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Proceedings of a Workshop
IN BRIEF

November 2016

Pain Management and Prescription Opioid-Related Harms: Exploring the State of the Evidence

Proceedings of a Workshop—in Brief

On September 22, 2016, the Committee on Pain Management and Regulatory Strategies to Address Prescription Opioid Abuse held a 1-day workshop titled "Pain Management and Prescription Opioid-Related Harms: Exploring the State of the Evidence." The committee was tasked with preparing a report that will identify actions that the U.S. Food and Drug Administration (FDA) and others can take to address the opioid epidemic while taking into account individual need for pain control, including FDA's development of a formal method to incorporate the broader public health impact of prescription opioids into its future approval decisions regarding opioids.[1] This workshop was designed to bring the committee and the public together to hear presentations and hold discussions on issues that are relevant to this task and to inform the committee's deliberations. Specifically, the purpose of this workshop was to gather information about the state of the science and potential best practices in pain management, including the evolving role of opioids in pain management; to understand the epidemiology of the prescription opioid epidemic and discuss possible strategies to address it; and to identify potential areas for future research in the field.

Expert speakers were invited to give brief presentations, which were followed by open discussions among the speakers and workshop participants, including committee members. This Proceedings of a Workshop—in Brief highlights the dialogue that emerged from the individual speakers' presentations and the discussions that followed; it should not be seen as presenting findings, conclusions, or recommendations of the workshop participants or of the committee. Statements, proposals, and opinions expressed are those of individual presenters and participants and have not been endorsed or verified by the National Academies of Sciences, Engineering, and Medicine or the committee and they should not be construed as reflecting any group consensus. The committee's consensus report will be available in 2017.

PAIN MANAGEMENT WITH OPIOIDS: BENEFITS AND UNINTENDED CONSEQUENCES

In 2011, the Institute of Medicine released a report titled *Relieving Pain in America* (IOM, 2011). David Thomas from the National Institute on Drug Abuse and a founding member of the National Institutes of Health (NIH) Pain Consortium told participants that this report estimated that chronic pain affects 100 million Americans and costs the nation up to $630 billion each year. He added that the number of Americans affected by chronic pain has risen significantly over the past decade, and stated that in his view there is "a growing epidemic of pain." James Rathmell from Brigham and Women's Health Care and Harvard University said that there is an "enormous unmet medical need" for safe and effective management of pain.

[1] For the committee's full statement of task, see www.nationalacademies.org/opioids (accessed November 1, 2016).

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Rathmell noted that as there has been an increase in the number of Americans in pain, there has also been a marked increase in the use of opioids to treat pain. Opioids, a category of drugs that include opiates that are derived from poppy as well as synthetic derivatives, have been used to combat pain for thousands of years, particularly for acute pain and advanced illness, Rathmell said. Howard Fields from the University of California, San Francisco, told participants that opioids acting at the mu opioid receptor have a number of benefits: they are "highly effective" for acute severe pain, they act rapidly and can be used for many different types of pain, they can be administered through multiple routes, and they provide a sense of well-being beyond pain relief. In addition, Fields said, opioids act on the mu receptor, which is widely distributed in the body, synergistically relieving the "suffering" component of pain. However, Fields noted, opioids also have drawbacks: they have a sedating effect, many patients suffer from constipation, and patients develop tolerance to opioids over time, requiring them to either increase the dose or suffer from more pain. Even more troubling, said Fields, the use of opioids can lead to dependence and addiction—generally referred to as opioid use disorder—and overdose of an opioid can result in respiratory depression and death. While opioids are "very, very effective" in the short-term treatment of pain, they had been "shied away from" for long-term use because of these well-known risks of addiction and overdose, said Rathmell. However, a series of papers—primarily case studies of patients in clinical settings—was released in the mid-1980s that suggested that opioids could safely be used for chronic pain management. Rathmell said that this development was described in the pain field as a "breaking the sound barrier" event (Melzack, 1988), and noted that pain clinicians were optimistic at the time that opioids could be the solution to the unmet needs of patients with chronic pain. A number of new opioid products were developed and prescription opioid use surged. However, said Rathmell, as the use of opioids for chronic pain increased, so did opioid-related emergency department visits.

