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The Addiction Psychiatrist as Dual Diagnosis Physician: A Profession in Great Need and Greatly Needed

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Abstract

Addiction is the number one cause of premature illness and death in the U.S., especially among people with mental illness. Yet American medicine lacks sufficient workforce capacity, expertise, training, infrastructure, and research to support treatment for people with co-occurring addictions and mental illness. This essay argues that the addiction psychiatrist is essential in dual diagnosis care.

Keywords

addiction psychiatry; physician workforce shortages; public health crisis

Substance use disorders are the leading cause of premature illness and death in the U.S. (Mokdad, Marks, Stroup, & Gerberding, 2004). Although people with addictions are still primarily cared for outside of insurance coverage and physician-directed care (Altman et al., 2012), addictions generate a major portion of disease, injury, and early mortality, including cancer, stroke, heart and lung diseases, dementia, HIV and hepatitis, and many accidental and deliberate forms of injury, such as domestic violence (McGinnis & Foege, 1999). Meanwhile, the economic and social costs of viewing addiction as a criminal-legal problem rather than as an illness have been staggering (Altman et al., 2012; Pew Center on the States, 2009). The ‘War on Drugs’ has cost an estimated \$1 trillion since 1970 and has made the U.S. the world’s leader in per-capita incarcerations (DrugWarFacts, 2012; The Sentencing Project, 2006). States are beginning to spend as much on incarceration as providing college education (DrugWarFacts, 2012; Kingkade & McGuinness, 2012). These trends contribute to skyrocketing health and education expenses for families, harming their economic vitality and educational attainment, with no measureable benefits on preventing or reducing addictions over the last quarter century. Addiction problems are compounded by the large overlap with mental illness, termed co-occurring disorders or dual diagnosis (Kessler et al., 1994). The majority of patients with addiction who are seeking treatment suffer from one or more mental illnesses, and most patients with mental illness suffer from one or more addictions (Grant, 1996; Grant, Hasin, Chou, Stinson, & Dawson, 2004; Kessler, 2004; Kessler et al., 1994; Lasser et al., 2000).

In this essay I argue for the re-invigoration and expansion of addiction psychiatry. Health care for addictions and dual diagnosis patients in the U.S has long been inadequate due to a lack of integration of mental health and addiction services (Drake et al., 2001). A declining

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psychiatric workforce, punctuated by extremely low production of formally trained and certified addiction psychiatrists, may undermine integrated dual diagnosis care further.

Building a strong workforce of certified addiction psychiatrists could address the problem of dual diagnosis. Currently, psychiatric addictionology has insufficient numbers and resources to provide an adequate educational and consultative impact within medical schools and psychiatry departments (Renner, 2004). Despite health services research delineating the need to integrate approaches to addictions and mental health (Drake et al., 2001), very few physicians are trained to deliver both addictions and mental health care. Addiction psychiatrists rarely appear in addiction treatment centers or even in integrated dual diagnosis programs (Chambers, Connor, Boggs, & Parker, 2010).

The Addiction Psychiatrist as Dual Diagnosis Physician

Physicians become addiction psychiatrists by completing four goals: 1) General Psychiatry residency training (4 years); 2) Certification in General Psychiatry via the American Board of Psychiatry and Neurology exam; 3) Addiction Psychiatry Fellowship training (1 year) accredited by the Accreditation Council for Graduate Medical Education (ACGME); and 4) Certification in Addiction Psychiatry (American Board of Psychiatry and Neurology subspecialty exam). At present, this pathway is the only way a physician can be formally trained and certified as an addiction specialist in the U.S., sanctioned by ACGME and the American Board of Medical Specialties (ABMS), and the only way any health care professional can receive training and certification in psychotherapeutic and pharmacological modalities of care for both mental illness and addictions. An alternative pathway provided by the American Society of Addiction Medicine / American Board of Addiction Medicine certifies physicians of any type in Addiction Medicine. This certification also requires an exam, but not formal training. However, the American Board of Addiction Medicine is pursuing ABMS/ACGME recognition for Addiction Medicine with a residency training requirement that circumvents psychiatry training (McNamara, 2007). Only physicians certified in Addiction Psychiatry can be training directors for Addiction Psychiatry Fellowships. Addiction psychiatry training is the only way physicians are formally trained and certified to be dual diagnosis capable, paralleling the way behavioral health systems are evaluated (e.g., the DDCAT) for dual diagnosis capability (Chambers et al., 2010).

