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Medication-Assisted Treatment for Opiate Addiction

The Cost Effectiveness of Medication-Assisted Treatment for Opiate Addiction

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Medication-assisted treatment for opiate addiction is cost-effective. This proposition is supported by scientific literature;¹ the Substance Abuse and Mental Health Services Administration (SAMHSA) and the White House Office of National Drug Control Policy concur.² The implications of this evidence for public policymakers, however, require an understanding of the meaning of the term “cost-effectiveness.” Also required is knowledge of the characteristics of the medications generally used to treat addiction and the public treatment systems that states use for medication-assisted treatment for opiate addiction.

The Opiate Addiction Treatment System in the United States

The two U.S. Food and Drug Administration-approved medications most commonly used to treat opiate addiction are buprenorphine and methadone. Naltrexone also is sometimes but not often prescribed for treatment of opiate addiction. The regulatory structure that governs treatment of opiate addiction with methadone in the United States differs significantly from that governing treatment with buprenorphine (or naltrexone) in office-based practice. This difference in the regulatory management of methadone and buprenorphine significantly affects the cost of treatment, the characteristics of the patient population that uses each of the medications, and the ability to substitute treatment with methadone for treatment with buprenorphine for some patients.

In the United States, use of methadone to treat opiate addiction may be provided only in a clinic certified under the auspices of the Substance Abuse and Mental Health Services Administration. Other federal agencies—such as the Drug Enforcement Administration—and State Methadone Authorities—also regulate clinics that provide opiate addiction treatment with methadone. Patients must attend these clinics daily for at least the first 90 days of treatment. Then, patients who have complied with treatment may be permitted to have up to two days of take-home drugs. After successfully completing a year of continuous treatment and maintaining stable health, a patient may be given up to a two-week supply of take-home medication.³ Methadone clinics also can administer buprenorphine under the same conditions.



In contrast to methadone, buprenorphine can be prescribed in an office-based setting by specially qualified physicians. Under these circumstances, buprenorphine is regulated more like other prescription opiate medications. Patients with a prescription for buprenorphine for the treatment of opiate addiction can obtain a 30-day supply from a pharmacy. Under federal regulations, physicians who prescribe buprenorphine must have a DEA number, must successfully complete appropriate training, and must have a buprenorphine waiver from the Center for Substance Abuse Treatment (CSAT). Individual physicians who have CSAT waivers may treat a maximum of 100 patients with buprenorphine at any time if at least one year has elapsed since the physician submitted their initial request for a buprenorphine waiver.

Differences in regulations and the minimum scale for a methadone clinic affect where methadone and buprenorphine treatment are available. Few rural areas, in particular, have the potential patient population necessary to support a methadone clinic, although there may be enough physicians who can prescribe buprenorphine. Moreover, patients who are reluctant or unable to travel daily to a methadone clinic may choose buprenorphine treatment. This is particularly likely for patients who have significant family, work or school responsibilities. Indeed, the federal evaluation of the buprenorphine waiver initiative conducted by SAMHSA/Center for Substance Abuse Treatment found that patients treated with buprenorphine were more likely to be female, to be employed and to have post-secondary education than were patients treated with methadone.⁴

These factors imply that, for U.S. patients, methadone and buprenorphine are not perfect substitutes for one another, in large part due to the differences in the regulatory environment that governs their use. Research in other countries also has concluded that patient preference is a significant factor in the choice of medications for treatment of opiate addiction. Some patients who are successfully treated with buprenorphine may refuse treatment with methadone and vice versa. Therefore, separate evaluation of the cost effectiveness of each is appropriate. Comparison of the cost effectiveness of buprenorphine with that of methadone is of limited use because, for patients, the two medications are not perfect substitutes; they differ clinically; and both are not universally available.

Defining Cost Effectiveness

Cost-effectiveness analysis is widely used to evaluate the comparative effectiveness of alternative health interventions such as treatments for opiate addiction and to relate that comparison to their costs.⁵ In cost-effectiveness analysis, researchers obtain information about the costs of alternative health interventions and data on the effects of these specific interventions on the health status of those subject to the interventions. The effectiveness of an intervention such as medication and therapy is measured by the effect of that intervention on a measure of health status in a typical treatment setting. Measures of health status commonly used in cost effectiveness analysis include years of life gained as a result of the intervention and more detailed measures such as number of days patients remain in treatment, the number of opiate-free days or other similar outcome measures.

