



Short Report

Admitted to treatment without diagnosis: The status of known diagnoses in US addictions treatment centres

Ethan Sahker^a, Yunkyong Loh Garrison^b, Soeun Park^b, Chi W. Yeung^b, Stephan Arndt^{c,*}^a Iowa Consortium for Substance Abuse Research and Evaluation; Department of Psychological and Quantitative Foundations, Counseling Psychology Program, College of Education, University of Iowa, 100 MTP4 Room 102, Iowa City, IA, 52242, USA^b Department of Psychological and Quantitative Foundations, Counseling Psychology Program, College of Education, University of Iowa, 361 Lindquist Center, Iowa City, IA, 52242, USA^c Iowa Consortium for Substance Abuse Research and Evaluation; Department of Psychiatry, Carver College of Medicine; Department of Biostatistics, College of Public Health, University of Iowa, 100 MTP4 Room 102, Iowa City, IA, 52242, USA

ARTICLE INFO

Keywords:

Data fidelity
Reporting standards
Substance use disorders

ABSTRACT

Background: Diagnostic and treatment gaps exist for those with substance use disorders (SUD). SUD diagnostics in treatment have been critically under-investigated. We investigated known diagnoses in US addiction treatment centres receiving state or federal funding.**Methods:** Cross-sectional risk factor analysis of variables associated with known diagnoses in US inpatient and outpatient treatment facilities receiving public funding from 2000 to 2014 (N = 8,692,362).**Results:** Of all clients, 59.68% had unknown diagnoses. However, 14 states reported zero diagnostic data, representing the majority of unknown diagnoses. Of the reporting states (n = 4,161,021), 16.05% had unknown diagnoses. Those with known diagnoses were represented by four subcategories of SUD (73.22%), No Diagnosis (0.81%), Alcohol Intoxication (1.36%), and Mental Health (8.57%). Uninsured status was one meaningful association and was less likely to have a known diagnosis. Insurance status, referral source, service setting, and wait to admission significantly predicted known diagnosis ($p < 0.0001$).**Conclusions:** A large proportion of admissions are missing diagnoses. Many states do not report any diagnostics. Variables predictive of a known diagnosis highlight administrative inconsistencies. Policies requiring SUD diagnosis documentation can improve assessment of treatment appropriateness and level of care, programme evaluation, and inform the funding allocation for relevant treatment efforts.

Introduction

Accurate diagnosis is important for effectively treating substance use disorders (SUDs) (Csete et al., 2016). However, only 10% of individuals diagnosed with an SUD receive treatment (Han, Hedden, Lipari, Copello, & Kroutil, 2015; U.S. Department of Health and Human Services [USHHS], 2016). In 2014, approximately 21.5 million Americans met criteria for an SUD, while only 2.3 million of those people received treatment (Han et al., 2015). This disparity is referred to as the treatment gap, which may indicate poor treatment access, SUD stigma, or insufficient screenings and diagnostics (United States Department of Health & Human Services, 2016; White & Kelly, 2011). In addition, half of the 4.1 million Americans who received treatment did not fit criteria for an SUD (Han et al., 2015). SUDs should be treated in the same way as other chronic illnesses to better inform treatment, insurance policy,

and outcome evaluation (McLellan et al., 2000). Proper diagnostic reporting may become more important as more substance use treatment is covered by insurance following healthcare parity laws in countries such as the US. To be treated equal, diagnoses should be equally important in physical and mental illness, SUDs included.

Alcohol use treatment and its associated costs to society are estimated to be near \$224 billion (Bouchery, Harwood, Sacks, Simon, & Brewer, 2011) and other drugs, while less than alcohol, are also estimated in the billions (Mark, Woody, Juday, & Kleber, 2001). If nearly 90% of those with an SUD go untreated (United States Department of Health & Human Services, 2016), and the cost of treatment is already soaring (Bouchery et al., 2011; Mark et al., 2001), then admitting clients to treatment with unknown SUD diagnoses may cause an undue burden on the treatment resources. Presently, there is a high percentage of missing SUD diagnostic data in federally funded datasets

* Corresponding author at: University of Iowa, Iowa City, IA, 52245-5000, USA.

