

BMJ Open Industry strategies to market opioids to children and women in the USA: a content analysis of internal industry documents from 1999 to 2017 released in State of Oklahoma v. Purdue Pharma, L.P. *et al*

Hanna Yakubi, Brian Gac, Dorie E Apollonio 

To cite: Yakubi H, Gac B, Apollonio DE. Industry strategies to market opioids to children and women in the USA: a content analysis of internal industry documents from 1999 to 2017 released in State of Oklahoma v. Purdue Pharma, L.P. *et al*. *BMJ Open* 2022;**12**:e052636. doi:10.1136/bmjopen-2021-052636

► Prepublication history and additional supplemental material for this paper are available online. To view these files, please visit the journal online (<http://dx.doi.org/10.1136/bmjopen-2021-052636>).

Received 21 April 2021
Accepted 19 October 2022



© Author(s) (or their employer(s)) 2022. Re-use permitted under CC BY-NC. No commercial re-use. See rights and permissions. Published by BMJ.

Department of Clinical Pharmacy, University of California, San Francisco, California, USA

Correspondence to

Dr Dorie E Apollonio;
dorie.apollonio@ucsf.edu

ABSTRACT

Objective Identify advertising strategies used to market opioids to women and children.

Design Qualitative content analysis of internal pharmaceutical industry documents released in litigation, dated between 1999 and 2017.

Setting USA.

Participants Opioid manufacturers (Janssen, Ortho-McNeil, Purdue, Teva (Actavis), Janus, Cephalon); women; children.

Primary and secondary outcome measures Advertising campaigns, industry executive statements regarding marketing goals

Methods We examined ((DATASET) link: <https://www.industrydocuments.ucsf.edu/drug/>) documents released in State of Oklahoma v. Johnson & Johnson (2019) to identify marketing strategies and campaigns developed by opioid manufacturers that focused on children and women, as well as public records, including websites developed by manufacturers and their allies, to confirm whether marketing campaigns proposed in internal industry documents were implemented. Documents identified as relevant were coded for themes based on expectations drawn from previous research on marketing using internal industry documents, which included making emotional appeals and understating the risks of addiction.

Results We found that opioid manufacturers sought to recruit coaches and school nurses to encourage opioid use by children, developed unbranded initiatives suggesting adolescents ask providers for pain care medications, suggested that opioid use could reduce health risks associated with untreated pain among women and advocated to policy makers that women faced unmet needs for pain medication.

Conclusions The USA strictly regulates direct marketing of medications but does not place the same restrictions on indirect marketing and unbranded campaigns, which encourage people to seek treatment without indicating the names of specific products. Opioid manufacturers in the early 21st century appear to have relied largely on unbranded campaigns for marketing, which they described externally as public health promotion and internally as

STRENGTHS AND LIMITATIONS OF THIS STUDY

- ⇒ A major strength of this study is that it used new data, specifically internal industry documents released in litigation against pharmaceutical companies, to identify how opioid manufacturers market to consumers.
- ⇒ An additional strength was that it validated the existence of marketing strategies mentioned in internal industry documents by checking public records.
- ⇒ The main limitation is that documents released during legal discovery are likely incomplete and may exclude relevant material.

a way to increase sales of opioids. The rapid increase in opioid use concomitant with these campaigns suggests that additional scrutiny of this kind of marketing may be needed in order to protect vulnerable groups.

INTRODUCTION

Since 1999, nearly 841 000 people have died in the USA from drug overdoses and in 2019 roughly 70% of all drug overdose deaths involved opioids.¹ Between 21% and 29% of people who use opioids report misuse and 8%–12% advance to addiction.² The 2019 National Survey on Drug Use and Health (NSDUH) found that 3.3% of women aged 12 and older misused opioids,³ and women are more likely to misuse prescription opioids than men.^{4 5} Sixty-five per cent of opioid prescriptions are held by women and their use has led to negative health consequences during pregnancy; the incidence of neonatal abstinence syndrome (NAS) increased five-fold from 2004 to 2014 in the USA, with the incidence of maternal opioid use disorder rising by a similar rate.^{6 7} Data drawn from NSDUH in 2015 and 2016 found that 3.8%



of adolescents misused opioids⁸; this misuse is linked to parental medical use of prescription opioids.⁹ Parental prescriptions are also linked with overdoses among children ages 0–5 years.^{10–11} However research on the risks of opioids has paid relatively limited attention to children,^{12–14} despite the fact that by 2015 one-fourth of US high school seniors reported using opioids.^{15–16} Younger children also use opioids; in one study of children ages 2–17 enrolled in Medicaid in Tennessee from 1999 to 2014, 15% had filled an opioid prescription annually.¹⁷ Among those prescribed opioids for pain, prescriptions were frequently given for conditions that were not severe, 1 in every 2611 prescriptions was associated with an emergency department visit, hospitalisation or death, and 89% of those adverse events were related to therapeutic use.^{17,18} Paediatric hospitalisations for opioid poisonings doubled between 1997 and 2012,¹² representing over a quarter of all opioid poisonings as of 2018,¹⁹ and mortality rates from paediatric opioid exposures nearly tripled from 1999 to 2016.¹³ As with adults, opioid misuse among adolescents typically follows medical use by prescription.^{15–18}

On 30 June 2017, the state of Oklahoma brought a lawsuit against Johnson & Johnson, Purdue Pharma, and 11 other pharmaceutical manufacturers, claiming that they overestimated the efficacy and underestimated the safety risks of opioids and encouraged physicians to prescribe more of these medications, even when patients exhibited signs of addiction.²⁰ In 2019, these manufacturers were fined US\$465 million for intentionally overstating the clinical benefit and minimising the addictive potential of opioids,^{21–22} and since then additional litigation has led to fines of over US\$355 million.²³ The Oklahoma verdict specifically referenced issues with unbranded campaigns, a form of direct-to-consumer marketing that highlights disease awareness and the need to seek medical care but do not reference specific brands and as a result are not subject to US Food and Drug Administration (FDA) regulations that require a ‘fair balance’ of both positive and negative information in advertising.²⁴ This advertising has been found to misinform patients about disease causes and prevalence, overemphasise drug benefits, sensationalise natural or trivial conditions, and lead to inappropriate prescribing,^{25–26} especially among women.²⁷ By encouraging patients to seek prescriptions, they can also increase sales for manufacturers.^{28–29}

