

Adverse Childhood Experiences Associated with Common Issues Entering Therapeutic Residential Care (TRC)

Kenneth M. Coll^{1*}, Roger A. Stewart², Jessica S. Gutheil¹, Lexa Day¹, Sibela Osmanovic¹,
Stacey Scholl³ & Nicole Hauser³

¹Counseling and Educational Psychology, University of Nevada, Reno, Nevada, USA

²Boise State University, Boise, Idaho, USA

³Cathedral Home for Children, Laramie, WY, USA

Abstract

This study focused on youth in therapeutic residential care (TRC). It explored the relationship between Adverse Childhood Experiences (ACEs) and common characteristics youth bring with them upon entering residential care. The characteristics explored included the type of referring agency, presence of an individualized education program (IEP), previous suicidal behaviors, history with Child Protective Services (CPS), and prior psychiatric hospitalization. Researchers assessed clinical data records of 139 youth from two therapeutic residential care centers in the Rocky Mountain Region of the US and analyzed associations between ACEs and the characteristics using nonparametric tests. Perhaps not surprisingly, ACEs results indicated that youth entering TRC reported much higher levels of abuse, neglect, home environment disruption, and overall ACEs scores than the national average. Important for treatment planning and intervention, patterns showed that emotional and physical neglect appear to be the discriminating ACEs variables for increased risk for suicidal behavior, CPS, and psychiatric hospitalizations. In addition, youth referred by mental health providers showed significantly higher ACEs than those referred by juvenile justice. Youth entering the TRCs without an Individualized Education Plan (IEP) showed significantly higher ACEs than those entering with an IEP.

Keywords: mental health, counseling, residential therapeutic care, common issues

Introduction

Adverse Childhood Experiences (ACEs) for adolescents in therapeutic residential care (TRC) have not been comprehensively evaluated, nor have the relationships between types of adverse childhood experiences and other important youth characteristics, including such variables as route to TRC (e.g., mental health or juvenile justice), presence of an IEP, suicidal behaviors, history with CPS, and prior psychiatric hospitalization. For more effective outcomes, the Association of Children's Residential and Community Services (ACRC) (2015) urged more focus on ACEs and associated variables for youth in therapeutic residential care

*Corresponding Author Email: kcoll@unr.edu

Published: 11 February 2026

DOI: <https://doi.org/10.70558/IJSSR.2026.v3.i1.30821>

Copyright © 2026 The Author(s). This work is licensed under a Creative Commons Attribution 4.0 International License (CC BY 4.0).

(Briggs et al., 2012; Coll, 2017; Kazdin, 1993). Thus, the study reported herein focused on youth in therapeutic residential care (TRC) and explored the relationships between Adverse Childhood Experiences (ACEs) and the above-listed variables. Researchers assessed clinical data records of 139 youth from two therapeutic residential care centers in the Rocky Mountain Region of the US. These specific variables were selected due to their typical appearance in records accompanying youth at admission to the TRC agencies.

Therapeutic Residential Care for Adolescents and Mental Health Services History

It is estimated that about 42,000 youth in the U.S. between the ages of 12 and 17 are in out-of-home therapeutic residential care (TRC) (Berger, et al., 2024). As TRCs typically work with youth from lower economic status who lack access to mental healthcare, therapeutic residential care is often the first opportunity for treatment (McCall-Hosenfeld et al., 2014; Milette-Winfrey et al., 2020). While TRCs typically incorporate mental health and substance abuse services to some degree, there is often limited availability and accessibility often due to lack of resources (Cummings, et al., 2016; Haflinger & Christens, 2006), thus intentionality of treatment services becomes important.

Routes to Therapeutic Residential Care and Adolescent Mental Health

For TRC youth, tracking their issues is further complicated due to the complexity of their circumstances (Handwerk et al., 2008). Some enter through state and county mental health agencies (e.g., Protective Services, Family Services, Health and Welfare) and some via juvenile justice. Estimates run anywhere from a third to a half of youth coming from juvenile justice, although that number can vary from state to state. (Coll, 2017). Presenting issues may also differ somewhat, with youth entering through the juvenile justice door typically expressing more interpersonal behavioral concerns (e.g., bullying, fighting, theft) and those coming through the mental health door exhibiting more emotional distress and a range of intrapersonal challenges and disruptive behaviors (e.g., suicidality, psychiatric hospitalization) (Coll et al., 2021). As indicated, many youth only begin treatment for mental health once they are a part of state or county juvenile justice (e.g., via arrests) or mental health (e.g., via Child Protection Services) systems. Regardless of how they enter, once at TRCs, few studies have explored the relationships between routes to entry and ACEs (Coll, et al., 2021).