In addition, the non-medical use[2] of prescription pain killers more than doubled between 1998 and 2003, said Jennifer Havens from the University of Kentucky, citing data from the National Survey on Drug Use and Health. Linda Cottler from the University of Florida reported that non-medical opioid use may lead to opioid use disorder; she said that 40 percent of adults who had used opioids within the past year met the criteria for opioid dependence, which include tolerance and withdrawal syndromes, giving up other activities to use opioids, and suffering from related legal problems.[3] Non-medical use of opioid pain relievers is associated with increased mortality and likelihood of engagement in risky behaviors such as sharing needles, leading to infections such as HIV and hepatitis C, reported Cottler. Overdose is one of the most severe outcomes of opioid use, and the number of hospitalizations due to prescription opioid overdose more than quadrupled between 1993 and 2011, Daniel Ciccarone from the University of California, San Francisco, said. Some professionals—such as elite athletes who are prescribed opioids for pain relief and health professionals who have ready access to prescription drugs—are more at risk for developing dependence on opioids, said Cottler.

The rise of prescription opioid use foreshadowed a similar but later rise in the use of heroin and heroin overdoses. Hospitalizations due to heroin overdose have doubled since 2005, said Ciccarone, and heroin use is associated with a risk of premature death that is three to four times higher than a non-heroin user, Cottler said. Ciccarone told participants that the prescription opioid and heroin epidemics are intertwined, noting that some patients who begin taking prescription opioids for pain relief end up turning to heroin, because it provides similar effects and is more readily available in certain areas, despite being illegal. A majority of heroin-dependent users report initiating opioid use with a prescription opioid, said Ciccarone. Heroin presents a particular public health challenge, said Ciccarone, because heroin may vary from market to market and day to day; it may be adulterated with substances such as fentanyl.[4] Although there is more stigma surrounding heroin than prescription opioids, heroin is becoming rapidly more accessible in many areas of the country.

Daniel Raymond from the Harm Reduction Coalition pointed out that while chronic pain and the opioid epidemic are often treated as separate problems with separate affected populations, there is actually considerable overlap between people with chronic pain and people with substance use disorders. Thomas proposed his idea that one of the ways prescription drug abuse starts is with inadequate pain treatment, observing that areas such as Appalachia that suffer from high opioid death rates are the same areas that are medically underserved. He theorized that when people cannot access effective pain treatment, or when "we just throw opioids at them and let them out the door," this is a "prescription for trouble." With this in mind, the workshop turned toward a discussion about progress in research on pain management and strategies to address the prescription opioid epidemic.

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[2] Defined as use without a prescription of the individual's own or simply for the experience or feeling the drugs caused (SAMHSA, 2015).

[3] Criteria are from the Diagnostic and Statistical Manual of Mental Disorders (DSM) IV; the DSM V does not include legal problems.

[4] Fentanyl is a very strong opioid that is involved in many overdose deaths (CDC, 2016).

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PROGRESS IN THE SCIENCE ON PAIN MANAGEMENT AND THE DEVELOPMENT OF NEW ANALGESICS

Individual speakers at the workshop discussed their perspectives on progress in the science on pain management, including the evolving role of opioids. Rathmell noted that despite the recent increase in the use of opioids to manage chronic pain, there has been little rigorous research showing that opioids are safe or effective for this purpose. In 2014, NIH commissioned the Agency for Healthcare Research and Quality to conduct a systematic review of the evidence on the role of opioids in the treatment of chronic pain (Chou et al., 2015). This review found that there are no studies that evaluate the effects of long-term opioid therapy compared to no opioid therapy, Rathmell told participants. Rathmell listed a number of negative side effects of long-term opioid use that were identified by the review, including the potential for overdose and abuse, increased fractures, myocardial infarction, and sexual dysfunction. David Shurtleff from the National Center for Complementary and Integrative Health (NCCIH) at NIH added that the review concluded that "evidence is insufficient to determine the effectiveness of long-term opioid therapy for improving chronic pain and function. Evidence supports a dose-dependent risk for serious harms." Rathmell said that currently there are not "adequate alternatives" to opioid use and that many of his patients have suffered chronic pain for years because of a lack of safe, effective, evidence-based treatments.