Addiction Psychiatry: History, Workforce Size and Training Infrastructures

After the American Society of Addiction Medicine first established a certification exam for physicians in addictionology in 1986, the American Board of Psychiatry and Neurology recognized Addiction Psychiatry as an ABMS subspecialty in 1993 (Galanter, 2011). Over five years, 1,776 Addiction Psychiatry certificates were awarded by exams without training requirements to seed the field (Galanter, Dermatis, & Calabrese, 2002). Subsequently, when fellowship training became required, new entries into the sub-specialty sharply declined. From 1998 to 2002, less than 190 physicians graduated from addiction psychiatry fellowships nationwide (Tinsley, 2004). In the 2000's, fellowship numbers remained stagnant, filling only 55% of 108 positions in 2003 (Juil, Scheiber, & Kramer, 2004), and 47% of 116 positions in 2006 (McNamara, 2007). In 2000, only 1% of all U.S. psychiatry residents were enrolled in addiction psychiatry fellowships (Tinsley, 2004), decreasing to 0.8% by 2009 (Hales & Delanoche, 2009). Also by 2009, the number of addiction psychiatry programs and positions offered had fallen to 44 programs and 90 positions, with 74% (67) positions filled (Galanter, 2011). With less than 50 addiction psychiatry fellowship graduates per year since 1998, these data suggest that less than 1,000 physicians in the U.S. have ever been formally trained and certified in addiction psychiatry. These numbers

compare with 4,162 physicians receiving American Society of Addiction Medicine certification by 2007, about half of whom were psychiatrists (McNamara, 2007).

Less than 25% of all 184 American Psychiatry Residency Training Programs in the U.S. offer addiction fellowships (ACGME, 2013; www.acgme.org). In 2009, less than a third of U.S. medical schools and only 28 of 50 states offered an Addiction Psychiatry Fellowship (Galanter, 2011). Large disparities across the states in addiction psychiatry training infrastructures punctuate weak overall workforce production (Figure 1). Only 9 states offer more than 0.05 fellowship positions per 100,000 population (i.e., 1 per 2 million), with New York, Connecticut, and Massachusetts together accounting for a third. The U.S. has a capacity to produce about one addiction psychiatrist for every three million people, while actually filling about 75% of this capacity, producing one addiction specialist for every four million. Given that approximately 25% of the U.S. population suffers with some form of addiction, and addictions collectively represent the leading cause of premature illness and death (Altman et al., 2012; Mokdad et al., 2004), these numbers reflect major healthcare workforce failures.

The emerging iatrogenic prescription drug epidemic may be related to the deficiency of addiction psychiatrists. Over the last 15 years, five-fold increases in opioid prescribing in primary care (CDC, 2011; Governale, 2010; Lembke, 2012) has resulted in proportional five-fold increases in unintended overdoses and deaths due to prescription drugs (CDC, 2011). By 2010, enough opioid medications were prescribed in the U.S. to maintain every adult on 6 opioid pills a day for a month (CDC, 2011), and Americans were more likely to die from a prescription drug overdose than from a car accident or suicide (Minino, Murphy, Xu, & Kochanek, 2011). People with mental illness, at the center of this epidemic, are disproportionately vulnerable to and negatively impacted by these prescribing practices (Becker et al., 2009; Boscarino et al., 2010; Richardson et al., 2012). Among returning combat veterans suffering high rates of dual diagnoses, lethal opioid overdoses are occurring in alarming rates in the context of inadequate mental health and addictions expertise and treatment services at VA hospitals (Bohnert et al., 2012; Institute of Medicine, 2012; Seal et al., 2012; Wallace, West, Booth, & Weeks, 2007). National VA hospital pharmacy data from 2010 characterizes the prescription and dispensation of opioid medications to veterans nationwide. Prescription data like these, and national measures of public health rankings (e.g., from the United Health Foundation, 2009) can be assessed in conjunction with population densities of addiction psychiatry training position offered (Figure 1) across the states, to probe for possible relationships between these measures and the strength of addiction psychiatry training infrastructures.