Therapeutic Residential Care Populations: History of Suicidality, CPS, and Psychiatric Hospitalization

Suicidality and ACEs are often correlated in the general population. Evidence shows that facing a range of abuse, neglect, and other challenging situations in the home while growing up are major factors for the development of suicidality (Ports et al., 2017). ACEs also have high potential for leading to other risk exposure later in life (e.g., sexual violence, problematic relationships, and issues at work), which can further increase adult suicidal ideation (Ports et al., 2017). Perez et al. (2016) found that early experiences with ACEs tend to affect personality and increase maladaptive behaviors, which then lead to a higher likelihood of suicidality. In a sample of inpatient psychiatric patients, Isohookana et al. (2013) found an increase in self-mutilative behaviors and suicide attempts in females with five or more ACEs. They also learned that one in four inpatient psychiatric patients was exposed to physical abuse,

a prevalent ACE, in their lifetime (Isohookana et al., 2013). Steinke (2018) and Coll (2021) both reported elevated ACEs scores, with averages over 4 out of 10 for most youth in TRC.

Youths face many stressors when interacting with Child Protection Services (CPS) (Helton et al., 2022). Youth who are under the protection of CPS will usually have a high probability of having experienced ACEs, or if they haven't, they will have a likelihood of experiencing them if left in the home (Helton et al. 2022; Slack & Berger 2020).

In terms of psychiatric hospitalization, Joyce et al. (2019) noted that self-injurious thoughts and behaviors stemming from adverse childhood experiences are the most common reasons for adolescent psychiatric hospitalization. However, these patterns of CPS or psychiatric hospitalizations and ACEs have not been explored specifically for youth in therapeutic residential care.

Presence of an Individualized Education Plan (IEP)

Youth with disabilities, including ADHD, depression, and conduct disorder, can qualify for an Individualized Education Program (IEP) if there is evidence that condition affects their ability to succeed in school. Dougherty and Strod (2014) note that an IEP creates an opportunity for teachers, parents, school administrators, related services personnel, and students (when appropriate) to work together to improve educational results for children with disabilities. In addition to academics, goals often include enhancing social skills. IEPs also typically focus on ways to address behaviors that interfere with a youth's school performance, such as anger management. However, evidence indicates that IEPs are under-assessed in schools (Alba, et al., 2022). It is also not known how IEPs are associated with ACEs for youth in therapeutic residential care (Dougherty & Strod, 2014).

Research Question

The research question for this study was: Are there significant differences in ACES categories by mental health and/or juvenile justice entry into TRC, youth having an Individualized Education Plan or not, youth manifesting suicidal behaviors or not, youth who have interacted with Child Protection Services or not, and youth who have experienced psychiatric hospitalization or not?

Methods

Participants and Settings

The 139 youth in this study ranged in age from 12 to 18 (average age 14.5; SD 1.9), with 78% identifying as male and 22% identifying as female. Participants indicated their ethnicity as European American (69%), Hispanic (19%), American Indian/Alaska Native (6%), African American (4%), and Asian American (2%). Fifty percent of the youth came from families below the poverty line. The average length of stay at the two facilities was 6.1 months.

The settings for this Institutional Review Board (IRB) approved study were two therapeutic residential care centers in the Rocky Mountain Region of the United States. Both agencies are located in small towns (population under 30,000) and offer specialized educational, psychological, and therapeutic services for adolescents, including individual and

group mental health, substance abuse, counseling, and family therapy. Youth at both facilities live in cottages or “pods” and have 24-hour supervision from staff. Youth are referred to these facilities by (a) referral from state or county services for mental health and/or familial issues (e.g., Protective Services, Family Services, Health and Welfare) or (b) referral from juvenile justice. The two participant agencies both embrace a strength-based, relational mission. Their operating philosophy is to “know deficits but intervene relationally with strengths.”

Procedures

Client Record Data

Archival data was analyzed, consisting of reviews of youths’ records from each TRC. Included in the records were demographic data, youth ACE data, and treatment data. This initial assessment information was gathered from youth within three weeks of entry into TRC by masters and doctoral-level clinicians.