The evidence on several alternatives to the use of opioids was discussed at the workshop, including non-pharmacological approaches. Shurtleff introduced the topic of complementary and integrative health (CIH) approaches, which are non-pharmacological and can include practices such as acupuncture, yoga, tai chi, cognitive behavioral therapy, and meditation. The NCCIH developed a strategic plan in order to further understand these practices and how they may be useful for pain management. The NCCIH plan outlines several priorities, including elucidating the targets and pathways of CIH approaches, research on non-invasive neuromodulation techniques such as transcranial current stimulation and ultrasound, examining the interactions between pharmacologic and CIH interventions, and developing objective pain measures. Shurtleff noted that CIH approaches are used by millions of Americans for chronic pain and that research suggests that such techniques can be effective in treating pain. For example, Shurtleff presented one study that found that patients with chronic low back pain showed greater improvement in pain and functional limitations with the use of mindfulness-based stress reduction or cognitive behavioral therapy, compared to usual care (Cherkin et al., 2016). Shurtleff told participants about a number of ongoing studies designed to identify promising CIH techniques; in one such project, NCCIH is collaborating with the Veterans Health Administration to evaluate CIH techniques for managing pain and co-morbid conditions in military personnel and veterans.

Research is also under way to develop new non-opioid analgesics, according to Clifford Woolf from Harvard University. Rathmell and Woolf both noted that in the past 5 years, there have been no new analgesics that act on novel targets. Woolf said that identifying targets for novel analgesics is contingent on understanding the neurobiology of pain and developing products that act on the particular pain mechanisms of the particular patient. He noted that the mechanisms that produce pain are "diverse and complex and vary from one patient to the other," and that the traditional approach of "treating pain as a single entity is both inadequate and incorrect." Woolf said that while there has been some progress in identifying potential targets, there is a need for "a massive investment in understanding the molecular biology underlying pain mechanisms and ... until that investment occurs, we are not going to make progress that is going to transform our approach to the management of pain." Woolf told participants that most failures in drug development are failures of efficacy and that to develop more efficacious drugs developers need to focus on understanding genetic variance and new techniques for identifying effective targets and measuring pain. Woolf said that development of novel non-opioid analgesics will be strengthened by human genetic validation, screening with human stem cell derived neurons, and development of biomarkers for efficacy and target engagement, as well as new ways of selecting the most appropriate patients for inclusion in proof of principle trials.

William Schmidt from NorthStar Consulting, LLC, told participants about his experiences with the funding challenges that researchers face when trying to develop new non-opioid analgesics. He noted that drug development is a long and expensive process and that there are barriers that impede the smooth transition from discovery to preclinical research to clinical research to approval. Schmidt said that in recent years, innovation in early drug discovery has moved away from large pharmaceutical companies and into academic laboratories or small pharmaceutical companies. He noted that large pharmaceutical companies have focused instead on conducting later phases of clinical trials or on reformulation of existing products such as the recent increase in new formulations of opioid analgesics. Schmidt said that funding for these early stages of discovery and development can be hard to come by and has been described as the "valley of death" for drug development. He said that before proof of concept has been established in clinical trials in