E-mail addresses: ethan-sahker@uiowa.edu (E. Sahker), yun-garrison@uiowa.edu (Y. Loh Garrison), soeun-park@uiowa.edu (S. Park), chi-yeung@uiowa.edu (C.W. Yeung), stephan-arndt@uiowa.edu (S. Arndt).<https://doi.org/10.1016/j.drugpo.2018.11.015>

(Bouchery et al., 2012; United States Department of Health & Human Services, 2015). Moreover, little is understood about these missing data and the state of known and unknown diagnoses in treatment. Therefore, investigating the present state of SUD diagnostics is of paramount importance to properly provide and evaluate treatment services. The purpose of this exploratory analysis is to investigate the proportion of those with known diagnoses in American treatment centres receiving public funding. A secondary purpose is to determine factors associated with missing SUD diagnosis.

Material and methods

The Substance Abuse and Mental Health Services Administration (SAMHSA) requests admission information from all public and private treatment facilities receiving public funding in the US. These data are available as the Treatment Episode Datasets – Admissions (TEDS-A) (United States Department of Health & Human Services, 2015). Following previous methods with these data (Marzell, Sahker, & Arndt, 2017) we only included first-time admissions, ensuring a non-duplicative group of individuals admitted to treatment. We limited the present study to non-detoxification treatment admissions from 2000 to 2014 ($N = 8,692,362$). Because these data represent de-identified existing public information there was no informed consent and the University Human Subjects Office, Institutional Review Board exempted this study from review.

Study variables

SUD diagnosis ($N = 8,692,362$) was coded as 0 = unknown diagnosis and 1 = known diagnosis. Known diagnosis included any diagnosis reported, which fell into four diagnostic subcategories of 1) SUD (35.17%), 2) No Diagnosis (0.39%), 3) Alcohol Intoxication (0.65%), and 4) Other Mental Health (4.11%). Unknown diagnosis included missing/not collected/unknown/invalid data (59.68%). TEDS categorizes data to identify SUDs and provides no information as to the subtypes of mental health diagnoses (United States Department of Health & Human Services, 2015). Administrative variables included in this study were insurance status, referral source, service setting, wait to admission, and state. Health insurance status was recorded as private, Medicaid/Medicare, uninsured, and missing. Referral source included the seven categories of individual or self-referral, alcohol/drug abuse agency, healthcare professional, school, employer or employee assistance program (EAP), other community referral (e.g., shelters, religious organizations), and criminal justice agency (e.g., parole, probation). Service setting included non-detox categories of rehabilitation hospital, rehabilitation short-term, rehabilitation long-term, intensive outpatient, and outpatient. Wait to admission is reported within weekly increments: 1 week, 2 weeks, 3 weeks, 4 weeks, and 5+ weeks. Wait to admission was categorized in this way because it is a count variable, not normally distributed, and highly zero-saturated. States included 49 states, Washington DC (DC), and Puerto Rico. Mississippi is excluded as they do not report treatment data to TEDS-A. States were coded as reporters ($k = 37$) and non-reporters ($k = 14$). Non-reporter states that do not include diagnostics were: California, Iowa, Kansas, Maine, Maryland, Massachusetts, Minnesota, New Jersey, New York, Oregon, Pennsylvania, Texas, Washington, and Wisconsin.