Data Coding/Loading/Data Analyses

All study data were abstracted from existing clinical records collected for the secondary purpose of conducting this research. All information was collected in the course of providing standard-of-care clinical services at the TRCs. Data from the youths’ records were coded into experienced ACEs, presence or absence of an Individualized Education Plan, suicidal behaviors, experience with Child Protection Services, and psychiatric hospitalization. Since the data analysis resulted in a series of counts of occurrence of the variables in individual youth, nonparametric tests (chi square) were utilized to statistically evaluate the associations between types of adverse childhood experiences and the factors discussed.

Measurement of ACEs

An individual’s ACE score is expressed as the total number of reported ACEs measured in a binary, yes/no fashion. For example, a positive response to a question on sexual abuse would score one point, whether there were one or 100 incidents of such abuse. There are 10 different categories of ACEs assessed by the instrument so scores range from 0-10. Empirical studies with the general US population have shown that ACEs are interrelated and exert a powerful cumulative effect on human development (Anda et al., 2010). The use of the ACE score as a measure of stress exposure during childhood is valuable for treatment (Aguila-Otero al., 2020; Baglivio et al., 2014). Sample questions include three categories -Abuse (3 questions)—Did a parent or other adult in the household often or very often... Push, grab, slap, or throw something at you? Or ever hit you so hard that you had marks or were injured?; Neglect (2 questions)—Did you often or very often feel that... You did not have enough to eat, had to wear dirty clothes, and had no one to protect you?; Home environment—(5 questions) Did you live with anyone who was a problem drinker or alcoholic or who used street drugs? Were your parents too drunk or high to take care of you or take you to the doctor if you needed it?; and Total Score.

The actual ACE questionnaire was not administered to the youth as part of their TRC. Researchers instead coded for ACEs based on the information contained in the archival files. Records were abstracted by staff from clear indications in the client records of ACEs (e.g.,

previous physical and sexual abuse). All records were checked at least two times for accuracy among a team of two researchers and the clinical director from each agency. (Note, ACEs were not directly assessed using the 10 item ACEs questionnaire at either site as intrusiveness was a concern.) Consequently, as part of the archival data analysis, youth ACEs were assigned to the established categories of abuse, neglect, household environment, and total ACEs (Felitti et al., 1998). Each of the answers from the three ACEs categories was also tracked individually, except the question “Was a household member depressed or mentally ill?”, as answers to that question were inadvertently not gathered.

Results

As a group, ACE scores were relatively high (average = 4.5) compared to national norm groups with 48% scoring four or higher vs. 12.5% nationally ((Petrucelli et al., 2019; Sacks, et al., 2018). Half the participants (50.4%) reported physical abuse compared to the national average of 28.3%, 76% indicated emotional and/or physical neglect compared to the national average of 14%. Household substance abuse was reported to be over 40% greater, and divorce was 36.4% more common. Only 2.2% of the current sample did not experience any ACEs, compared to 36.1% nationally.

The research question also addressed relationships between ACEs and other key variables reflecting TRC youth backgrounds. Most youth came through the mental health door (66%), with 34% coming from juvenile justice. Forty-three percent (43%) had an Individualized Education Plan at TRC entry; 40% experienced suicidal behavior; and 45% had psychiatric hospitalizations. Those entering TRC via the mental health door indicated significantly higher neglect (See Table 1). The data analysis resulted in a series of counts of occurrence of the variables in individual youth, therefore chi square tests were utilized to statistically evaluate the associations between types of adverse childhood experiences and the factors discussed.

Table 1

Mental Health Entry: Means and P Values

| Mental Health Entry | ACEs | | | |
|---------------------|---------------------------------|------------------------------------|---|---------------------------------------|
| | Abuse [1-3 scale] (p=.33) | Neglect [1-2 scale] (p=.005) | Home Environment [1-5 scale] (p=.72) | Total ACEs [1-10 scale] (p=.20) |
| No (n=47) | 1.09 | 1.46 | 1.81 | 4.39 |
| Yes (n=92) | 1.26 | 1.81 | 1.74 | 4.81 |

Those entering TRC via the juvenile justice door indicated significantly lower abuse, neglect, and total ACEs. Home environment ACEs were non-significant (See Table 2).

Table 2

Juvenile Justice Entry: Means and P Values

| Juvenile Justice Entry | ACES | | | |
|------------------------|----------------------------------|------------------------------------|--|--|
| | Abuse [1-3 scale] (p<.001) | Neglect [1-2 scale] (p<.001) | Home Environment [1-5 scale] (p=.65) | Total ACEs [1-10 scale] [p<.001] |
| No (n=92) | 1.26 | 1.71 | 1.83 | 4.83 |
| Yes (n=47) | .43 | .83 | 1.74 | 3.00 |

Youth with a history of suicidal behavior had experienced significantly higher neglect. All other areas were non-significant. (See Table 3).