Studying industry marketing is frequently challenging, in part due to difficulties in collecting data. Research on other industries has addressed this limitation by reviewing internal documents released in litigation.^{30–31} Although industry documents are often first reported on in the popular media, past document-based research has identified ways that industries seek to influence consumers, clinicians and researchers to increase sales and profits.³⁰ Studies using internal industry documents have found that other industries, such as tobacco and sugar companies, have marketed directly to vulnerable groups, including children^{32–34} and women,³⁵ among others.^{36–38} Children are particularly susceptible to predatory marketing

tactics,³⁹ which in the case of tobacco included tailored slogans and emotional appeals,⁴⁰ misrepresentation of the potential for addiction,³⁷ and sponsorship of popular brands and events.³⁶ Prior research on opioid industry marketing has primarily focused on efforts by manufacturers to influence physicians,^{41–45} with little study of industry efforts to market directly to population groups that have been disproportionately affected. The extent of opioid industry marketing is an area of concern given increasing mortality attributed to opioid use. In this study, we reviewed and analysed internal industry documents released in the State of Oklahoma lawsuit to identify strategies used to market opioids to children and women. We hypothesised that like the tobacco and food industries, opioid manufacturers advertised directly to these groups in an effort to increase their consumption of opioids.

METHODS

Our study relied on a retrospective qualitative content analysis of pharmaceutical industry documents. Since 2005, internal documents released during lawsuits against pharmaceutical companies have been stored in the Drug Industry Document Archive (DIDA) at the University of California, San Francisco, a public, open access repository ((DATASET) link: <https://www.industrydocuments.ucsf.edu/opioids/>).⁴⁶ In January 2020, DIDA released 503 documents totaling 62 703 pages drawn from the State of Oklahoma lawsuit brought against 13 opioid manufacturers including Purdue Pharma, Janssen and Ortho-McNeil (both subsidiaries of Johnson & Johnson, merged into a single entity in August 2011), Johnson & Johnson, Teva (Actavis), Cephalon, Allergan and Watson.^{20–47} While sources disagree on the share of the opioid market controlled by these companies, Actavis was identified as the highest-volume manufacturer of opioids in Oklahoma, with Purdue ranked fifth; Johnson & Johnson was identified as producing active ingredients used in 60% of oxycodone available in the USA.⁴⁸ Documents produced in the lawsuit included reports of relevant clinical trials, witness declarations, internal corporate communications and marketing strategy outlines regarding opioids through 2017. The 503 documents constituting the Oklahoma Opioid Litigation Document Collection were the primary database for the study.

Two authors (HY and BG) independently read and coded all of the 503 documents included in the archive and created a master file from them containing key quotes, figures and concepts. To ensure every document was examined, each author involved (HY and BG) individually checked each of the 503 documents’ unique identification codes to ensure it was represented in the master document shared by all authors. After this review, one investigator (HY) copied documents from the master file identified as relevant to the industry’s targeting of vulnerable populations, defined as patients with psychosocial characteristics that could make them more vulnerable to pharmaceutical industry marketing

and that included, but were not limited to, populations historically exploited by the tobacco industry.^{36–38 49} Targeting was defined as any explicit reference to business, marketing, outreach or advertising strategies that focused on increasing opioid sales or creating favourable perceptions of opioid products among these groups. Opioid manufacturers listed target markets in these documents, which included women and children (as well as a handful of other groups, including veterans,⁵⁰ but not men or adults explicitly). The same investigator (HY) then reviewed each document again for explicit references to either children or women.

Following this assessment, all authors generated a list of relevant search terms, including ‘adolescent’, ‘school’, ‘coaches’, ‘sports’, ‘pregnancy’, ‘RSD’ and ‘fibromyalgia’. As a verification strategy, two authors (HY and BG) searched for these terms in the online archive of all 503 documents to ensure no relevant documents had been missed; no additional documents were identified.

Documents were coded using modified grounded theory, an inductive methodology that uses source material to identify hypotheses and that has previously been used in the analysis of pharmaceutical industry documents,^{50 51} to categorise evidence based on general themes. A preliminary categorisation of themes was based on those identified in research on tobacco, specifically emotional appeals, misrepresentation of the potential for addiction and efforts to influence policy makers.^{36 37 40} In addition, referencing past research using pharmaceutical industry documents, the documents were assessed for references to marketing to consumers such as unbranded campaigns.^{52–54} The industry’s targeted marketing to groups that had been disproportionately affected by the opioid epidemic was independently identified by all authors as a unique category for coding. When multiple documents made similar claims or presented similar ideas they were categorised together. If there was question of a document’s relevance to the study or its categorisation, it was discussed by all three authors until consensus was reached. Documents were excluded from analysis if they did not contain information due to redaction prior to release or when it was impossible to identify whether they were relevant. Additional details on methodology are provided in online supplemental file.

To triangulate and verify these findings, one author (DEA) checked the Internet Archive ‘Wayback Machine’ (<https://archive.org/web/>) to track changes in industry-sponsored websites for unbranded campaigns identified in the documents. Another (HY) searched Dollars for Docs from ProPublica (<https://projects.propublica.org/docdollars/>) and Open Secrets (<https://open-secrets.org>) for payments made from pharmaceutical companies to physicians and policy makers named in the documents.

Patient and public involvement

No patient involvement.

RESULTS

We reviewed industry strategies to market opioids to two groups: children (including adolescents) and women (including pregnant women). For each of these groups, the following results first review corporate marketing plans, and assess how they were implemented based on two themes identified: advocacy to policy makers and unbranded campaigns.

Opioid industry targeting of children

Corporate strategic planning

In 2003, Janssen (the pharmaceutical division of Johnson & Johnson) generated an internal summary of their Duragesic (fentanyl patch) brand that targeted young patients as a source of franchise expansion. Analysis of the marketplace for Duragesic listed ‘paediatric exclusivity’ as a growth opportunity and indicated that a ‘paediatric extension request’ was submitted to the FDA as part of an initiative to ‘continue development of products to maximise the pain franchise’.⁵⁵

Janssen’s focus on young patients was not limited to their Duragesic brand. In an October 2011 meeting of the Imagine the Possibilities Pain Coalition, a group of professionals within Janssen who aimed to ‘create a broad-based community in the field of Pain Management,’ repeatedly identified youth as a desired target.⁵⁶ The Coalition’s Media Outreach team was tasked with targeting three separate groups: ‘youth, military veterans, public’ and sought to ‘destigmatise pain’.⁵⁶ The team targeted children as young as elementary school in an initiative to ‘reach early’ and designed a ‘practical message’ of ‘pain is your body telling you something is important’ to be delivered ‘via respected channels, for example, coaches.’⁵⁶ A slide from the presentation is shown in figure 1.