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humans, investors or large pharmaceutical companies are sometimes reluctant to invest in a product, even if it has shown promise. He discussed a case study of a new analgesic product that was administered to a horse with a painful condition called laminitis and showed remarkable results; the horse who had exhausted all conventional treatments and was scheduled for euthanasia was up on her feet and walking 3 hours after the intervention. Despite the substantial evidence of efficacy, the company that developed the product had a difficult time obtaining funding to transition the product to the next stage, said Schmidt. Fortunately, Schmidt said, there are several government programs that step into this gap and provide funding for early development, including Department of Defense grant support, NIH Small Business Innovation Research funding, and NIH Blueprint Neurotherapeutics funding. In the case of the analgesic that was administered to the horse, the NIH Blueprint Neurotherapeutics program provided funds to carry out advanced preclinical development, safety evaluation in animals, and Phase I clinical trials. Schmidt said that "this project would not have advanced" without this program. Schmidt concluded that in order to advance the discovery and development of new non-opioid analgesics, there needs to be an increased focus on funding researchers to take "shovel ready" products into clinical trials.

Fields told the workshop participants about progress in efforts to develop products that separate the "reward" effect of opioids from the analgesic effect. Fields said that opioids, in addition to relieving pain, produce a "sense of well-being." This sense of well-being may be beneficial for patients who suffer from chronic pain, but it can also lead to opioid use disorder. Fields showed participants how opioids act on multiple receptors in the peripheral and central nervous system, which is part of the reason that opioids are so effective, and noted that the opioid reward pathway is separate from the pain pathway. In theory, he said, a drug could be designed that would activate only beneficial effects—such as pain relief—and would not have adverse effects. As an example, he noted that researchers are in the process of developing a compound that binds to the mu receptor and, because of differences in structure, it produces analgesia without respiratory depression. However, Fields said that there are several barriers to developing an opioid drug that would provide analgesia without the reward, including a lack of knowledge about the mechanisms of dependence, a lack of funding for research, and a lack of interest from pharmaceutical companies because there are many approved opioids currently on the market.

Raymond observed that while these presentations and discussions about alternative approaches to treating chronic pain revealed "tantalizing lines of inquiry and potential pathways," it seems "reasonable to think that at least for the next several years we are going to be living with the opioids rather than having a substitute just around the corner." Given this situation, workshop presenters discussed ways that opioid analgesics could continue to be used for the management of pain, while at the same time reducing availability and unnecessary use of opioids.

One proposal that was suggested by both Rathmell and Shurtleff was integrative pain management, a collaborative model of care in which pain is managed with a team of practitioners and a variety of methods that may include both medications and complementary approaches such as acupuncture and mind–body practices. Rathmell told participants that meta-analyses of such integrated approaches have shown that they result in reduction of pain, better function, and reduced opioid intake. However, Rathmell noted that insurers are reluctant to pay for this type of care, choosing instead to pay for individual interventions in a piecemeal fashion, which is a "recipe for fragmented, unsuccessful care." Shurtleff mentioned that there are numerous barriers to reimbursement for integrative care, including a patchwork of state laws, differing insurance criteria, and the difficulty of evaluating the cost-effectiveness of the care. Thomas noted that by not paying for integrative care, "we are paying a big price" in terms of both dollars and human suffering.

PROGRESS IN THE SCIENCE ON STRATEGIES TO ADDRESS PRESCRIPTION OPIOID-RELATED HARMS

Workshop participants discussed a number of proposals for reducing opioid-related harms that are aimed at providers, prescribers, and payers. Tamara Haegerich from the Centers for Disease Control and Prevention (CDC) spoke about Prescription Drug Monitoring Programs (PDMP), in which prescriptions for controlled substances, such as opioids, are submitted to a central tracking system. The data can then be accessed by providers, insurance agencies, health care licensing boards, public health departments, and law enforcement. (States vary with regard to who may access the data and for what purposes.) Haegerich stated that PDMPs, which are currently authorized in 49 states, can be used to find patients who are accessing opioids through multiple providers, identify providers who are over-prescribing opioids, and provide population-level surveillance about patterns of prescribing. PDMPs have shown mixed results, with some studies demonstrating a decrease in prescribing and a reduction in opioid-related overdose deaths, said Haegerich. Haegerich also told participants about public and private insurance strategies, including requiring prior authorization for opioid prescriptions, reviewing prescribing practices of providers, and requiring patients to use one provider and pharmacy for

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opioid prescriptions. State and federal clinical guidelines for prescribing can also be useful in reducing the use of opioids and overdoses, Haegerich said. CDC issued guidelines on prescribing opioids for chronic pain in March 2016,[5] and states are beginning to adapt these for their own use, as well as developing implementation efforts.