Table 3

History of Suicidal Behavior: Means and P Values

| History of Suicidal Behavior | ACES | | | |
|------------------------------|---------------------------------|-----------------------------------|--|---------------------------------------|
| | Abuse [1-3 scale] (p=.09) | Neglect [1-2 scale] (p=.02) | Home Environment [1-5 scale] (p=.37) | Total ACEs [1-10 scale] (p=.45) |
| No (n=82) | 1.02 | 1.45 | 1.87 | 4.38 |
| Yes (n=55) | 1.29 | 1.76 | 1.71 | 4.78 |

Two cases missing

Youth with an IEP upon entry had significantly lower total ACEs. (See Table 4).

Table 4

IEP Upon Entry: Means and P Values

| IEP | ACES | | | |
|-----------|---------------------------------|-----------------------------------|--|---------------------------------------|
| | Abuse [1-3 scale] (p=.26) | Neglect [1-2 scale] (p=.07) | Home Environment [1-5 scale] (p=.09) | Total ACEs [1-10 scale] (p=.04) |
| No (n=79) | 1.19 | 1.65 | 1.91 | 4.76 |

| | | | | |
|------------|------|------|------|------|
| Yes (n=59) | 1.02 | 1.44 | 1.66 | 4.15 |
|------------|------|------|------|------|

One case missing

Those with previous psychiatric hospitalizations indicated significantly higher abuse and neglect. Home environment and total ACES were non-significant. (See Table 5).

Table 5

Previous Psychiatric Hospitalizations: Means and P Values

| Previous Psychiatric Hospitalizations | ACES | | | |
|---------------------------------------|----------------------------------|-----------------------------------|--|---------------------------------------|
| | Abuse [1-3 scale] (p=.002) | Neglect [1-2 scale] (p=.02) | Home Environment [1-5 scale] (p=.66) | Total ACES [1-10 scale] (p=.08) |
| No (n=79) | .92 | 1.42 | 1.85 | 4.22 |
| Yes (n=59) | 1.37 | 1.74 | 1.78 | 4.90 |

One case missing

Those youth with prior association with Child Protective Services (CPS) indicated significantly higher abuse, neglect, and total ACES. The home environment was non-significant (See Table 6).

Table 6

CPS: Means and P Values

| CPS | ACES | | | |
|------------|----------------------------------|------------------------------------|--|--|
| | Abuse [1-3 scale] (p<.001) | Neglect [1-2 scale] (p=.007) | Home Environment [1-5 scale] (p=.23) | Total ACES [1-10 scale] (p<.001) |
| No (n=72) | .87 | 1.39 | 1.71 | 3.97 |
| Yes (n=66) | 1.39 | 1.76 | 1.94 | 5.14 |

One case missing

Discussion

Patterns related to the research question show that neglect (both emotional and physical) appears to be an important discriminating ACEs variable predictive of prior suicidal behavior, contact with CPS, and psychiatric hospitalizations. Given this, TRC staff training is

needed focused on the fact that neglect for these youth is a common and damaging experience. Neglect can teach youth that their feelings and experiences are not important. The consequences of this can be deep and long-lasting, as indicated in these results. Thus, additional clinical TRC practices and training around strength building should be considered to help ameliorate the pervasive consequences of neglect. Coll et al. (2024) found that supporting social competence skill building (e.g., empathy development and dealing with conflict) may be productive toward this end. Opportunities to strengthen youth empowerment should also be leveraged (Coll et al., 2024). In order to stop the patterns of neglect many of these youth experience, TRC staff will need training in how to carefully plan after-care to minimize further potential for neglect.

Clinicians and other staff also need to be cognizant that youth entering via the juvenile justice door displayed significantly fewer ACEs. More investigation is needed, yet a clinical focus for these youth may be more prosocial activities, such as promoting part-time jobs, sports, and academics.

Those students who had prior CPS involvement, reported significantly more abuse and neglect when compared to youth with no prior CPS involvement. They also had significantly greater Total ACEs scores. Helton et al. (2022) and Slack & Berger (2020) found similar results, especially for those left at home without intervention or needed services. Thus, when, upon entry to TRC, staff ascertain the youth's prior history with CPS, then after-care planning should consider the benefits and drawbacks of having the youth back home without markedly improved conditions. Previous psychiatric hospitalizations also were associated with significantly higher ACEs in youth in TRC. TRC staff should investigate the youth's circumstances and issues that led to the hospitalization(s) and factor in this information both during in-house treatment and after-care planning.