Media Outreach Initiatives

Reaching out to: *Youth*

- reach early: elementary school level; via respected channels, e.g., coaches
- deliver a practical message: Pain is your body telling you something important.

Reaching out to: *Returning Veterans*

- where do they get their information about pain management
- change the paradigm of stoicism: the positive side of pain management

Reaching out to: *Media*

- capture venues that the media want to cover, e.g., art created by people in pain
- emphasize that the problem of poorly managed pain is often lost to the topic of fear of addiction, even though it is an issue of many magnitudes greater concern

s1166-0006 Imagine the Possibilities Pain Coalition

Figure 1 Excerpt from the October 2011 ‘Imagine the possibilities pain coalition’ meeting. The coalition served as group of leaders in pain management and Janssen professionals that aimed to influence the perception of pain among target groups which included youth and military veterans. Source: ((DATASET) link: <https://www.industrydocuments.ucsf.edu/drug/>) UCSF drug industry documents Archive (CC BY-NC-ND 3.0).

In a May 2012 meeting, the Coalition's Public Policy/Advocacy team, with the stated goal of 'chang(ing) the conversation about pain,'⁵⁶ also identified adolescents as a target audience. Like the Media Outreach team, the Public Policy/Advocacy team proposed emphasising the role of pain in 'sports and activities' with the tagline 'LESSONS LEARNED—HEALTH MATTERS (emphasis in original).'⁵⁷

Advocacy to policy makers

We identified documents from multiple companies, most involved in the Oklahoma litigation, that undertook advocacy to policymakers: Janssen, Ortho-McNeil (both subsidiaries of Johnson & Johnson, merged into a single entity in August 2011), Johnson & Johnson itself, Purdue, Teva (Actavis), Cephalon and Janus. One of the leaders of Janssen's Public Policy/Advocacy team, Bob Twillman, had historically worked closely with other pharmaceutical companies to advocate opioid-friendly policy positions. In 2012, Twillman led a task force development a 'Pain Care Forum' to create and urge CDC approval of 'Clinical guidelines for the use of Chronic Opioid Therapy in Chronic Non-Cancer Pain'⁵⁸ and in 2013, Twillman spoke at an FDA public hearing to argue that the reclassification of hydrocodone products from schedule III to schedule II would be too costly.⁵⁹ The Pain Care Forum was a coalition of pharmaceutical companies and advocacy organisations that aimed to be the 'voice on pain care issues in Washington,'⁶⁰ and in 2010, was comprised of 60 organisations including the companies named above as well as Pfizer and Allergan, and the American Pain Foundation, American Academy of Pain Management, and American Pharmacists Association.⁶¹ The executive committee was comprised of industry leaders from Purdue Pharma and Ligand Pharmaceuticals, as well as leaders from American Pain Foundation and National Hospice and Palliative Care Organisation.^{61 62} In a 2008 email from Howard R. Udell, Executive Vice President and Chief Legal Officer at Purdue Pharma, to Burt Rosen, Vice President of Government Affairs at Purdue Pharma, Udell noted that 'The PCF (Pain Care Forum) has become 'a force' to be courted by members of Congress.'⁶³

In June 2006, the American Pain Foundation and the Pain Care Forum presented a briefing on the 'Epidemic of Pain in America' to members of Congress on Capitol Hill.⁶⁴ The presentation was in cooperation with Representative Mike Rogers, who had received over US\$600 000 in contributions from the pharmaceutical industry from 1995 to 2015.⁶⁵ Supporting material from the Epidemic of Pain in American briefing showed that the Pain Care Forum advocated for pain treatment in young patients. The Forum emphasised that 'pain affects people at all stages of life—including infants, children, young adults and the elderly.'⁶⁴

Research!America, an advocacy organisation that promotes medical research, included a flyer in the briefing noting, 'as many as 20% of children experience chronic pain.'⁶⁴ Research!America was extensively

involved with the pharmaceutical and opioid industry; a November 2008 internal memo from the Pain Care Forum showed that Research!America was actively 'looking for industry financial (and planning) support' for a 2009 Pain Summit,⁵⁸ and an internal email from Jon Sackler of Purdue indicated that Research!America had a long term relationship with the Sackler family and until February 2018 named their national leadership award the 'Raymond and Beverley Sackler award.'⁶⁶

Unbranded campaigns

Companies named in the Oklahoma lawsuit also created unbranded campaigns to target adolescents. In June 2007, an Ortho-McNeil internal presentation titled 'Non-Branded Promotions' indicated that it sought to partner with advocacy groups in unbranded campaigns to 'establish instant credibility,' 'develop good will' and 'alleviate regulatory anxiety.'⁶⁷ A 2008 strategy document for the marketing of Janssen's Nucynta (tapentadol) indicated that the goal of direct-to-patient unbranded campaigns was 'to increase patient origination.'⁶⁸

A separate 2008 Janssen internal presentation titled 'Pain Non-Branded Campaign Market Research' described an unbranded initiative with the outward-facing message of bringing awareness to physicians about undertreated acute pain, but indicated that the expected impact was 'primary care providers stat(ing) that they will be more aggressive in their treatment and use more opioids.'⁶⁹ This unbranded initiative focused on the negative consequences of undertreated acute pain and emphasised multipathway pain treatment in order to encourage physicians to adopt a 'more aggressive approach to treating (stronger dosing and meds).'⁶⁹ The campaign also attempted to address physician concerns about addiction by 'refocusing them from addiction to side effect concerns.'⁶⁹ The marketing research concluded with the identification of 'the elderly, younger patients, post-operative and post-trauma patients' as target groups.⁶⁹

Two specific unbranded campaigns centred on young patients. In 2008, Janssen partnered with the National Association of School Nurses (NASN) to launch Smart Moves, Smart Choices, a programme that proposed bringing awareness to prescription drug abuse among teenagers.^{70 71} However, internal Janssen documents classified Smart Moves, Smart Choices as an unbranded campaign.⁷² Smart Moves, Smart Choices was also included as part of Janssen's 'Pain Franchise' public relations programme and for their opioid product Nucynta,⁷³ specifically as part of a larger strategic approach to 'redirect dialogue from drug control to controlling pain (emphasis in original)',⁷⁴ and to 'educate/influence to maintain physician/patient access.'⁷³ The programme launched a website in 2010 as a partnership between NASN and PriCara⁷⁵ (later Janssen^{76 77}) and continued to list Janssen as a partner through November 2018.⁷⁸ In January 2019, the website contained the same materials but stopped listing Janssen as a sponsor.⁷⁹ As of July 2022,