Addiction Psychiatrist as Translator and Educator of Addiction Neuroscience

The view of addiction as a moral-criminal-legal problem rather than a treatable illness is rooted in a general lack of knowledge, even within the medical profession, regarding neural mechanisms and anatomy that underlie the disease. The concept that addiction is an illness explains the involuntary nature of addiction and its prevalence in people with mental illness and adolescents (Altman et al., 2012; Chambers, Krystal, & Self, 2001; Chambers, Taylor, & Potenza, 2003; Renner, 2004). The stigma associated with this misunderstanding presents a major barrier to recruiting educational and economic support for expanding evidence-based treatments and increasing professional expertise. Beyond their importance in representing addictionology as a branch of psychiatry and medicine, addiction psychiatrists are needed to educate the public, other physicians, and mental health professionals about addiction neuroscience and its translation to clinical phenomenology and treatment.

The training of physician-scientists in the U.S. is in decline, despite calls from trainees, educators, and scientists to increase neuroscience training of psychiatrists (Naftolin, Lockwood, & Sobel, 2004; Roffman et al., 2006; Rosenberg, 1999). A direct connection between the National Institute on Drug Abuse and addiction psychiatry training programs or trainees has never been established. In 2011, only 59 investigators in the U.S. with MD or MD/ PhD degrees were NIDA grant awardees with projects on the basic neuroscience of addictions (R01 or K-Awards). Within this set, only 12 (20%) had primary appointments within psychiatry departments, whereas 80% had appointments in basic science or clinical departments of medical schools (e.g., biochemistry, anesthesia, radiology) that do not treat dual diagnoses or addictions and do not train physicians in these treatments. No addiction psychiatrists were funded to do basic neuroscience in addictions. These trends suggest that NIDA funding for basic translational neuroscience in addiction is not supporting education or research in addiction psychiatry programs.

Addiction Psychiatry: Need for Revitalization

A realistic dialogue is needed for counteracting three major dynamics driving workforce failures in addiction psychiatry. First, addiction psychiatry draws its recruits from general psychiatry which is itself facing unprecedented challenges (Katschnig, 2010). As the number of American students entering psychiatry has declined since 1990 (Hales & Delanoche, 2009), medical schools have reduced psychiatric education in core curricula (Cutler, 2012). Psychiatry is now in the poorest condition among all major medical fields in terms of having the most unfavorable balance of aging workforce and average incomes (Figure 2) (MGMA, 2012). In Indiana, for example, about half of all psychiatrists are within a decade of the retirement age of 65, with only about a third as many in practice ages 30-34 compared to ages 50-54 (Chambers et al., 2010; MGMA, 2012). Similar trends are affecting social workers, psychologists, and nurses, endangering that the entire behavioral health field (Lewis, Sheff, Richard, Brandt, & Zollinger, 2012).

Second, the behavioral health system of the U.S., including research, professional training, and clinical care, remains firmly entrenched in a segregated view of addictions and mental illnesses as unrelated entities (Gonzales & Insel, 2004; O'Brien et al., 2004). Even as most behavioral health patients suffer with dual diagnoses (Grant, 1996; Grant et al., 2004; Kessler, 2004; Kessler et al., 1994; Lasser et al., 2000), and despite mounting evidence suggesting the biological inter-relatedness of these diseases (Chambers et al., 2001; D'Souza et al., 2005; Lappalainen et al., 1998; Zhang, Stein, & Hong, 2010), the National Institutes on Drug Abuse (NIDA), Mental Illness (NIMH), and Alcohol Abuse and Alcoholism (NIAAA) still primarily fund research that focuses on drug abuse, or alcohol abuse, or mental illness, as separate disorders. Similarly, clinical funding streams, professions, and treatment infrastructures remain segregated. Thus, despite an evidence-based consensus that integrated dual diagnosis services are the most effective and efficient standard of care (Drake et al., 2001; Drake & Wallach, 2000; Minkoff & Cline, 2004), the great majority of patients with co-occurring mental illness and addiction are still unable to access integrated treatments (Power & Demartino, 2004).