The fundamental measure used in such analysis is the cost-effectiveness ratio (calculated by dividing the difference in the costs of the two alternative interventions by the difference in their effectiveness). For example, if one treatment alternative costs \$1,000 per patient and

provides patients with an average of three additional years of life, and a second alternative costs \$3,000 per patient and provides patients with an additional five years of life, then the cost effectiveness ratio in this example is \$2,000:2, or \$1,000:1, meaning that the second intervention costs \$1,000 per additional year of life. It is widely accepted that, in the United States a health care intervention is considered cost effective if a treatment costs less than \$50,000 per year of life gained.⁶

It is important to note that social and economic effects of alternative interventions—such as increases in employment or effects other than improved health or longer life—are not included in a typical cost-effectiveness analysis. Although cost-effectiveness is a useful tool, it may ignore other important policy-related outcomes of addiction treatment, such as finding and maintaining legal employment, enrollment in school or training, reduction in arrests for criminal activity and incarceration, and improved quality of personal and family life. Distribution of the costs of each intervention among the patient, the provider and other entities also are not included in cost-effectiveness analyses. Cost-effectiveness analyses in healthcare do not consider such distinctions, which are likely when looking at medication-assisted treatment and its alternatives. Thus, although cost-effectiveness analyses often are requested by policymakers, some important consequences may not be considered that could particularly affect analyses of addiction treatments.

Cost-benefit analysis, on the other hand, attempts to measure all benefits of an intervention and can stand alone, rather than measuring the relative effectiveness of alternative methods to achieve the same goal. As the primary goal of addiction treatment is to reduce addiction and thereby improve health, cost-effectiveness analysis is the most common analytical technique used in the research literature that compares alternative means of so doing.

Although seemingly more straightforward than measurement of effectiveness, measuring costs is not simple. First, the measurement depends upon the perspective from which the cost is measured. Cost to the payer or funder (the state) differs from the cost to the provider and from the cost to the patient. For example, two alternative treatments may be provided at different locations, so that patients must travel further to reach one of them. From the perspective of the payer, if payment to each of the two providers is the same, then the cost is the same. The two providers, however, may be organized, staffed and housed differently, so that one provider may be just breaking even at a certain payment rate while the other generates a substantial surplus. Finally, the patient may find that the costs of time (*i.e.* the “time price”) and travel associated with one provider substantially exceed those associated with use of the other. A study of patients attending methadone treatment clinics in the Detroit area found that the average “time price” was 40 percent of total treatment cost and that higher time prices were related to lower rates of clinic attendance.⁷ When evaluating the result of a cost effectiveness analysis, therefore, it is crucial to understand the perspective from which costs are measured. The actual measurement of the costs of treatment, from whatever perspective is chosen, is not a trivial task, especially in the context of the medication-assisted treatment of opiate addiction in the public sector, where such analysis is complicated.⁸

Methadone

Methadone emerged as a major medication for the treatment of opiate addiction from a 1964 New York research project. The results of this project showed that outpatient treatment of opiate addiction with methadone was successful, and a clinic model was adopted in 1966 to expand methadone maintenance treatment throughout the United States. By 2006, 254,000 methadone patients were in treatment in the United States.⁹

According to the National Survey on Drug Use and Health, in 2006 an estimated 560,000 people had used heroin within the past year.¹⁰ The survey also reported that 1.6 million people were dependent on illicit prescription pain relievers in the past year. Far fewer individuals were enrolled in buprenorphine or methadone treatment. Both figures relate to a significant gap between the number of people who need treatment and the number who actually receive it, even if the number of people who were receiving buprenorphine is added to the number receiving methadone.

A comprehensive review of the literature on methadone maintenance therapy and meta-analysis conducted in 2003¹¹ concluded that methadone was statistically significantly more effective than non-pharmacological approaches in retaining opiate addicts in treatment and in suppressing heroin use. The article notes that methadone treatment remains one of the best researched treatments for opiate addiction and, at the time the article was written, was the only opiate addiction treatment that had been clearly demonstrated in clinical trials to reduce illicit opiate use more than either no treatment, drug-free treatment, placebo medication, or detoxification.

A more recent literature review published in 2005¹² included 52 studies. It concluded that methadone maintenance therapy at appropriate doses is the most effective in retaining patients in treatment and in suppressing heroin use. The evidence showed that high doses of methadone are associated with better retention in treatment and less heroin use.