Statistical analysis

All data analyses were conducted using SAS 9.4. The present study is a cross-sectional risk factor analysis of variables associated with known diagnoses using the TEDS-A dataset from the Substance Abuse Mental Health Services Administration. Data on SUD diagnoses are provided and include DSM-IV-TR (American Psychiatric Association, 2000) diagnoses of Substance Abuse and Dependence. Chi-square analysis was used to test categorical data. An adjusted multiple logistic

regression model predicting known diagnosis was used to test the significance with all administrative predictor variables assumed present. All administrative variables were loaded into the initial regression model. To investigate differences in state diagnostic reporting variability, a secondary model further adjusted for the contribution from state variation by using state dummy variables. Because of the very large sample size, trivial differences have the potential to be statistically significant. To avoid misidentifying trivial significance, we only considered $p < 0.001$ as significant. Effect sizes are presented in adjusted odds ratios (AOR) and state adjusted odds ratios (State AOR) comparing sub-categorical odds of having a known diagnosis. Additionally, risk differences (RD) represents a difference between known and unknown diagnosis percentages. RD is the inverse of number needed to treat (Grissom & Kim, 2012) and is a simple difference in proportions. Following previous criteria, ORs greater than 2.0 or less than 0.5, and RDs greater than 5 or less than -5 were considered meaningful effect sizes (St. Marie, Sahker, & Arndt, 2015).

Results

Results from the entire national sample ($N = 8,692,362$) demonstrate that 59.68% of all clients had unknown diagnoses within the TEDS dataset, whereas 40.32% of clients had known diagnoses. The large percent of unknown cases may be misleading, however. In fact, these diagnoses are unknown within the data because many states choose not to report diagnostic information, even though they report other variables. Fourteen states had zero data for diagnoses, representing the majority of unknown cases. Only states that reported diagnostic data were included in the final analysis, consisting of 35 reporting states, DC, and Puerto Rico ($n = 4,161,021$). For reporting states, admissions were mostly male (65.89%), White (62.88%), and between the ages of 25–29 (15.02%). Of the reporting states, 16.05% ($n = 667,847$) had unknown diagnoses and 83.95% ($n = 4,161,021$) had known diagnoses. Those who had known diagnoses were represented by four subcategories of SUD (73.22%, $n = 3,046,519$), Mental Health (8.57%, $n = 356,689$), Alcohol Intoxication (1.36%, $n = 56,427$), and No Diagnosis (0.81%, $n = 33,539$).

Administrative predictors of known diagnoses

Table 1 presents diagnosis comparison percentages and AORs. The logistic regression omnibus test predicting diagnosis from insurance status, referral source, service setting, and wait to admission was significant (Wald $\chi^2_{[17]} = 12,347.09$, $p < 0.0001$). After controlling for state, the regression remained significant and the odds were reduced ($p < 0.0001$). Insurance status significantly predicted known diagnosis (Wald $\chi^2_{[3]} = 4,259,096.93$, $p < 0.0001$) and two subcategories had meaningful effect sizes. Those with missing insurance data were more associated with known diagnoses (RD = 18.41, 95% CI = 18.28–18.53). Additionally, the uninsured were less associated with known diagnoses (RD = 17.54, 95% CI = 17.41–17.67). Service setting significantly predicted a known diagnosis (Wald $\chi^2_{[4]} = 6,872,264.15$, $p < 0.0001$) with only outpatient settings demonstrating a meaningful effect size and being more associated with known diagnoses (RD = 6.58, 95% CI = 6.46–6.71). Wait to admission significantly predicted a known diagnosis (Wald $\chi^2_{[4]} = 230,829.74$, $p < 0.0001$) with those waiting 0 days to one week being more associated with known diagnoses (RD = 5.02, 95% CI = 4.43–5.61). Finally, referral source significantly predicted a known diagnosis (Wald $\chi^2_{[6]} = 16,106,444.10$, $p < 0.0001$), but meaningful RDs were not present.

Discussion

The present study investigated the most up-to-date proportion of admissions to addictions treatment centres in the US. In the entire US, 59.68% of admissions had an unknown diagnosis. Much of the

Table 1

Administrative predictors of known diagnoses in US inpatient and outpatient addictions treatment centres among reporting states, DC, and Puerto Rico.