Third, without parity for addictions treatment reimbursement from both private and public insurers, addiction psychiatry expertise remains rare and financially unsupported. Fellowship training in addiction psychiatry does not significantly increase earning potential of psychiatrists in distinction to subspecialty training in all other medical fields where further training can double or triple incomes (MGMA, 2012). Meanwhile, no generally recognized clinical-professional standards or privileges empower, support, and require the unique expertise that addiction psychiatrists offer. Insurance companies are as likely to deny addictions treatment provided by an addiction psychiatrist as that provided by an

obstetrician. With the exception of a required ACGME quota of two certified addiction psychiatrist-faculty per addiction psychiatry fellowship, no standards of hospital accreditation or health insurance programs require addiction, mental health, or dual diagnosis treatment programs, or medical schools to have addiction psychiatrists. Further, increasing medical school and undergraduate loan debt rules out careers in addiction psychiatry (let alone psychiatry) for many. While the median medical student loan debt increased from about \$24,000 in 1985 to \$117,000 in 2003 (Jolly, 2005), the costs of undergraduate education have risen similarly, burdening many residents with debts of \$250,000! Under these conditions, few can afford an additional sacrifice of another \$100,000 necessary for pursuing addiction psychiatry training.

Addiction Psychiatry: Creating a New Initiative

New initiatives are needed for re-invigorating and expanding addiction psychiatry as a strategy for avoiding the vast expenditures now spent on illness, injuries, and incarcerations resulting from iatrogenic and untreated addictions. An action plan might include: 1) Establish student loan repayment programs for addiction psychiatry fellows; 2) Establish addictions treatment standards (including opiate maintenance programs) that require integrated dual diagnosis capabilities with certified addiction psychiatrists; 3) Achieve parity of insurance coverage for dual diagnosis and addiction treatment, contingent on provision of care by certified addiction psychiatrists; 4) Strengthen the American Psychiatric Association and ACGME standards for educational requirements in addictions in psychiatry training; 5) Enhance accreditation standards by the Liaison Committee on Medical Education (LCME), whereby American medical schools should include addiction psychiatry training programs; 6) Initiate extramural NIH granting programs and policies to foster research training for addiction psychiatry fellows, enhance success rates of basic and clinical neuroscience grant applications from departments that train addiction professionals and treat patients, and create grant programs explicitly focused on dual diagnosis. Implementing measures like these with modest goals (e.g., of tripling the number of addiction psychiatrists, and expanding fellowships to the majority of U.S. medical schools and psychiatry residencies) would require collaboration among many stakeholders and organizations spanning psychiatry, medical education, research, and the insurance industry. Reinvigorating and growing addiction psychiatry could promote a healthier population, a better economy, and a better quality of life in the U.S.

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REFERENCES

- Altman, DE.; Fineberg, HV.; Gold, MS.; Greenfield, SF.; Kabler, ER.; Lynk, M.; Sullivan, LW. Addiction medicine: Closing the gap between science and practice. The National Center on Addiction and Substance Abuse at Columbia University; New York, NY: 2012. Retrieved from <http://www.casacolumbia.org/upload/2012/20120626addictionmed.pdf>
- Becker WC, Fiellin DA, Gallagher RM, Barth KS, Ross JT, Oslin DW. The association between chronic pain and prescription drug abuse in Veterans. *Pain Medicine*. 2009; 10(3):531–536. [PubMed: 19425211]
- Bohnert AS, Ilgen MA, Ignacio RV, McCarthy JF, Valenstein M, Blow FC. Risk of death from accidental overdose associated with psychiatric and substance use disorders. *American Journal of*