The association between youth having an IEP and lower ACEs in general needs further exploration. While the results reported herein might be influenced by intermediary variables such as socio-economic status and/or more parental involvement in the youth's life, these results indicate that an IEP can be a potential protective factor. Staff and clinicians might consider advocating for IEPs when youth transition out of TRC back to regular schooling.

In conclusion, Krishnan et al. (2016) noted the importance of assessment and monitoring to refine aspects of treatment planning. Intentional assessment of ACEs with informed staff training and individualized youth services could be beneficial, as revealed in this study.

Limitations

This study's sample population came from two TRCs in the Rocky Mountain Region of the US, located in small towns. This makes it difficult to generalize the results to TRCs in other areas of the US or bigger cities. The sample TRCs also used a strength-based approach. TRCs with different approaches may find different results.

The sample in this study was mostly male (78%) and highly European American (69%). The lack of racial diversity and a mainly male sample leaves little insight into racial and gender

impact. Additionally, this was a smaller, high-risk sample of participants. Other institutions might enroll youth with lower risk profiles. Thus, additional research with larger and more diverse samples in a variety of settings and locations is needed.

Note: No funding has been received for this research.

References

- Águila-Otero, A., Bravo, A., Santos, I., & Del Valle, J. F. (2020). Addressing the most damaged adolescents in the child protection system: An analysis of the profiles of young people in therapeutic residential care. *Children & Youth Services Review, 112*, N.PAG. <https://doi-org.unr.idm.oclc.org/10.1016/j.chilyouth.2020.104923>
- Alba, L. A., & Bains, B. K. (2022). Does School Psychology Literature Address the Inequities in the Assessment Practices for Special Education Eligibility Under Emotional Disturbance?
- Baglivio, M. T., Epps, N., Swartz, K., Huq, M. S., Sheer, A., & Hardt, N. S. (2014). The prevalence of adverse childhood experiences (ACE) in the lives of juvenile offenders. *Journal of Juvenile Justice, 3*(2), 1-23. Retrieved February 15, 2021.
- Berger, L. M., Cancian, M., Kim, H., Ko, A., & Pac, J. (2024). Child support and child welfare system interactions. *Institute for Research on Poverty, University of Wisconsin*. Available online: <https://www. irp. wisc. edu/wp/wp-content/uploads/2024/07/CSRA-2022-2024-T2-07242024. pdf>.
- Briggs, E. C., Greeson, J. K. P., Layne, C. M., Fairbank, J. A., Knoverek, A. M., & Pynoos, R. S. (2012). Trauma exposure, psychosocial functioning, and treatment needs of youth in residential care: Preliminary findings from the NCTSN core data set. *Journal of Child & Adolescent Trauma, 5*(1), 1–15. <https://doi.org.unr.idm.oclc.org/10.1080/19361521.2012.646413>
- Coll, K. M., Stewart, R. A., Sawyer, S., Woodliff, T., Fear, C., Scholl, S., & Hauser, N. (2024). Fostering humanistic counseling via utilizing the Search Institute's Asset Checklist: An outcome study. *The Journal of Humanistic Counseling, 63*(1), 24-35.
- Coll, K. M., Day, A., Stewart, R. A., Fear, C., Scholl, S., & Hauser, N. (2021). An exploration of Adverse childhood experiences, treatment types, and strengths in adolescent therapeutic residential care. *International Journal on Child Maltreatment: Research, Policy and Practice, 1*-14.
- Cummings, J. R., Case, B. G., Ji, X., & Marcus, S. C. (2016). Availability of youth services in US mental health treatment facilities. *Administration and Policy in Mental Health and Mental Health Services Research, 43*, 717-727.
- Dougherty, R. H., & Strod, D. (2014). Building consensus on residential measures:

Recommendations for outcome and performance measures. *Rockville, MD, Substance Abuse and Mental Health Services Administration.*