Variable	% Unknown Diagnosis (n = 667,847)	% Known Diagnosis (n = 3,493,174)	AOR	95% CI	State AOR	95% CI
Health Insurance^a						
Private	7.22	5.52	1.00		1.00	
Assistance	12.11	12.95	2.00	1.91-2.10	1.75	1.749-1.754
Uninsured	44.40	26.86	1.29	1.24-1.34	1.09	1.087-1.090
Missing Data	36.26	54.67	9.45	8.98-9.94	2.61	2.602-2.611
Referral Source^a						
Self	26.80	25.85	1.28	1.24-1.31	1.42	1.422-1.426
SUD Provider	3.02	5.24	1.09	1.04-1.14	2.22	2.215-2.222
Other Healthcare	6.20	7.58	0.87	0.83-0.92	1.30	1.297-1.300
School	2.71	2.06	1.18	1.08-1.28	0.56	0.562-0.564
Employer	0.73	0.76	1.02	0.99-1.06	1.11	1.107-1.110
Other Community	10.08	11.09	1.59	1.47-1.71	1.26	1.259-1.262
Criminal Justice	50.46	47.44	1.00		1.00	
Service Setting^a						
Hospital Rehab	0.69	0.54	0.95	0.90-1.01	3.36	3.353-3.362
≤ 30 Day Rehab	11.28	7.43	0.95	0.87-1.03	1.77	1.765-1.769
> 30 Day Rehab	4.53	6.13	1.64	1.41-1.92	1.75	1.752-1.756
Intensive Outpatient	16.18	11.99	1.44	1.37-1.51	1.59	1.591-1.594
Outpatient	67.33	73.91	1.00		1.00	
Wait to Admission^a						
1 Week	37.62	42.64	0.95	0.69-1.31	1.20	1.201-1.204
2 Weeks	8.16	8.72	0.69	0.66-0.72	1.11	1.113-1.116
3 Weeks	6.50	5.03	0.77	0.73-0.81	1.06	1.060-1.063
4 Weeks	2.38	2.50	0.91	0.88-0.95	1.20	1.202-1.206
5+ Weeks	45.34	41.11	1.00		1.00	

Note: SUD = substance use disorder; CI = confidence interval; AOR = adjusted odds ratio includes all covariates listed in the table; State AOR = state included in the final adjusted model; Known diagnosis includes: no diagnosis, alcohol intoxication, SUD, and non-SUD mental health. Excluded non-reporter states include: California, Iowa, Kansas, Maine, Maryland, Massachusetts, Minnesota, New Jersey, New York, Oregon, Pennsylvania, Texas, Washington, and Wisconsin. Column percentages may not sum to 100 due to rounding.

Bold = meaningful risk difference greater than |5| percentage points comparing Unknown and Known diagnoses.

* $p < 0.0001$ χ^2 test for difference.

unknown cases were due to unreported diagnostic data from 14 states. Among reporter states, 16.05% had an unknown diagnosis, and 26.78% of admissions to addictions treatment did not have a recorded SUD. This may be due to how data are reported. Centres can only select one subcategory of diagnosis, leaving mental health to compete with SUDs in terms of importance. This means that in the federal data, centres can select only one type of diagnosis. If they select mental health diagnosis, the SUD diagnosis would appear unknown. Addictions treatment centres must decide which is more important to report, mental health or SUD. Those with a diagnosed SUD only made up 73.22% of clients in reporting states. To understand the status of known diagnoses in US addictions treatment, available administrative variables were explored as predictors.