- Psychiatry. 2012; 169(1):64–70. doi: 10.1176/appi.ajp.2011.10101476appi.ajp.2011.1010147. [PubMed: 21955932]
- Boscarino JA, Rukstalis M, Hoffman SN, Han JJ, Erlich PM, Gerhard GS, Stewart WF. Risk factors for drug dependence among out-patients on opioid therapy in a large US health-care system. *Addiction*. 2010; 105(10):1776–1782. doi: 10.1111/j.1360-0443.2010.03052.x ADD3052. [PubMed: 20712819]
- CDC. Vital Signs: Overdoses of prescription opioid pain relievers United States, 1999–2008. *Monthly Morbidity and Mortality Report*. 2011; 60(43):1487–1492.
- Chambers RA. Adult hippocampal neurogenesis in the pathogenesis of addiction and dual diagnosis disorders. *Drug and Alcohol Dependence*. 2012 doi: 10.1016/j.drugalcdep.2012.12.005.
- Chambers RA, Bickel WK, Potenza MN. A scale-free systems theory of motivation and addiction. *Neuroscience and Biobehavioral Reviews*. 2007; 31:1017–1045. [PubMed: 17574673]
- Chambers RA, Connor MC, Boggs CJ, Parker GF. The Dual Diagnosis Physician-infrastructure Assessment Tool: Examining physician attributes and dual diagnosis capacity. *Psychiatric Services*. 2010; 61(2):184–188. doi: 10.1176/appi.ps.61.2.184. [PubMed: 20123825]
- Chambers RA, Krystal JK, Self DW. A neurobiological basis for substance abuse comorbidity in schizophrenia. *Biological Psychiatry*. 2001; 50:71–83. [PubMed: 11526998]
- Chambers RA, Taylor JR, Potenza MN. Developmental neurocircuitry of motivation in adolescence: A critical period of addiction vulnerability. *American Journal of Psychiatry*. 2003; 160:1041–1052. [PubMed: 12777258]
- Cutler JL. Commentary on “Shorter psychiatry clerkship length is associated with lower NBME psychiatry shelf exam performance”. *Academic Psychiatry*. 2012; 36(3):167–168. doi: 10.1176/appi.ap.12020025. [PubMed: 22751814]
- D’Souza DC, Abi-Saab WM, Madonick S, Forselius-Bielen K, Doersch A, Braley G, Krystal JH. Delta-9-tetrahydrocannabinol effects in schizophrenia: Implications for cognition, psychosis, and addiction. *Biological Psychiatry*. 2005; 57(6):594–608. doi: 10.1016/j.biopsych.2004.12.006. [PubMed: 15780846]
- Drake RE, Essock SM, Shaner A, Carey KB, Minkoff K, Kola L, Rickards L. Implementing dual diagnosis services for clients with severe mental illnesses. *Psychiatric Services*. 2001; 52(4):469–476. [PubMed: 11274491]
- Drake RE, Wallach MA. Dual diagnosis: 15 years of progress. *Psychiatric Services*. 2000; 51(9):1126–1129. [PubMed: 10970914]
- DrugWarFacts. Economics. 2012. Retrieved from <http://www.drugwarfacts.org/cms/Economics>
- Galanter, M. Addiction psychiatry fellowships. Department of Psychiatry, NYU School of Medicine; New York, NY: 2011.
- Galanter M, Dermatis H, Calabrese D. Residencies in addiction psychiatry: 1990 to 2000, a decade of progress. *The American Journal on Addictions*. 2002; 11(3):192–199. doi: 10.1080/10550490290087956. [PubMed: 12202011]
- Gonzales JJ, Insel TR. The conundrum of co-occurring mental and substance use disorders: Opportunities for research. *Biological Psychiatry*. 2004; 56(10):723–725. doi: 10.1016/j.biopsych.2004.09.007. [PubMed: 15556114]
- Governale, L. Outpatient prescription opioid utilization in the U.S., Years 2000–2009: FDA report. National data acquisition; Surveillance Data, Inc, Vector One: 2010. 2010
- Grant BF. Prevalence and correlates of alcohol use and DSM-IV drug dependence in the United States: Results of the NLAES. *Journal of Substance Abuse*. 1996; 8:195–210. [PubMed: 8880660]
- Grant BF, Hasin DS, Chou SP, Stinson FS, Dawson DA. Nicotine dependence and psychiatric disorders in the United States: Results from the National Epidemiologic Survey on Alcohol and Related Conditions. *Archives of General Psychiatry*. 2004; 61(11):1107–1115. [PubMed: 15520358]
- Hales, DJ.; Delanoche, N. Resident census: Characteristics and distribution of psychiatry residents in the U.S. 2008–2009. American Psychiatric Association; Arlington, VA: 2009.
- Institute of Medicine. Substance use disorders in the U.S. Armed Forces. Institute of Medicine, National Academy of Sciences; Washington, D.C.: 2012.