The National Institute of Drug Abuse has further concluded that, based on research, methadone maintenance treatment is not only effective but is “beneficial to society, cost-effective, and pays for itself in basic economic terms.”¹³ Although a number of research studies conducted in the 1970s through the 1990s reached this conclusion, the study that is currently most widely cited in the research literature was published in 2000.¹⁴ This study used Quality-Adjusted Life Year (QALY) as the outcome measure.

The QALY is an outcome measure that reflects both the quantity and quality of life; quality-of-life adjustments are based on patient or societal ratings of the quality of life associated with different health states. A year in perfect health is considered equal to 1.0 QALYs. The value of a year in ill health would be discounted. For example, a year bedridden might have a value equal to 0.5 QALYs.

The cost effectiveness measure that is calculated shows the cost of producing an additional Quality-Adjusted Life Year by providing additional methadone treatment. This study used the payer’s perspective to calculate costs, so any costs incurred by patients—such as time and travel—were excluded. Also excluded were non-health care costs of government agencies, such as costs of social service or criminal justice agencies. The study results demonstrated that expanded access to methadone maintenance has an incremental cost-effectiveness ratio

of less than \$11,000 per Quality-Adjusted Life Year. The ratio indicates that this therapy is more cost-effective than many other widely used medical therapies. The study noted that one major benefit of expanded methadone treatment is reduced transmission of HIV. This benefits both those who are dependent upon opiates and their sexual partners in the general population who do not use opiates.

Buprenorphine

Buprenorphine has been used in the United States to treat opiate addiction since October 2002, when the FDA approved the use of Suboxone,[®] a formulation of buprenorphine, for use in opiate addiction treatment. Like methadone, buprenorphine is used in many countries worldwide. Recent research on the cost-effectiveness of medication-assisted treatment for opiate addiction has focused on buprenorphine because it is relatively new in the United States. By the time buprenorphine was introduced to the U.S. health care system, methadone maintenance therapy had been long recognized as the standard effective therapy for opiate addiction. Therefore, much of the research literature focused on comparisons to methadone. The FDA approval of buprenorphine, as with other medications, required that it be proven an effective medication, rather than being more effective than methadone or cost effective.

A comprehensive review of the literature on buprenorphine maintenance therapy and meta-analysis conducted in 2003¹⁵ concluded that no statistical difference existed between high-dose buprenorphine and high-dose methadone on patient retention in treatment or in self-reported heroin use. The review also showed that, like methadone, high-dose buprenorphine showed a statistically significant benefit over placebo (no treatment) in terms of retaining patients in treatment and suppressing heroin use.

A study too recent to be included in the above review compared the cost-effectiveness of buprenorphine to that of methadone¹⁶ and concluded that there is not a statistically significant difference between the two with respect to the cost-effectiveness measures employed. The study was performed in Australia, where configuration of treatment services for the treatment of opiate addiction differs from that used in the United States; thus, the results may not be strictly comparable. At least for purposes of the study, all patients were required to be present daily at a clinic for observed administration of a liquid dose of buprenorphine. Although this is standard practice in U.S. methadone clinics, in this country, buprenorphine is most commonly prescribed by a physician and dispensed by a pharmacy; a patient takes the medication at home without observation by a medical worker. This has, of course, a significant impact on reducing the cost of treatment to payers and patients compared to a model where daily observed dosing is required.

Two comprehensive reviews of the research literature published in 2007¹⁷ concluded that both methadone and buprenorphine were cost-effective treatments for opiate addiction. A study for Health Technology Assessment concluded that both methadone and buprenorphine provided more health benefits and were less costly than providing no drug treatment. This study found the results were robust, based on a systematic review and meta-analysis of randomized controlled trials. The other 2007 review reached the same conclusion: Both methadone and buprenorphine are cost-effective treatments for opiate addiction.