The present study revealed that uninsured clients were associated with the largest percentage of unknown diagnoses. Controlling for state variation attenuated the odds of having a known diagnosis. This suggests that certain states' billing and diagnosis reporting are more associated with diagnoses. Uninsured clients with missing diagnoses calls into question the treatment needs. Being uninsured is associated with poverty or economic instability (Mills, 2001). Due to financial barriers, uninsured clients may receive mandated treatment through the criminal justice system, whereas insured clients may have better access to financial and social resources which may increase their use of services (Wu & Ringwalt, 2005). These findings suggest that insurance status should be considered in the reporting of diagnoses in addictions treatment.

State reporting variation lead to shifting odds of having a known diagnosis. This variation was illustrated by changing odds after controlling for state. States report treatment data differently (United States Department of Health & Human Services, 2018). However, the present findings demonstrate that beyond state recording variation practises, other administrative variables are still associated with known diagnosis. For instance, those missing insurance information were more

than twice as likely as insured clients to have a diagnosis, after controlling for state. This is interesting because to bill insurance, a diagnosis is usually needed. This may reflect cash payments for treatment. Still, unknown diagnoses make it difficult to conduct proper evaluations of treatment outcomes and epidemiological monitoring. Furthermore, paying cash may make it difficult to determine treatment effectiveness if diagnoses are omitted. Administrative decisions to report when clients choose not to have a diagnosis recorded could improve this problem when evaluating treatment effectiveness.

Diagnoses are important for guiding treatment plans. If the SUD diagnostic system is not properly used, adjustments should be made at the administration and government funding levels to improve measurement and serve patient needs. Treatment admissions could be better evaluated if SUD diagnostic information were mandated. Additionally, mental health diagnostics may override SUD diagnostics in the TEDS data. Both SUD and mental health diagnoses represent extremely important information in treatment planning; therefore, both should be reported. The present study also highlights the need for uniform diagnostic reporting, especially when centres receive public funding.

Limitations

Although the present study used a national sample, data from 14 states were unavailable. Additional national research or state-level research is needed to accurately understand treatment recipients' SUD diagnostics. Data including clinician diagnostic documentation need further investigation. Concluding that all admissions missing diagnostic information do not fit criteria for SUD is not possible with these data. True diagnostic information is needed to evaluate the effects of the treatment gap; those who need treatment compared to the actual smaller proportion who receive treatment. In addition, each state reports diagnostic information differently. States who choose not to

report diagnostic information is as much a part of the problem in evaluating diagnostics. Thus, the information gathered from the present investigation is informative for needed policy considerations.

Implications

Maintaining proper diagnoses and reporting of administrative data in addictions treatment is critical for mental and behavioural health parity. The present investigation exposes the need to manage these services at a level akin to services for treating other chronic illnesses. Clinical documentation needs to be improved for proper care delivery, management of substance use treatment trends, and informed allocation of funds for treatment. All treatment facilities in the present study receive federal or state funding; therefore, policymakers can improve outcomes monitoring by mandating SUD diagnostic reporting at treatment admission and discharge. Finally, data thoroughness and accuracy may help policy makers and governmental agencies understand best practices for the treatment of SUDs.

Financial disclosures

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Contributors

All authors have approved the final article. Mr. Sahker conducted the analysis and along with Ms. Loh Garrison, Mr. Yeung, and Ms. Park contributed to the literature search, study design, data interpretation, writing, and editing. Dr. Arndt, contributed to study design, data analysis, data interpretation, writing, and editing.

Declaration of interest

None.