- Helton, J. J., Vaughn, M. G., & Schiff, M. (2022). The accrual of parent-reported adverse childhood experiences following a child protective services investigation: A prospective approach. *Child Abuse & Neglect, 124*, N.PAG. <https://doi-org.unr.idm.oclc.org/10.1016/j.chiabu.2021.105447>
- Isohookana, R., Riala, K., Hakko, H., & Räsänen, P. (2013). Adverse childhood experiences and suicidal behavior of adolescent psychiatric inpatients. *European Child & Adolescent Psychiatry, 22*(1), 13–22. <https://doi-org.unr.idm.oclc.org/10.1007/s00787-012-0311-8>
- Joyce, V. W., King, C. D., Nash, C. C., Lebois, L. A., Ressler, K. J., & Buonopane, R. J. (2019). Predicting psychiatric rehospitalization in adolescents. *Administration and Policy in Mental Health and Mental Health Services Research, 46*(6), 807-820.
- Krishnan, M. C., Bellonci, C., Foltz, R., & Lieberman, R. E. (2016). Redefining residential: Toward rational use of psychotropic medication. *Residential Treatment for Children & Youth, 33*(1), 3–12. <https://doi-org.unr.idm.oclc.org/10.1080/0886571X.2016.1162602>
- McCall-Hosenfeld, J. S., Mukherjee, S., & Lehman, E. B. (2014). The prevalence and correlates of lifetime psychiatric disorders and trauma exposures in urban and rural settings: Results from the national comorbidity survey replication (NCS-R). *PloS one, 9*(11). <https://dx.doi.org/10.1371/journal.pone.0112416>
- Milette-Winfrey, M., Orimoto, T., Preston-Pita, H., Schwiter, G., & Nakamura, B. J. (2020). Improving rural mental health service quality through partnerships and innovation. *Journal of Rural & Community Development, 15*(1), 33–48.
- Perez, N., Jennings, W., Piquero, A., & Baglivio, M. (2016). Adverse childhood experiences and suicide attempts: The mediating influence of personality development and problem behaviors. *Journal of Youth & Adolescence, 45*(8), 1527–1545. <https://doi-org.unr.idm.oclc.org/10.1007/s10964-016-0519-x>
- Petrucelli, K., Davis, J., & Berman, T. (2019). Adverse childhood experiences and associated health outcomes: A systematic review and meta-analysis. *Child abuse & neglect, 97*, 104127.
- Ports, K. A., Merrick, M. T., Stone, D. M., Wilkins, N. J., Reed, J., Ebin, J., & Ford, D. C. (2017). Adverse childhood experiences and suicide risk: Toward comprehensive prevention. *American Journal of Preventive Medicine, 53*(3), 400–403. <https://doi-org.unr.idm.oclc.org/10.1016/j.amepre.2017.03.015>
- Sacks, V., & Murphey, D. (2018). The prevalence of adverse childhood experiences, nationally, by state, and by race or ethnicity. *Child trends, 20*, 2018.
- Slack, K. S., & Berger, L. M. (2020). Who is and is not served by child protective services systems? Implications for a prevention infrastructure to reduce child

Maltreatment. *The ANNALS of the American Academy of Political and Social Science*, 692(1), 182–202. <https://doi.org/10.1177/2F0002716220980691>

Steinke, C. M., & Derrick, R. M. (2018). An exploration of the role of adverse childhood experiences (ACEs) on youth engagement in residential treatment. *Children and Youth Services Review*, 89, 355-363.

Yampolskaya, S., Mowery, D., & Dollard, N. (2014). Profile of children placed in residential psychiatric program: Association with delinquency, involuntary mental health commitment, and reentry into care. *American Journal of Orthopsychiatry*, 84(3), 234–243. <https://doi-org.unr.idm.oclc.org/10.1037/h0099808>

Author Declarations

There are no known conflicts of interest associated with this publication and there has been no significant financial support for this work that could have influenced its outcome. We confirm that the manuscript has been read and approved by all named authors and that there are no other persons who satisfied the criteria for authorship but are not listed. We further confirm that the order of authors listed in the manuscript has been approved by all of us. We confirm that we have given due consideration to the protection of intellectual property associated with this work and that there are no impediments to publication, including the timing of publication, with respect to intellectual property. In so doing we confirm that we have followed the regulations of our institutions concerning intellectual property. We understand that the Corresponding Author is the sole contact for the Editorial process (including Editorial Manager and direct communications with the office). He is responsible for communicating with the other authors about progress, submissions of revisions and final approval of proofs. We confirm that we have provided a current, correct email address which is accessible by the Corresponding Author.

All procedures performed in studies involving human participants were following the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki. The authors confirm that this is a University of Nevada, Reno Institutional Review Board (IRB) approved study, and that appropriate informed consent was obtained. Data Availability Statement: The data used in this study is not publically available as it consists of the agency's private records and is protected by FERPA and HIPPA regulations.