¹ Useful bibliography and literature reviews on this topic include the following:

- William S. Cartwright. *Economics of Drug Abuse Treatment Services Bibliography*. Bethesda, MD: National Institute of Drug Abuse, January 2005.
- Steven Belenko, Nicholas Patapis and Michael French. *Economic Benefits of Drug Treatment: A Critical Review of the Evidence for Policy Makers*. University of Pennsylvania, Treatment Research Institute, January 2005.
- Henrick Harwood et al. *Cost Effectiveness and Cost Benefit Analysis of Substance Abuse Treatment: A Literature Review*. Falls Church, VA: The Lewin Group, June 2002.
- National Institute of Drug Abuse. *Questions and Answers Regarding Methadone Maintenance Treatment Research, Cost benefits to methadone maintenance treatment*, http://international.drugabuse.gov/collaboration/guide_methadone/partb_question15.html.
- M Connock et al. "Methadone and Buprenorphine for the Management of Opioid Dependence: A Systematic Review and Economic Evaluation." *Health Technology Assessment* 11, no. 9 (2007), www.hta.ac.uk/execsumm/summ1109.htm.
- University of Maryland. *Review of Cost-Benefit and Cost-Effectiveness Literature for Methadone or Buprenorphine as a Treatment for Opiate Addiction*. University of Maryland: Center for Health Program Development and Management, May 9, 2007.

² See www.whitehousedrugpolicy.gov/publications/factsht/methadone/index.html.

³ See www.dpt.samhsa.gov/pdf/OTPAccredGuidelines-2007.pdf.

⁴ See <http://buprenorphine.samhsa.gov/findings.pdf>.

⁵ Useful texts explaining the application of cost-effectiveness research methods in health care include the following:

- Marthe Gold, Joanna Siegel, Louise Russell and Milton Weinstein (eds.), *Cost-Effectiveness in Health and Medicine* (New York: Oxford University Press, 1996).
- Peter Muening, *Designing and Conducting Cost-Effectiveness Analyses in Medicine and Health Care*. (San Francisco: Jossey-Bass. 2002+.

⁶ Paul Barnett and Sally Hui, "The Cost-Effectiveness of Methadone Maintenance," *The Mount Sinai Journal of Medicine* 67, nos. 5 and 6 (October/November 2000).

⁷ N.N. Borisov and A.C. Goodman, "The Effects of Time and Money Prices on Treatment Attendance for Methadone Maintenance Clients," *Journal of Substance Abuse Treatment* 26 (2004): 43-50.

⁸ See texts on cost-effectiveness methods listed above and the following:

- Michael French, www.datcap.com/, DATE.
- Helena Salome, Michael French, Michael Miller, and Thomas McLellan, *Estimating the Client Costs of Addiction Treatment: First Findings from the Client Drug Abuse Treatment Cost Analysis Program (Client DATCAP)*. *Drug and Alcohol Dependence*, 71 (2003)
- Gary Zarkin, Laura Dunlap, and Ghada Homsy, *The Substance Abuse Services Cost Analysis Program (SASCAP): A New Method for Estimating Drug Treatment Services Costs*. *Evaluation and Program Planning* 27 (2004).

⁹ SAMHSA, National Survey of Substance Abuse Treatment Services (N-SSATS), www.dasis.samhsa.gov/webt/state_data/US06.pdf. DATE/

¹⁰ See www.oas.samhsa.gov/nsduhLatest.htm.

¹¹ R.P. Mattick, C. Breen, J. Kimber, and M. Davoli, *Methadone Maintenance Therapy Versus No Opioid Replacement Therapy for Opioid Dependence* (PLACE: The Cochrane Library, 2003).

¹² Laura Amato et al., "An Overview of Systematic Reviews of the Effectiveness of Opiate Maintenance Therapies: Available Evidence to Inform Clinical Practice and Research," *Journal of Substance Abuse Treatment* 28 (2005).

¹³ National Institute of Drug Abuse, www.international.drugabuse.gov/collaboration/guide_methadone/partb_question15.html, 2006.

¹⁴ Paul Barnett and Sally Hui, "The Cost-Effectiveness of Methadone Maintenance."

¹⁵ R.P. Mattick, J. Kimber, C. Breen, and M. Davoli., *Buprenorphine Maintenance Versus Placebo or Methadone for Opioid Dependence*.

¹⁶ Christopher Doran, et al., "Buprenorphine Versus Methadone: A Cost Effectiveness Analysis". *Drug and Alcohol Dependence* 71 (2003).

¹⁷ M. Connock, et al., "Methadone and Buprenorphine for the Management of Opioid Dependence: A Systematic Review and Economic Evaluation. Health Technology Assessment."

¹⁸ Center for Health Program Development and Management, *Review of Cost-Benefit and Cost-Effectiveness Literature for Methadone or Buprenorphine as a Treatment for Opiate Addiction* (University of Maryland Baltimore County, May 9, 2007).