- Jolly P. Medical school tuition and young physicians' indebtedness. *Health Affairs (Millwood)*. 2005; 24(2):527–535. doi: 10.1377/hlthaff.24.2.527.
- Juil D, Scheiber SC, Kramer TA. Subspecialty certification by the American Board of Psychiatry and Neurology. *Academic Psychiatry*. 2004; 28(1):12–17. doi: 10.1176/appi.ap.28.1.12. [PubMed: 15140803]
- Katschnig H. Are psychiatrists an endangered species? Observations on internal and external challenges to the profession. *World Psychiatry*. 2010; 9(1):21–28. [PubMed: 20148149]
- Kessler RC. The epidemiology of dual diagnosis. *Biological Psychiatry*. 2004; 56:730–737. [PubMed: 15556117]
- Kessler RC, McGonagle KA, Zhao S, Nelson CB, Hughes M, Eshleman S, Kendler KS. Lifetime and 12-month prevalence of DSM-III-R psychiatric disorders in the United States. Results from the NCS. *Archives of General Psychiatry*. 1994; 51:8–19. [PubMed: 8279933]
- Kingkade T, McGuinness W. Prison, drug war spending rockets while higher education funding declines. *Huffington Post*. 2012 Retrieved from http://www.huffingtonpost.com/2012/08/28/spending-on-prisons-higheredn_1835889.html.
- Lappalainen J, Long JC, Eggert M, Ozaki N, Robin RW, Brown GL, Goldman D. Linkage of antisocial alcoholism to the serotonin 5HT1B receptor gene in 2 populations. *Archives of General Psychiatry*. 1998; 55(11):989–994. [PubMed: 9819067]
- Lasser K, Boyd JW, Woolhandler S, Heimmerstein D, McCormick D, Bor D. Smoking in mental illness: A population-based prevalence study. *JAMA: The Journal of the American Medical Association*. 2000; 284(20):2606–2610. [PubMed: 11086367]
- Lembke A. Why doctors prescribe opioids to known opioid abusers. *New England Journal of Medicine*. 2012; 367(17):1580–1581. doi: 10.1056/NEJMp1208498. [PubMed: 23094719]
- Lewis, C.; Sheff, ZT.; Richard, AE.; Brandt, AJ.; Zollinger, TW. 2010 Indiana mental health professionals re-licensure survey report. Bowen Research Center, Department of Family Medicine, Indiana University School of Medicine, Indiana Area Health Education Centers Program; Indianapolis, IN: 2012.
- McGinnis JM, Foege WH. Mortality and morbidity attributable to use of addictive substances in the United States. *Proceedings of the Association of American Physicians*. 1999; 111(2):109–118. [PubMed: 10220805]
- McNamara D. Addiction medicine seeks ABMS status. *Internal Medicine News*. 2007:1.
- MGMA. 2012 MGMA specialty analysis, reimbursement and numbers of docs [dataset]. Medical Group Management Association- American College of Medical Practice Executives (MGMA-ACMPE); Englewood, CO: 2012.
- Minino AM, Murphy S, Xu J, Kochanek KD. Deaths: Final data for 2008. *National Vital Statistics Reports*. 2011; 59(10)
- Minkoff K, Cline CA. Changing the world: The design and implementation of comprehensive continuous integrated systems of care for individuals with co-occurring disorders. *Psychiatric Clinics of North America*. 2004; 27(4):727–743. doi: 10.1016/j.psc.2004.07.003. [PubMed: 15550290]
- Mokdad AH, Marks JS, Stroup JS, Gerberding JL. Actual causes of death in the United States, 2000. *JAMA: The Journal of the American Medical Association*. 2004; 291:1238–1245. [PubMed: 15010446]
- Naftolin F, Lockwood CJ, Sobel BE. Keeping medicine and science together. *Experimental Biology and Medicine (Maywood)*. 2004; 229(6):437–438.
- O'Brien CP, Charney DS, Lewis L, Cornish JW, Post RM, Woody GE, Weisner C. Priority actions to improve the care of persons with co-occurring substance abuse and other mental disorders: A call to action. *Biological Psychiatry*. 2004; 56(10):703–713. [PubMed: 15556110]
- Pew Center on the States. One in 31: The long reach of American corrections. The Pew Charitable Trusts; Washington, DC: 2009. Retrieved from http://www.pewstates.org/uploadedFiles/PCS_Assets/2009/PSPP_1in31_report_FINAL_WEB_3-26-09.pdf
- Power K, Demartino R. Co-occurring disorders and achieving recovery: The Substance Abuse and Mental Health Services Administration perspective. *Biological Psychiatry*. 2004; 56(10):721–722. doi: 10.1016/j.biopsych.2004.03.005. [PubMed: 15556113]