Smart Moves, Smart Choices website address redirected to the NASN main page.⁸⁰

In December 2011, Janssen and Janus partnered with the American Chronic Pain Association (ACPA) to launch a separate unbranded campaign, Growing Pains. Robyn Kohn, Director of Medical Education at Janssen, noted this was a ‘significant contribution to the understanding of pain among the child and adolescent populations.’⁸¹ The ACPA described Growing Pains as a ‘a new social networking site for young people with pain’ and allowed children as young as 13 years old to become members.⁸² This unbranded campaign encouraged adolescent patients to seek help for pain. The programme website, launched in 2013, listed funding by Janssen and included a page on ‘Talking With Health Care Providers’ that stated ‘you can manage [pain] by improving the quality of your life, increasing your function, and reducing your sense of suffering,’ claims similar or identical to those made in other opioid marketing campaigns.^{50 83} The Growing Pains website was maintained through at least 2021.⁸⁴

Opioid industry targeting of women

Corporate strategic planning

In a presentation to increase its European sales after 2001, Johnson & Johnson emphasised that one of its ‘major franchises’ was ‘women’s health.’⁸⁵ In 2012, Janssen (a subsidiary) expanded its marketing to women with a new ‘Mainstream Media Pitch’.⁸⁶ In 2013, Teva created an ‘Advocacy Mapping’ plan to ‘understand potential alliances and detractors... to engage and/or minimize them’ which specifically noted potential allies that focused on women’s health.⁸⁷

Advocacy to policy makers

The Pain Care Forum developed by multiple opioid manufacturers also advocated for opioid use by women. Documents from the Pain Care Forum’s June 2006 briefing with lawmakers, described above, indicated it sought to establish a perceived need for painkillers among women. While describing the demographics of pain, the Forum specified ‘women’s pain reports are taken less seriously than men’s’ and ‘women receive less aggressive treatment than men for their pain’.⁶⁴

As part of their message that chronic undertreated pain disproportionately affects women, the Pain Care Forum shared stories of women suffering from unresolved chronic pain due to reflex sympathetic dystrophy (RSD), which it spotlighted as a pain condition that affected women more than men.⁶⁴ Documents used as supporting material from the Pain Care Forum briefing showed a pattern of using personal anecdotes about RSD to warn of the disastrous effects of untreated chronic pain among women. One story focused on Barbara, who suffered from RSD, and warned ‘when the pain rises up, I think it is not really worth living.’⁶⁴ The story featured Barbara’s female friend who ‘probably had RSD’ and ‘eventually committed suicide’.⁶⁴ Another story focused on Alexandra, a sixteen-year-old woman suffering from RSD since the age of ten,

who grieved the loss of her childhood due to untreated chronic pain and noted that her senior year had been spent ‘tak[ing] more medications than my grandparents’ and spending time in the hospital ‘just wishing to walk.’⁶⁴ Although the Pain Care Forum claimed that pain stories like Alexandra’s are ‘told 50 million times,’⁶⁴ there was no accompanying context: RSD is a rare disease and likely not representative of how most women experience pain or their resulting levels of disability.^{88 89}

The same briefing included a 2006 article from The Washington Post which focused on physician Howard Heit. It highlighted his decision to prescribe Oxycontin to his pregnant daughter-in-law and that her infant did not experience withdrawal symptoms, implying that opioid use could be safe for pregnant women and their newborns.⁶⁴ The article noted, ‘she [Heit’s daughter-in-law] knew she could never get through the pregnancy without the medication [Oxycontin].’⁶⁴ At the time of the article’s publication, the risk of NAS in infants exposed in utero to opioids was known and characterised.^{90 91} The article failed to mention that in 2004 Dr. Heit had provided consulting services promoting Actiq, a fentanyl transmucosal lozenge sold by Cephalon.⁹² Dr. Heit continued to consult for Cephalon and Johnson & Johnson in 2011.^{93 94}

A separate *New York Times* article titled ‘When it Comes to Severe Pain, Doctors Still Have Much to Learn’ was also included in the supporting material for the briefing and focused on ‘clueless or unnecessarily cautious’ doctors and their reluctance to prescribe opioids.⁶⁴ The article included a quote from a 1995 entry into *The Journal of the American Medical Association*: ‘Bringing about significant change may depend on empowering patients to demand adequate pain treatment. This empowerment will not come easily, especially if opioids must be used for pain relief and the pain is of nonmalignant origin.’⁶⁴

Unbranded campaigns

Consistent with efforts to market opioids as a form of patient empowerment, the American Pain Foundation brainstormed techniques to target women for a fibromyalgia disease awareness campaign funded by a US\$10 000 check from Pfizer in July 2007.⁶⁴ The notes claimed that the ‘empowerment angle can be used with any program (emphasis in original)’ and that the disease awareness programme aimed to ‘create patient demand for proper pain diagnosis and treatment.’⁶⁴ The Foundation planned to use ‘viral tactics/word of mouth education (sic)’ by ‘let[ting] women educate women in their natural setting (eg, Tupperware parties, garden groups, e-cards).’⁶⁴ The Foundation also proposed to share this outreach message via communication channels such as ‘women’s books’ and ‘the National Women’s Health Resource Center.’⁶⁴

In 2012, Janssen proposed similar strategies to target women as part of a public relations programme for its pain franchise and specifically to market Nucynta. Janssen’s pitch stated, ‘Women are feeling the pain, study says—what every woman needs to know,’ and the message

was targeted to 'women's books' among other advertising venues.⁷³

DISCUSSION

Summary of the evidence

This study of internal opioid industry documents detailed how opioids were marketed to children and women at the beginning of the 21st century through targeted advocacy directed to policy makers and by using unbranded campaigns intended to increase demand for opioids. It builds on previous documents research that has illustrated the unreliability of data, claims and marketing produced by the pharmaceutical industry.^{50–53} Over the same time period, there were significant increases in opioid use, poisonings and related mortality in these populations.