References

- American Psychiatric Association (2000). *Diagnostic and statistical manual of mental disorders* Text revision (DSM-IV-TR) (4th edn.). Washington, D.C: APA.
- Bouchery, E. E., Harwood, H. J., Sacks, J. J., Simon, C. J., & Brewer, R. D. (2011). Economic costs of excessive alcohol consumption in the U.S., 2006. *American Journal of Preventive Medicine*, 41(5), 516–524. <https://doi.org/10.1016/j.amepre.2011.06.045>.
- Bouchery, E., Harwood, R., Malsberger, R., Caffery, E., Nysenbaum, J., & Hourihan, K. (2012). *Medicaid substance abuse treatment spending: Findings report (#HHSP23320095642WC)* Washington, DC. Retrieved from <https://aspe.hhs.gov/basic-report/medicaid-substance-abuse-treatment-spending-findings-report>.
- Csete, J., Kamarulzaman, A., Kazatchkine, M., Altice, F., Balicki, M., Buxton, J., et al. (2016). Public health and international drug policy. *The Lancet*, 387(10026), 1427–1480. [https://doi.org/10.1016/S0140-6736\(16\)00619-X](https://doi.org/10.1016/S0140-6736(16)00619-X).
- Grissom, R. J., & Kim, J. J. (2012). *Effect sizes for research: Univariate and multivariate applications* (2nd ed.). New York, NY: Routledge.
- Han, B., Hedden, S. L., Lipari, R., Copello, E. A. P., & Kroutil, L. A. (2015). *Receipt of services for behavioral health problems: Results from the 2014 National Survey on Drug Use and Health. NSDUH Data Review*. Retrieved from <http://www.samhsa.gov/data/sites/default/files/NSDUH-DR-FRR3-2014/NSDUH-DR-FRR3-2014/NSDUH-DR-FRR3-2014.htm>.
- Mark, T. L., Woody, G. E., Juday, T., & Kleber, H. D. (2001). The economic costs of heroin addiction in the United States. *Drug and Alcohol Dependence (A2 Outros)*, 61(2), 195–206. [https://doi.org/10.1016/S0376-8716\(00\)00162-9](https://doi.org/10.1016/S0376-8716(00)00162-9).
- Marzell, M., Sahker, E., & Arndt, S. (2017). Trends of youth marijuana treatment admissions: Increasing admissions contrasted with decreasing drug involvement. *Substance Use & Misuse*, 0(0), 1–6. <https://doi.org/10.1080/10826084.2017.1311349>.
- McLellan, A. T., Lewis, D. C., O'Brien, C. P., & Kleber, H. D. (2000). Drug dependence, a chronic medical illness: implications for treatment, insurance, and outcomes evaluation. *JAMA*, 284(13), 1689–1695. <https://doi.org/10.1001/jama.284.13.1689>.
- Mills, R. J. (2001). *Health insurance coverage: 2000. Current population reports*. Retrieved from <http://www.cdc.gov/nchs/fastats/health-insurance.htm>.
- St. Marie, B., Sahker, E., & Arndt, S. (2015). Referrals and treatment completion for prescription opioid admissions: Five years of national data. *Journal of Substance Abuse Treatment*, 59, 109–114. <https://doi.org/10.1016/j.jsat.2015.07.010>.
- United States Department of Health and Human Services (2016). *Facing addiction in America: The Surgeon General's report on alcohol, drugs, and health* Washington, DC: Author. Retrieved from Addiction.SurgeonGeneral.gov.
- United States Department of Health and Human Services (2015). *Treatment Episode Data Set – admissions (TEDS-A) – concatenated, 1992 to 2012*. Substance Abuse and Mental Health Services Administration. Center for Behavioral Health Statistics and Quality.
- United States Department of Health and Human Services (2018). *Drug and alcohol services information system. TEDS Crosswalks*. Retrieved from Substance Abuse and Mental Health Services Administration <https://www.dasis.samhsa.gov/dasis2/crosswalks.htm>.
- White, W. L., & Kelly, J. F. (2011). Recovery management: What if we really believed that addiction was a chronic disorder? In J. F. Kelly, & W. L. White (Eds.). *Addiction recovery management: Theory, research and practice* (pp. 67–84). New York, NY: Humana Press. https://doi.org/10.1007/978-1-60327-960-4_5.
- Wu, L.-T., & Ringwalt, C. (2005). Use of substance abuse services by young uninsured American adults. *Psychiatric Services*, 56(8), 946–953. <https://doi.org/10.1176/appi.ps.56.8.946>.