Clinical guidelines have shown to result in moderate knowledge improvements among providers, with some reduction in prescribed doses and overdose deaths. Implementation increases when training and education efforts are available to support them, reported Haegerich. Finally, Haegerich noted that state legislation can reduce opioid use through the regulation and oversight of pain clinics; one such law in Florida resulted in a decline in some types of opioid prescriptions and opioid overdoses (Johnson et al., 2014). Haegerich concluded that while these approaches have shown some promise, there is a need for rigorous evaluation to determine which approaches can best reduce opioid-related harms while still supporting effective pain management.

Richard Dart from the Rocky Mountain Poison and Drug Center presented information about the development of opioids with abuse-deterrent properties. These formulations allow patients with pain to use opioids, but reduce the likelihood that the product will be abused. Dart began by noting that there are multiple routes of administration for prescription opioids—intravenous, intranasal, and oral (intact or chewed/crushed). Dart told participants that chewing or crushing a pill results in a "better high," and that the act of chewing or crushing is itself a critical step toward abusing drugs; one study showed that such manipulation of prescription drugs was a critical factor in the eventual transition to heroin abuse (Vosburg, 2015). One abuse-deterrent formulation that has shown promise is oxycodone ER, which is an extended-release opioid that is resistant to being crushed or dissolved. Dart said that after the abuse-deterrent formulation of oxycodone ER replaced the previous formulation in 2010 there was a rapid and substantial drop in a number of measures, including a reduction in the number of prescriptions for oxycodone, fewer calls to poison centers for acute events involving intentional oxycodone abuse, and fewer patients entering treatment programs who reported recent use of oxycodone.

Other participants discussed ideas that could help individual patients avoid or recover from opioid use disorder. Rathmell suggested several strategies that could be used in order to identify, monitor, and counsel patients who are abusing opioids or who are at risk of doing so. His suggestions included a validated screening tool to identify at-risk patients, frequent monitoring and periodic urine screens for patients who have been prescribed opioids, opioid therapy agreements, checklists that remind the provider to take specific steps at every appointment (such as checking the PDMP), and motivational counseling. Yngvild Olsen from the Institute for Behavior Resources, Inc., told participants about treatment and recovery support services for patients who are addicted to opioids. She noted that there is no cure for addiction and that the goal is "lifelong management" with the understanding that the risk of relapse is never entirely eliminated. Olsen discussed the use of opioid agonists for the treatment of opioid use disorder, including methadone, buprenorphine, and naltrexone. Olsen said that all three of these have been shown to be effective, reducing the use of illicit opioids by 40 to 80 percent, and reducing opioid-related mortality. Olsen reported that despite these available tools, more than 1 million people who could benefit from agonist therapy are not currently being treated. She identified several barriers to access to treatment, including inadequate insurance coverage, physician and public stigma, and patients' perception that they are not in need of treatment. Olsen also noted that legal barriers to off-label use for opioids mean that some products can be used for pain but not opioid use disorder or vice-versa, which complicates care for the considerable number of people addicted to opioids who also suffer from chronic pain.