Pharmaceutical industry efforts to market opioids to children primarily relied on unbranded campaigns, which sidestep FDA regulations on traditional pharmaceutical advertisements.²⁷ These campaigns used appeals to authority to influence children's understanding of pain and opioids, seeking to recruit adults they would be perceive as credible, including coaches and school nurses. Two specific unbranded campaigns, *Growing Pains* and *Smart Moves, Smart Choices*, were explicitly developed and launched as a means to market opioids despite being presented to the public as public health campaigns. These approaches were likely to have been influential given that past research has shown that advertisements in school settings affect children because they are associated with authority figures such as teachers.³⁹ This kind of marketing is problematic because children and adolescents may have difficulties understanding the fundamental purpose of advertisements, due to still-developing executive functioning and critical thinking skills, as well as a lack of scepticism among those of younger age.⁹⁵

Opioid manufacturers also developed direct appeals to women based on the desire for self-empowerment, emotions and fears surrounding disability and pregnancy, and social desirability. This marketing may help explain the disproportionate opioid-related health risks among women; by 2014 opioid-related hospitalisations rates for women surpassed those of men in a majority of states.⁹⁶ Appeals to policy makers made through the industry-sponsored Pain Care Forum used selective information and anecdotes to develop claims that opioids were needed to address untreated pain among women. Companies also provided financial support for advocates that supported opioid use among pregnant women. One suggestion made through the Pain Care Forum, that Oxycontin use during pregnancy is safe, was particularly concerning given that it failed to describe the risks of NAS due to in utero opioid exposure.^{90 91} Although opioid use in limited doses during pregnancy may be warranted for treatment of some specific conditions (eg, terminal cancer), American Pain Society guidelines recommend no use or minimal use due to adverse effects on fetal

development.^{97 98} In the years following these presentations the incidence of NAS quintupled.⁶

Strengths and limitations

Our study has strengths and limitations. Internal industry documents provide a unique perspective on industry behaviour with implications for public health that is 'not available from any other source'.³⁰ However the Opioid Industry Documents Archive does not include all documents created by the pharmaceutical companies involved during the development, production, marketing and distribution of opioid products. While the documents included in the archive were considered significant during the process of legal discovery, they may not include other relevant material, particularly documents that never existed in electronic form. For example, although we identified marketing materials explicitly targeting women as a group, we did not find comparable materials intended to reach men as a group; nonetheless, these documents may have existed. Some documents were presentation aids such as PowerPoint decks and sales pitch outlines that may not have been presented or used, although we searched public records for validation that campaigns were launched and provide that information where available. Our findings may not be generalisable to companies that were not included in the settlement or to marketing for non-opioid products, although they are drawn from multiple companies that both sold their own opioid products to consumers and that provided active ingredients to multiple opioid manufacturers. Due to the delay in releasing documents related to litigation, some of the materials cited in the manuscript date back over two decades, and reveal a pattern of pharmaceutical company behaviour that has remained largely unresolved; the FDA has been criticised by multiple sources for failing to change its regulatory policies to address opioid marketing over this time period.⁹⁹

Recommendations for research

Litigation against opioid manufacturers continues, as does the release of new documents identified in legal discovery. Further review and analysis of pharmaceutical industry documents is needed to understand the industry's ongoing marketing strategies, what portions of the population may be targeted, and whether pharmaceutical companies may market other products using similar campaigns, particularly given that FDA regulations remain unchanged.

CONCLUSION

In previous research, findings from industry documents research have been critical in generating discussion and scrutiny about the role of industry funding and influence in scientific publications and health policy, and in generating changes in policy and practice that protect public health.^{30 100 101} To our knowledge, this study represents the first analysis of internal industry documents drawn

from lawsuits against opioid manufacturers that describes marketing to children and women. Findings from previous pharmaceutical industry documents research have illustrated the unreliability of industry-associated data, claims and marketing^{31 52 53} and have detailed efforts by manufacturers to influence physicians.^{41–45} This work builds on this previous research by providing new insight into how pharmaceutical companies sought to increase opioid use among women and children. Our results serve as a warning to clinicians and policy makers about the risks of direct-to-consumer advertising and particularly the use of unbranded campaigns. The opioid industry's use of unbranded campaigns to promote opioid use, despite the existence of regulation intended to limit pharmaceutical advertising, suggests that additional regulatory oversight may be needed to discourage inappropriate marketing of addictive medications.

Twitter Dorie E Apollonio @apollonio

Acknowledgements The authors acknowledge Rachel Taketa at the UCSF library for assistance with searching for documents.

Contributors HY, BG, and DEA worked together to design the study, analyze the data, interpret the results, and revise the manuscript. HY drafted the manuscript and HY and BG completed the initial review of the documents. DEA is responsible for the overall content as the guarantor.

Funding This work was supported by National Institutes of Health #DA046051 (Apollonio) and a Pathway Project Grant from the University of California, San Francisco (Yakubi and Gac).

Competing interests None declared.

Patient and public involvement Patients and/or the public were not involved in the design, or conduct, or reporting, or dissemination plans of this research.

Patient consent for publication Not applicable.

Ethics approval Not applicable.

Provenance and peer review Not commissioned; externally peer reviewed.

Data availability statement Data are available in a public, open access repository. The data analyzed for the current study are available from the UCSF Opioid Industry Documents Archive repository, <https://www.industrydocuments.ucsf.edu/opioids/>.

Supplemental material This content has been supplied by the author(s). It has not been vetted by BMJ Publishing Group Limited (BMJ) and may not have been peer-reviewed. Any opinions or recommendations discussed are solely those of the author(s) and are not endorsed by BMJ. BMJ disclaims all liability and responsibility arising from any reliance placed on the content. Where the content includes any translated material, BMJ does not warrant the accuracy and reliability of the translations (including but not limited to local regulations, clinical guidelines, terminology, drug names and drug dosages), and is not responsible for any error and/or omissions arising from translation and adaptation or otherwise.

Open access This is an open access article distributed in accordance with the Creative Commons Attribution Non Commercial (CC BY-NC 4.0) license, which permits others to distribute, remix, adapt, build upon this work non-commercially, and license their derivative works on different terms, provided the original work is properly cited, appropriate credit is given, any changes made indicated, and the use is non-commercial. See: <http://creativecommons.org/licenses/by-nc/4.0/>.

