiving ≥ 2 urine drug tests were more likely in providers who received the TEACH intervention. The adjusted odds ratio for early refills of chronic opioid therapy was not statistically significant. Moreover, a randomized matched-pairs study conducted by Quanbeck et al. aimed to assess a multifaceted intervention's effectiveness in enhancing provider adherence to guidelines.³⁴ Adherence to guidelines resulted in statistically significant increases in the following outcomes: percentage of patients with mental health screening, up-to-date treatment agreements and urine drug testing. Statistically significant decreases occurred in opioid-benzodiazepine co-prescribing rates. The effectiveness outcomes of the proportion of patients with a consistent opioid prescription, average morphine equivalent daily dose prescribed, and proportion of patients with morphine equivalent daily dose greater than 120 were not significantly impacted by provider adherence to guidelines.

Intervention feasibility

Fifteen interventions captured information on the feasibility of conducting the intervention based on study characteristics, goals and outcomes.^{6,7,17–20,23,25,27,28,31,33,34,36}

AD uptake was reported as a feasibility measure in three interventions.^{19,20,23,25} Bounthavong et al. measured AD uptake by the number of providers that received one or more AD visits (23%) and the average percentage of providers at each station exposed to the intervention *versus* unexposed (14%).^{19,20}

Smart et al. measured the number of first visits completed (90%), second visits completed (77%), and the response rate of provider surveys to first (96%) and second (61%) visits.²³ Similarly, May et al. measured the number of providers who completed the first visit (78%) and the retention rate from the first to second visit (71%) of their chronic pain programme.²⁵

The feasibility of AD interventions may also be understood through a description of AD visit characteristics and different barriers identified with AD.^{17,28} Behar et al. described the implementation of a naloxone AD intervention by measuring the number of providers that accepted the invitation (84%), providers' reasons for refusal of AD being lack of time and interest, and how successful means of contact were primarily made by telephone and email.²⁸ Barth et al. surveyed academic detailers to identify barriers of providers using the PMP and found that providers cited time needed to check the PMP (25%) and difficulty using the platform (8%) as barriers to use.¹⁷

Six interventions described feasibility by reporting provider satisfaction, input and self-reported changes via provider surveys.^{7,23,27,33,34,36} Donaldson et al. found that ED providers agreed that their opioid prescribing would change after the AD session (67%), strongly agreed that that the AD session was an appropriate length of time (70%) and strongly agreed that AD was interactive (67%).²⁷ After a group AD intervention in Utah, Coachella et al. found that providers were confident in implementing state opioid guidelines (85%) and no longer prescribing long-acting opioids (60–80%).⁷ Further, Kennedy et al. found that 96% of pharmacists that received naloxone-focused AD reported that the provided information would influence their practice.³⁶ The investigators administered a second survey to the participating pharmacists and found that 100% of the respondents reported that AD impacted their practice. However, the pharmacists did not self-report behaviour change regarding checking the prescription drug monitoring programme, offering non-opioid alternatives and dispensing naloxone. Moreover, Quanbeck et al. assessed provider satisfaction via a detailed provider survey.³⁴ They found that providers strongly agreed they had a better understanding of long-term opioid prescribing risks and benefits (50%), strongly agreed that they were more familiar with the literature surrounding long-term opioid use (50%) and strongly agreed they felt more able to meet the opioid prescribing recommendations of their health system (58%).³⁴ Abd-Elsayed et al. evaluated provider satisfaction with the structure of a naloxone AD intervention. Providers were asked to rate their satisfaction from 0 to 100, with 100 points being the highest, resulting in an average rating of 84 points.³³

Discussion

We identified 20 interactive opioid-related AD interventions delivered in various formats, with 7 interventions specifically resulting in decreased opioid prescribing.^{6,7,17–35} The majority of the interventions were one on one. All interventions varied widely in the number and type of providers detailed, the

duration of AD visits and the outcomes evaluated. Overall, the studies evaluating the interventions reported a desired effect of AD on their respective outcomes.

There was much heterogeneity in study design and AD programme delivery. Research suggests AD is most effective in one-on-one settings because of the personalized nature of the intervention.^{9,10} However, we also included interventions using small group settings so long as an interactive environment between the detailer and providers was present. Additionally, we found some studies included AD as a component of a multifaceted intervention delivered to providers, thus limiting our ability to attribute the effects of those interventions solely to AD.

Although most studies reported statistically significant changes in the measured outcome following AD implementation, most interventions only consisted of a single AD visit, limiting investigators' ability to evaluate long-term effectiveness. A single AD visit may not be enough to foster a trustworthy, sustainable relationship between a detailer and provider, which is essential in impacting provider behaviors.³⁷ Furthermore, several studies were quasi-experimental, therefore susceptible to threats to internal validity due to lack of randomization and blinding. Moreover, the quality of reporting of relevant study elements was inconsistent, such as missing information about the number of participants, duration of visits and the number of visits. Additionally, external factors may have also influenced the intervention's outcome measures because of local and national attention drawn to the opioid epidemic.

This review advances the literature in several respects. It focuses specifically on the characteristics and impact of AD interventions to improve opioid-related prescribing and related indicators. AD refers to a specific type of educational outreach shown to be effective across a range of disease areas that is well suited to mitigate the opioid epidemic and clinician uncertainty about pain management.^{6–8} This topic is particularly relevant

to public health initiatives in the current environment where provider education about pain management and opioid prescribing is of heightened concern as opioid-related overdoses surge again in the wake of COVID-19.²

Our review had several limitations. It was not an exhaustive review of the literature and our aims were limited to the description of the studies and results rather than critically appraising the quality of the studies.³⁸ We restricted the search to English-language articles in two primary bibliographic sources. Due to considerable heterogeneity across interventions and outcomes, we had limited ability to generalize about preferred approaches to AD delivery. As found in other reviews, there was considerable variation in the design and delivery of AD programmes as well as the metrics employed to assess effectiveness, which made it challenging to make summary statements about the overall effectiveness of AD programmes in impacting specific outcomes. However, these findings reveal the importance of using a range of measures to understand the impact of such programmes on providers and their patients.

Conclusion

All the identified programmes varied in their execution and evaluation of opioid-related AD interventions. The studies we included in our scoping review were heterogeneous in many aspects and cannot be compared one-to-one; however, 80% of the interventions resulted in statistically significant changes in one or more of their outcomes. Overall, the most common opioid-related AD intervention was conducted one-on-one between a pharmacist and a primary care provider, consisted of one visit, and lasted 16–30 minutes. Generally, opioid-related AD interventions were effective in outcomes such as changes in naloxone prescriptions and dispensing, opioid prescriptions, provider knowledge and adherence to guidelines.

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