The most severe harm related to opioids is death due to overdose. Fortunately, naloxone, a pure opioid antagonist, can reverse the effects of overdose and improve the odds of survival, said Philip Coffin from the San Francisco Department of Public Health. Coffin told participants that on a population level, access to naloxone reduces emergency department visits and deaths and is a cost-effective intervention. Coffin added that research has shown that naloxone has not been found to increase opioid use and may even encourage some opioid users to be more cautious about their use, for example, by reducing their dose or not using opioids alone. Coffin said that within the past 10 years, significant efforts have been made to get naloxone in the hands of people who can most effectively use it. He identified several strategies to increase access to naloxone, including state legislation that authorizes third-party administration of naloxone, prescription by standing order, and prescription to potential bystanders; "Good Samaritan" laws that protect witnesses and victims of overdose from prosecution for low-level drug offenses; and distribution of naloxone for free at needle exchange or overdose prevention programs. He noted that naloxone is most effective in the hands of drug users, because they are the likely witnesses to an overdose, they are familiar with overdoses, and they are comfortable with injections (the most common route of naloxone administration). Coffin also addressed the benefits and drawbacks to two other

[5] See https://www.cdc.gov/mmwr/volumes/65/rr/rr6501e1.htm (accessed November 1, 2016).

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strategies to increase access to naloxone. He said that co-prescribing naloxone to patients on a certain dose of opioids could be helpful, particularly because patients often do not recognize that they are at risk of overdose. Coffin noted that making naloxone available over the counter may alleviate some of the logistical hurdles to access, but that cost would be a significant barrier.

Workshop participants discussed the potential drawbacks of approaches to reduce the use of opioids and related harms. Penny Cowan from the American Chronic Pain Association (ACPA) said that she has heard from a number of people that the recent CDC guidelines have had the effect of limiting access to care; patients have been told that they will no longer be prescribed opioids for their pain. Cowan stated that ACPA conducted a survey of 1,000 patients with chronic pain and more than half of respondents reported problems accessing pain medications (Pain News Network, 2016). Raymond added that he has heard anecdotally that patients who get flagged by PDMPs get pushed out of the health care system and may end up turning to the street markets for prescription opioids, heroin, or fentanyl. Ciccarone seconded this idea, stating that he has seen in his research how patients who are initially prescribed opioids for pain and are then "cut off by the doctor" begin using heroin because it is more readily available. Dart noted that when access to a desirable opioid is restricted—whether through new formulations such as oxycodone ER or other measures to reduce opioid use—people may switch to using other opioid analgesics or heroin. However, a market comprised completely of abuse-deterrent formulations would be expected to reduce opioid abuse and its outcomes, Dart said.

POTENTIAL RESEARCH NEEDS

Individual workshop participants identified a number of research needs related to clinical and basic research on pain and strategies to address prescription opioid-related harms. Several participants noted the need for more basic research into pain and the mechanisms by which pain is produced and is alleviated. Woolf said that in order to improve understanding of how to treat pain, there is a need for more research on the neurobiology of pain and how an individual's genotype and environmental exposures may influence how pain presents and how it responds. Schmidt and Woolf said that there is a need for better animal models and better understanding of how animal pain is or is not a surrogate for human pain. Several individual participants spoke of the need to develop a validated tool to objectively measure pain. Thomas drew an analogy between measuring pain and measuring fever. He said that the current approach of asking patients to rate their pain on a smiley face scale of 1–10 is like asking patients to rate their fever on a scale of 1–10 with pictures of increasingly large fires, rather than using a thermometer to measure temperature.

A number of suggestions for research to increase knowledge about opioids were discussed. Cottler said that there are insufficient data on the long-term effectiveness of long-term opioid therapy for chronic pain and that there have been few studies on the safety and efficacy of the relatively new formulations of extended release and long-acting opioids. Rathmell proposed that research is needed in order to identify patients who will benefit most from chronic opioid therapy, as well as to identify patients who are not benefiting from opioid therapy and to determine how best to discontinue opioids for these patients.

Christin Veasley from the Chronic Pain Research Alliance noted that advances in science must be accompanied by efforts to translate advances into improved clinical care. Rathmell said that there is a need for the development and adoption of new models of collaborative care, with an emphasis on measurable improvement in function. Both Rathmell and Thomas suggested that research into pain needs to be focused on integrative, collaborative, and comprehensive approaches to clinical care.