ORCID iD

Dorie E Apollonio <http://orcid.org/0000-0003-4694-0826>

REFERENCES

- Centers for Disease Control and Prevention. The drug overdose epidemic: behind the numbers. opioids, 2021. Available: <https://www.cdc.gov/opioids/data/index.html> [Accessed 09 Feb 2022].
- Vowles KE, McEntee ML, Juines PS, *et al*. Rates of opioid misuse, abuse, and addiction in chronic pain: a systematic review and data synthesis. *Pain* 2015;156:569–76.
- Substance Abuse and Mental Health Services Administration. 2019 national survey on drug use and health: women, 2020. Available: <https://www.samhsa.gov/data/sites/default/files/reports/rpt31102/2019NSDUH-Women/Women%202019%20NSDUH.pdf> [Accessed 08 Feb 2022].
- Serdarevic M, Striley CW, Cottler LB. Sex differences in prescription opioid use. *Curr Opin Psychiatry* 2017;30:238–46.
- National Women's Health Network. Opioids and women: from prescription to addiction, 2018. Available: <https://www.nwhn.org/prescription-addiction-opioid-epidemic/> [Accessed 30 Nov 2020].
- Oklahoma HealthCare Authority (OHCA). Incidence of neonatal abstinence syndrome among soonercare covered infants. Oklahoma opioid litigation documents; opioid documents collection. Available: <https://www.industrydocuments.ucsf.edu/docs/jzgg0230>
- National Institute on Drug Abuse. Dramatic increases in maternal opioid use disorder and neonatal abstinence syndrome. [no date] Oklahoma Opioid Litigation Documents; Opioid Documents Collection. Available: <https://www.industrydocuments.ucsf.edu/docs/trgg0230>
- Hudgins JD, Porter JJ, Monuteaux MC, *et al*. Prescription opioid use and misuse among adolescents and young adults in the United States: A national survey study. *PLoS Med* 2019;16:e1002922.
- Griesler PC, Hu M-C, Wall MM, *et al*. Assessment of prescription opioid medical use and misuse among parents and their adolescent offspring in the US. *JAMA Netw Open* 2021;4:e2031073.
- Burghardt LC, Ayers JW, Brownstein JS, *et al*. Adult prescription drug use and pediatric medication exposures and poisonings. *Pediatrics* 2013;132:18–27.
- Finkelstein Y, Macdonald EM, Gonzalez A, *et al*. Overdose risk in young children of women prescribed opioids. *Pediatrics* 2017;139:e20162887.
- Winstanley EL, Stover AN. The impact of the opioid epidemic on children and adolescents. *Clin Ther* 2019;41:1655–62.
- Gaither JR, Shabanova V, Leventhal JM. Us national trends in pediatric deaths from prescription and illicit opioids, 1999-2016. *JAMA Netw Open* 2018;1:e186558.
- American Academy of Family Physicians. New research finds rise in pediatric deaths from opioids, 2019. Available: <https://www.aafp.org/news/health-of-the-public/20190118pedopioids.html> [Accessed 17 Nov 2020].
- McCabe SE, West BT, Veliz P, *et al*. Trends in medical and nonmedical use of prescription opioids among US adolescents: 1976-2015. *Pediatrics* 2017;139:e20162387.
- Substance Abuse and Mental Health Services Administration. *Key substance use and mental health indicators in the United States: results from the 2017 national survey on drug use and health*. Rockville, MD: Center for Behavioral Health Statistics and Quality, 2018.
- Chung CP, Callahan ST, Cooper WO, *et al*. Outpatient opioid prescriptions for children and opioid-related adverse events. *Pediatrics* 2018;142:e20172156.
- Yin S. Opioid intoxication in children and adolescents. UpToDate, 2020. Available: <https://www.uptodate.com/contents/opioid-intoxication-in-children-and-adolescents> [Accessed 17 Nov 2020].
- Boyles S. Severity of kids' opioid poisoning on the rise, 2020. Available: <https://www.medpagetoday.com/meetingcoverage/sccm/84925> [Accessed 17 Nov 2020].
- State of Oklahoma v Purdue Pharma LP *et al*. No. *Cj-2017-816 (judgment after non-jury trial*. District Court of Cleveland County, State of Oklahoma: Marilyn Williams, 2019.
- Hoffman J. *Johnson & Johnson ordered to pay \$572 million in landmark opioid trial*. NY Times, 2019.
- Dwyer C, Fortier J. *Oklahoma judge shaves \$107 million off opioid decision against Johnson & Johnson*. All Things Considered: NPR, 2019.
- Dwyer C. *Your guide to the massive (and massively complex) opioid litigation*. NPR, 2020.
- Ipsos. Direct-to-consumer pharmaceutical advertising: When to use branded versus unbranded campaigns. Innovation & Knowledge, 2015. Available: <https://www.ipsos.com/en-us/knowledge/consumer-shopper/direct-consumer-pharmaceutical-advertising> [Accessed 17 Nov 2020].
- Ventola CL. Direct-To-Consumer pharmaceutical advertising: therapeutic or toxic? *P T* 2011;36:669–84.
- Gilbody S, Wilson P, Watt I. Benefits and harms of direct to consumer advertising: a systematic review. *Qual Saf Health Care* 2005;14:246–50.
- Leonardo Alves T, Mantel-Teeuwisse AK, Paschke A, *et al*. Unbranded advertising of prescription medicines to the public