- Renner JA. How to train residents to identify and treat dual diagnosis patients. *Biological Psychiatry*. 2004; 56(10):810–816. doi: 10.1016/j.biopsych.2004.04.003. [PubMed: 15556127]
- Richardson LP, Russo JE, Katon W, McCarty CA, DeVries A, Edlund MJ, Sullivan M. Mental health disorders and long-term opioid use among adolescents and young adults with chronic pain. *Journal of Adolescent Health*. 2012; 50(6):553–558. doi: 10.1016/j.jadohealth.2011.11.011. [PubMed: 22626480]
- Roffman JL, Simon AB, Prasad KM, Truman CJ, Morrison J, Ernst CL. Neuroscience in psychiatry training: How much do residents need to know? *American Journal of Psychiatry*. 2006; 163(5): 919–926. doi: 10.1176/appi.ajp.163.5.919. [PubMed: 16648336]
- Rosenberg L. Physician-scientists--endangered and essential. *Science*. 1999; 283(5400):331–332. [PubMed: 9925491]
- Seal KH, Shi Y, Cohen G, Cohen BE, Maguen S, Krebs EE, Neylan TC. Association of mental health disorders with prescription opioids and high-risk opioid use in US veterans of Iraq and Afghanistan. *JAMA: The Journal of the American Medical Association*. 2012; 307(9):940–947. doi: 10.1001/jama.2012.234. [PubMed: 22396516]
- The Sentencing Project. New incarceration figures: Thirty-three consecutive years of growth. Dec. 2006 Retrieved from http://www.sentencingproject.org/Admin/Documents/publications/inc_newfigures.pdf
- Tinsley JA. Workforce information on addiction psychiatry graduates. *Academic Psychiatry*. 2004; 28(1):56–59. doi: 10.1176/appi.ap.28.1.56. [PubMed: 15140809]
- United Health Foundation. America's Health Rankings. 2009. <http://www.americashealthrankings.org/>
- U. S. Census Bureau. 2010 U.S. Census Data. 2010. Retrieved from <http://www.census.gov/2010census/>
- Wallace AE, West AN, Booth BM, Weeks WB. Unintended consequences of regionalizing specialized VA addiction services. *Psychiatric Services*. 2007; 58(5):668–674. doi: 10.1176/appi.ps.58.5.668. [PubMed: 17463348]
- Zhang X, Stein EA, Hong LE. Smoking and schizophrenia independently and additively reduce white matter integrity between striatum and frontal cortex. *Biological Psychiatry*. 2010; 68:674–677. [PubMed: 20678753]