Ciccarone and Cottler proposed several avenues of research on opioid use disorder: both recommended better surveillance on drug abuse patterns and consequences and Cottler suggested conducting life course studies on drug abuse, as well as occupational monitoring for athletes and health professionals. Coffin had several ideas for research on naloxone, including indications for co-prescribing, the use of naloxone in treatment programs and how it affects relapse risk, strategies for how to best provide naloxone to those in need, and optimal dosing of naloxone.

There were several suggestions made about research on the policy and systems approaches to reducing opioid use and abuse. Ciccarone proposed research that would look at whether policies that restrict opioid prescribing are effective and what the paradoxical or unintended consequences of such policies may be. Haegerich had three ideas for policy and systems research, including How can PDMP data be best leveraged for surveillance and etiologic investigation? What systems-level translation and improvement strategies can enhance adoption and use of recommended clinical strategies, including PDMP use? Which insurance/pharmacy benefit management (PBM) interventions and state policies change prescribing behaviors most effectively while supporting pain management?

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SUMMARIZING THOUGHTS

The workshop concluded with a panel of stakeholders who offered their perspectives on the presentations and discussions of the day. Raymond said that he has observed an inherent tension between people who approach opioids from the point of view of chronic pain and the people who approach opioids from the point of view of substance use. He noted that people on both sides of the table may resist the implementation of certain strategies to address pain and the prescription opioid epidemic because of unintended consequences; for example, reducing access to opioids in order to reduce abuse may leave people in pain with no treatment options. Raymond suggested that perhaps the focus should be on people who suffer from both chronic pain and substance use disorders—strategies that are tailored to help this group of people might be both efficacious and mitigate unintended consequences.

Turning from this broad viewpoint, Jonathan Goyer from the Anchor Recovery Community Center and Cowan highlighted the perspectives of individual patients living with substance use disorder and chronic pain, respectively. Goyer, who is in recovery after 10 years of addiction, spoke about the challenges that people struggling with addiction face. He told participants that when people who are suffering from opioid withdrawal are not able to get help, perhaps because of a lack of available beds or insurance coverage, they will go to great lengths to stop the withdrawal symptoms—whether that means stealing in order to buy heroin or committing a crime in order to get arrested and get immediate access to services. He emphasized that while recovery is possible, treatment must be accessible in real time for those who need it. Cowan noted that she observed a lack of focus at the workshop on the needs and expectations of people who suffer from chronic pain. She said that patients need to be active members of the treatment team and that providers need to listen and to understand the individual treatment goals of the patient. She said that in her experience, most patients do not necessarily expect a cure, but want better function and a better quality of life. As she put it, "They want to be able to go fishing again, they want to be able to play with their grandkids, they want to be able to drive their car again, or just go and see a movie."

Veasley said that we "have grossly underfunded research on pain," and as a result, we have "a lack of safe and effective therapies for people who have chronic pain." She said that a "major investment in research on pain" will lead to discovering best practices in pain control and added that as advances in science are made, we need translational efforts to educate clinicians on how they can use new interventions or new findings to help their patients. She also noted that reimbursement is a major barrier to alternative or collaborative therapies and that payers need to be at the table for discussions about pain and the opioid epidemic. Veasley stressed the need to develop evidence that will help clinicians and patients find solutions that work without increasing risk for opioid use disorder and to make "shared decisions about their care in an informed way."♦♦♦

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REVIEWERS: To ensure that it meets institutional standards for quality and objectivity, this Proceedings of a Workshop—in Brief was reviewed by **Richard C. Dart,** Rocky Mountain Poison and Drug Center; **James C. Eisenach,** Wake Forest University School of Medicine; **Josiah D. Rich,** Brown University and The Miriam Hospital; and **Clifford J. Woolf,** Boston Children's Hospital and Harvard Medical School. **Lauren Shern,** National Academies of Sciences, Engineering, and Medicine, served as the review coordinator.

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