- by pharmaceutical companies. *Cochrane Database Syst Rev* 2017;328:CD012699.
- 28 Vitry AI, Mintzes B. Disease mongering and low testosterone in men: the tale of two regulatory failures. *Med J Aust* 2012;196:619–21.
 - 29 Singer N. *Selling that new-man feeling*. The New York Times, 2013.
 - 30 Bero L. Implications of the tobacco industry documents for public health and policy. *Annu Rev Public Health* 2003;24:3.1–3.22.
 - 31 Glantz SA, Barnes DE, Bero L, et al. Looking through a keyhole at the tobacco industry. the brown and Williamson documents. *JAMA* 1995;274:219–24.
 - 32 National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health. *Preventing tobacco use among youth and young adults: a report of the surgeon General*. Atlanta, GA: Centers for Disease Control and Prevention (US), 2012.
 - 33 Story M, French S. Food advertising and marketing directed at children and adolescents in the US. *Int J Behav Nutr Phys Act* 2004;1:3.
 - 34 Markowitz G, Rosner D. "Cater to the children": the role of the lead industry in a public health tragedy, 1900-1955. *Am J Public Health* 2000;90:36–46.
 - 35 Anderson SJ, Glantz SA, Ling PM. Emotions for sale: cigarette advertising and women's psychosocial needs. *Tob Control* 2005;14:127–35.
 - 36 Smith EA, Malone RE. Tobacco promotion to military personnel: "the plums are here to be plucked". *Mil Med* 2009;174:797–806.
 - 37 Cataldo JK, Malone RE. False promises: the tobacco industry, "low tar" cigarettes, and older smokers. *J Am Geriatr Soc* 2008;56:1716–23.
 - 38 Apollonio DE, Malone RE. Marketing to the marginalised: tobacco industry targeting of the homeless and mentally ill. *Tob Control* 2005;14:409–15.
 - 39 Wilcox BL, Kunkel D, Cantor J, et al. Report of the APA Task force on advertising and children, 2004. Available: <https://www.apa.org/pi/families/resources/advertising-children.pdf> [Accessed 17 Nov 2020].
 - 40 Cruz TB, Rose SW, Lienemann BA, et al. Pro-tobacco marketing and anti-tobacco campaigns aimed at vulnerable populations: a review of the literature. *Tob Induc Dis* 2019;17:68.
 - 41 Hadland SE, Rivera-Aguirre A, Marshall BDL, et al. Association of pharmaceutical industry marketing of opioid products with mortality from opioid-related overdoses. *JAMA Netw Open* 2019;2:e186007.
 - 42 Van Zee A. The promotion and marketing of OxyContin: commercial triumph, public health tragedy. *Am J Public Health* 2009;99:221–7.
 - 43 Marks JH. Lessons from corporate influence in the opioid epidemic: toward a norm of separation. *J Bioeth Inq* 2020;17:173–89.
 - 44 Alpert AE, Evans WN, Lieber EM, et al. *Origins of the opioid crisis and its enduring impacts*. Cambridge, MA: National Bureau of Economic Research, 2019.
 - 45 Arteaga Cabrales C, Barone V. *The opioid epidemic: causes and consequences*. Toronto, ON: University of Toronto, 2021.
 - 46 University of California San Francisco. *Drug industry documents*. San Francisco, CA: UCSF, 2022.
 - 47 Oklahoma state of ex Rel attorney General of Oklahoma, plaintiff, V. Purdue pharma Lp, et al, 2019. Available: <https://www.oscn.net/dockets/GetCaseInformation.aspx?db=cleveland&number=CJ-2017-816&cmid=2266216> [Accessed 24 Mar 2021].
 - 48 Bauman V. J&j fights opioid 'kingpin' label by noting 1% market share, 2019. Available: <https://news.bloomberglaw.com/us-law-week/j-j-fights-opioid-kingpin-label-by-noting-1-market-share> [Accessed 08 Feb 2022].
 - 49 U.S. Department of Health and Human Services. *Preventing tobacco use among youth and young adults: a report of the surgeon General*. Atlanta, GA: Centers for Disease Control and Prevention, 2012.
 - 50 Yakubi H, Gac B, Apollonio DE. Marketing opioids to veterans and older adults: a content analysis of internal industry documents released from state of Oklahoma V. Purdue pharma Lp, et al. *J Health Polit Policy Law* 2022;47:453–72.
 - 51 Ross JS, Hill KP, Egilman DS, et al. Guest authorship and ghostwriting in publications related to rofecoxib: a case study of industry documents from rofecoxib litigation. *JAMA* 2008;299:1800–12.
 - 52 Jureidini JN, Amsterdam JD, McHenry LB. The citalopram CIT-MD-18 pediatric depression trial: deconstruction of medical ghostwriting, data mischaracterisation and academic malfeasance. *Int J Risk Saf Med* 2016;28:33–43.
 - 53 Landefeld CS, Steinman MA. The Neurontin legacy--marketing through misinformation and manipulation. *N Engl J Med* 2009;360:103–6.
 - 54 Spielmans GI, Parry PI. From evidence-based medicine to marketing-based medicine: evidence from internal industry documents. *J Bioeth Inq* 2010;7:13–29.
 - 55 Janssen. Litragestic - 2003 business plan summary. Oklahoma Opioid Litigation Documents; Opioid Documents Collection, 2003. Available: <https://www.industrydocuments.ucsf.edu/docs/sngg0230>
 - 56 Kohn R. Letter from robyn Kohn to tricia haertlein enclosing meeting 2 outputs presentation. Oklahoma opioid litigation documents; opioid documents collection, 2011. Available: <https://www.industrydocuments.ucsf.edu/docs/mmgg0230>
 - 57 Kohn R J, Henningfield J, Galassini P, et al. Letter to John mccarthy concerning Medicaid preferred drug list proposal. Oklahoma opioid litigation documents; opioid documents collection, 2012. Available: <https://www.industrydocuments.ucsf.edu/docs/rmgg0230>
 - 58 Hall M. Today's meeting of the pain care forum. Oklahoma Opioid Litigation Documents; Opioid Documents Collection, 2012. Available: <https://www.industrydocuments.ucsf.edu/docs/mqgg0230>
 - 59 Sapp K. U. S. medical advocacy, Teva. hydrocodone rescheduling advocacy group positions. Oklahoma opioid litigation documents; opioid documents collection, 2013. Available: <https://www.industrydocuments.ucsf.edu/docs/nghg0230>
 - 60 Purdue. 2006 objectives for external Affairs group. Oklahoma opioid litigation documents; opioid documents collection, 2018. Available: <https://www.industrydocuments.ucsf.edu/docs/pxgg0230>
 - 61 Pain care forum 2010 meetings schedule. Oklahoma opioid litigation documents; opioid documents collection. Available: <https://www.industrydocuments.ucsf.edu/docs/xxgg0230>
 - 62 Rosen B. I would like to send this to the pain care forum subject to your edits. many thanks. Oklahoma opioid litigation documents; opioid documents collection, 2006. Available: <https://www.industrydocuments.ucsf.edu/docs/sygg0230>
 - 63 Udell H. Purdue pharma. Email re: the pain care forum. Oklahoma opioid litigation documents; opioid documents collection, 2008. Available: <https://www.industrydocuments.ucsf.edu/docs/rygg0230>
 - 64 Rogers M. The epidemic of pain in America. Oklahoma opioid litigation documents; opioid documents collection, The American Pain Foundation, 2006. Available: <https://www.industrydocuments.ucsf.edu/docs/yqgg0230>
 - 65 Opensecrets.org. Rep. Mike rogers - michigan district 08, 2020. Available: <https://www.opensecrets.org/members-of-congress/summary?cid=N00009668&cycle=CAREER> [Accessed 17 Nov 2022].
 - 66 Sackler J, Roncalli A. Research America. Oklahoma opioid litigation documents; opioid documents collection, 2018. Available: <https://www.industrydocuments.ucsf.edu/docs/krgg0230>
 - 67 Leonard L. Non-branded promotion. Oklahoma opioid litigation documents; opioid documents collection, 2007. Available: <https://www.industrydocuments.ucsf.edu/docs/fngg0230>
 - 68 Ortho McNeil Janssen Pharmaceuticals Inc. Tapentadol IR and ER 2008 strategic plan. Oklahoma opioid litigation documents; opioid documents collection. Available: <https://www.industrydocuments.ucsf.edu/docs/hqgg0230>
 - 69 Jones ST. Non branded round 2 - final report review. Oklahoma Opioid Litigation Documents; Opioid Documents Collection, 2008. Available: <https://www.industrydocuments.ucsf.edu/docs/lmgg0230>
 - 70 Murphy J, Derden M, National Association of School Nurses (NASN). National association of school nurses launches educational program to address surge of prescription drug abuse by america's youth. Oklahoma Opioid Litigation Documents; Opioid Documents Collection, 2008. Available: <https://www.industrydocuments.ucsf.edu/docs/ksfg0230>
 - 71 Embrey ML. Smart moves, smart choices: how school nurses can help safeguard students from teen prescription drug abuse. *NASN Sch Nurse* 2012;27:101–2.
 - 72 Smart Moves Smart Choices School Toolkit. . Oklahoma opioid litigation documents; opioid documents collection. Available: <https://www.industrydocuments.ucsf.edu/docs/gfgg0230>
 - 73 Pain franchise 2012 PR program. Oklahoma opioid litigation documents; opioid documents collection, 2012. Available: <https://www.industrydocuments.ucsf.edu/docs/nrgg0230>
 - 74 Lynn L. Tapentadol PR initiatives. Oklahoma opioid litigation documents; opioid documents collection, Thomas Jefferson University. Available: <https://www.industrydocuments.ucsf.edu/docs/kmgg0230>
 - 75 Smart Moves Smart Choices. About us, 2010. Available: <https://web.archive.org/web/20101211094107/http://www.smartmovessm artchoices.org/>
 - 76 Formulary Watch. Pricara, ortho-mcneil now named janssen pharmaceuticals, 2011. Available: <https://www.formularywatch.com/>