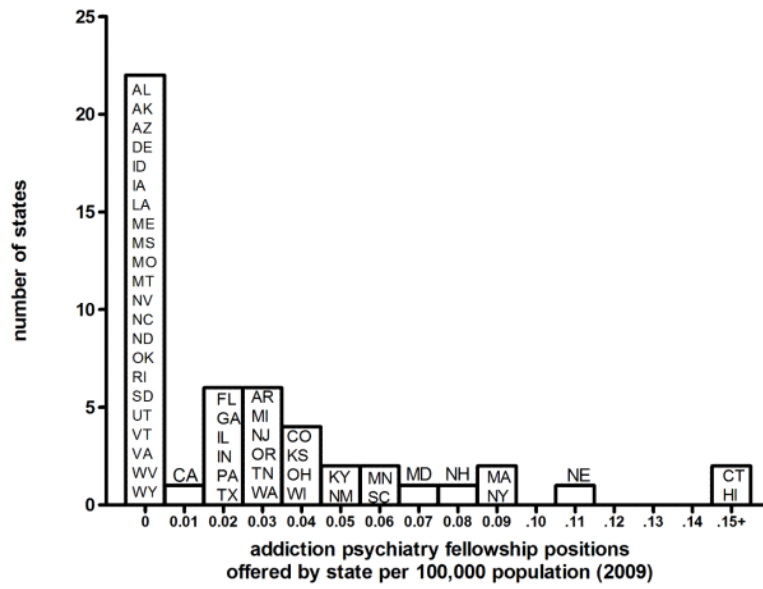


Figure 1. Histogram of the states grouped by numbers of addiction psychiatry fellowship positions offered by state per 100,000 population. Data in the figure was compiled from 2010 U.S. census data (U.S. Census Bureau, 2010) and 2009 addiction fellowship census data from the Center for Medical Fellowships in Alcoholism, and Drug Abuse (Galanter, 2011).

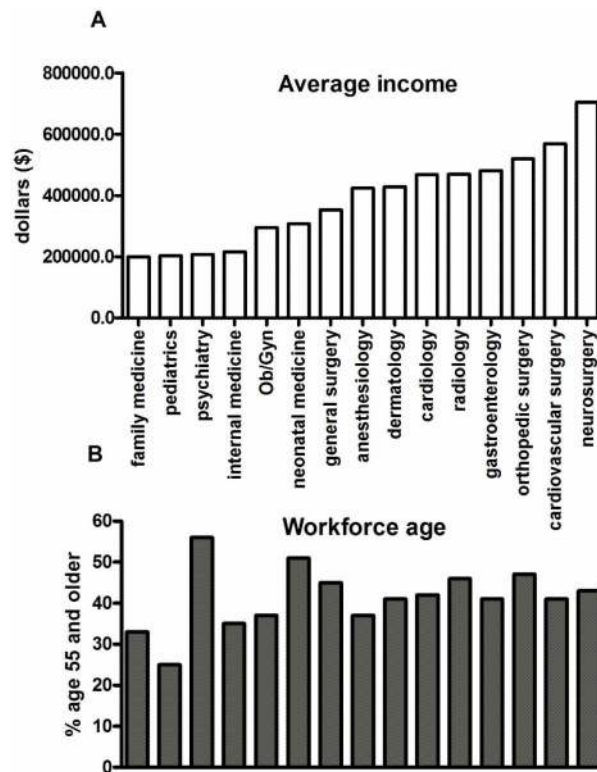


Figure 2. Indices of workforce vitality across major physician specialties. MGMA data from 2012 reveals psychiatry to be A) among the lowest reimbursed medical specialties (as with other primary care specialties) with B) the most advanced age of workforce suggestive of a medical profession in decline.