- com/view/pricara-ortho-mcneil-now-named-janssen-pharmaceuticals [Accessed 20 Jul 2022].
- 77 Smart Moves Smart Choices. About us: partner bios, 2011. Available: <https://web.archive.org/web/20120103000401/http://www.smartmovessmartchoices.org/partner-bios> [Accessed 20 Jul 2022].
 - 78 Smart Moves Smart Choices. About smart moves, smart choices, 2018. Available: <https://web.archive.org/web/20181117001356/http://smartmovessmartchoices.org/about> [Accessed 20 Jul 2022].
 - 79 Smart Moves Smart Choices. About smart moves, smart choices, 2019. Available: <https://web.archive.org/web/20190117050752/http://smartmovessmartchoices.org/about> [Accessed 20 Jul 2022].
 - 80 National Association of School Nurses (NASN). We are the National association of school nurses. 2022, 2022. Available: <https://www.smartmovessmartchoices.org/home> [Accessed 20 Jul 2022].
 - 81 Kohn R. Email from Kohn robyn to penney cowan concerning growing pains. Oklahoma opioid litigation documents; opioid documents collection, 2011. Available: <https://www.industrydocuments.ucsf.edu/docs/nmgg0230>
 - 82 American Chronic Pain Association. Growing pains. Available: <https://www.theacpa.org/conditions-treatments/conditions-a-z/growing-pains/> [Accessed 17 Nov 2020].
 - 83 Growing Pains. How do you feel today? 2013. Available: <https://web.archive.org/web/20130108180311/http://growingpains.org/> [Accessed 20 Jul 2022].
 - 84 Growing Pains. How do you feel today? 2021. Available: <https://web.archive.org/web/20210727175956/http://growingpains.org/> [Accessed 20 Jul 2022].
 - 85 Johnson & Johnson. Johnson and Johnson partner of choice in pharmaceuticals. January 29 [no date]. Oklahoma Opioid Litigation Documents; Opioid Documents Collection. Available: <https://www.industrydocuments.ucsf.edu/docs/gmgg0230>
 - 86 Janssen. Pain franchise 2012 PR program. Oklahoma opioid litigation documents; opioid documents collection, 2012. Available: <https://www.industrydocuments.ucsf.edu/docs/nrgg0230>
 - 87 Teva. Teva advocacy mapping: identifying advocacy partners to enhance patient care. Oklahoma opioid litigation documents; opioid documents collection, 2013. Available: <https://www.industrydocuments.ucsf.edu/docs/lnng0230>
 - 88 Birklein F, Dimova V. Complex regional pain syndrome-up-to-date. *Pain Rep* 2017;2:e624.
 - 89 National Center for Advancing Translational Sciences. Complex regional pain syndrome. genetic and rare diseases information center, 2017. Available: <https://rarediseases.info.nih.gov/diseases/4647/complex-regional-pain-syndrome> [Accessed 17 Nov 2022].
 - 90 Hudak ML, Tan RC, *et al*, COMMITTEE ON DRUGS. Neonatal drug withdrawal. *Pediatrics* 2012;129:e540–60.
 - 91 Rao R, Desai NS. Oxycontin and neonatal abstinence syndrome. *J Perinatol* 2002;22:324–5.
 - 92 Terifay T. Employee self appraisal. October 11 2004. Oklahoma opioid litigation documents; opioid documents collection. Available: <https://www.industrydocuments.ucsf.edu/docs/ttgg0230>
 - 93 ProPublica. Payment disclosure Howard heit MD facp PC, 2013. Available: <https://projects.propublica.org/d4d-archive/payments/10528478> [Accessed 17 Nov 2022].
 - 94 ProPublica. Payment disclosure Howard heit, 2013. Available: <https://projects.propublica.org/d4d-archive/payments/10173460> [Accessed 17 Nov 2022].
 - 95 Lapierre MA, Fleming-Milici F, Rozendaal E, *et al*. The effect of advertising on children and adolescents. *Pediatrics* 2017;140:S152–6.
 - 96 Weiss A, Barrett M, Steiner C, *et al*. *Patient characteristics of opioid-related inpatient stays and emergency department visits nationally and by state*. Agency for Healthcare Research and Quality, 2014.
 - 97 Yazdy MM, Desai RJ, Brogly SB. Prescription opioids in pregnancy and birth outcomes: a review of the literature. *J Pediatr Genet* 2015;4:56–70.
 - 98 Centers for Disease Control and Prevention. About opioid use during pregnancy. pregnancy, 2021. Available: <https://www.cdc.gov/pregnancy/opioids/basics.html> [Accessed 08 Feb 2022].
 - 99 Kolodny A. How FDA failures contributed to the opioid crisis. *AMA J Ethics* 2020;22:E743–50.
 - 100 PLoS Medicine Editors. A new policy on tobacco papers. *PLoS Med* 2010;7:e1000237.
 - 101 World Health Organization. Tobacco industry interference with tobacco control, 2009. Available: <https://www.who.int/tobacco/publications/industry/interference/en/> [Accessed 24 Mar 2021].