Exploring Genetic Counselors’ Practices and Attitudes Towards Patients Facing Substance Use Disorders

Master’s Thesis

Presented to

The Faculty of the Graduate School of Arts and Sciences
Brandeis University
Graduate Program in Genetic Counseling
Gretchen Schneider, MS, CGC, Advisor

In Partial Fulfillment
of the Requirements for the Degree

Master of Science
in
Genetic Counseling

by
Alexandra White

May 2018
Acknowledgements

There are many people whose contributions have made this project possible; as they say, “It takes a village to raise a (brain)child”. First, I owe the utmost gratitude to my thesis advisor, Gretchen Schneider, MS, CGC who has both talked me up and talked me down throughout this work and been the guiding light I relied on. My sincere thanks go out to my two wonderful committee members, Fayth Kalb, MS, CGC and Amy Sommer, LICSW who provided invaluable professional insight and encouragement throughout the research process. I would like to also extend my appreciation to Margarita Corral, PhD for her grace, kindness, and direction in survey design and data analysis. Thank you to Cassandra Buck, MS, CGC, Gayun Chan-Smutko, MS, CGC, Missy Goldberg, Lauren Lichten, MS, CGC, Judith Tsipis, PhD, and all the other Brandeis Genetic Counseling Program faculty who have buoyed me up through my graduate training and made it the best educational experience I could have hoped for. A very special thanks goes to my classmates who always provided a listening ear and comedic relief when it was needed most and without whom I would not have survived these past two years. To my family and friends, thank you for your endless love, reassurance, and positive distraction. And most of all, to Gabriel, I owe the success of this work to your steadfast TLC; you are truly my hero.
ABSTRACT

Exploring Genetic Counselors’ Practices and Attitudes Towards Patients Facing Substance Use Disorders

A thesis presented to the Graduate Program in Genetic Counseling

Graduate School of Arts and Sciences
Brandeis University
Waltham, Massachusetts

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Substance use disorders (SUDs) are a group of highly prevalent and heritable psychiatric conditions yet little data exists on the practice of genetic counseling for SUDs. Previous studies on genetic counseling for other psychiatric disorders suggest this practice can help to promote patient empowerment and decrease a personal sense of stigma. This study aimed to characterize genetic counselors’ encounters with SUDs in clinical practice and identify any obstacles to effective counseling for patients facing a history of SUD. Currently practicing genetic counselors in a patient-facing role were recruited and asked to complete an anonymous online survey. Of the 220 respondents, 82.1% reported never having a patient for whom the primary referral was SUD. When a history of SUD does arise in a session, on average our participants reported that they “often” include it in the patient’s pedigree, “sometimes” offer psychosocial counseling and discuss the hereditary nature of SUD, and “rarely” provide a personalized risk assessment or resources/referrals. A large portion of our respondents (41.2%) received SUD training in their graduate training program while only 10% reported such training in their post-graduate practice.
Despite a minority (7.7%) of participants reporting feeling that their training prepared them to provide genetic counseling for SUD, those with training were more likely to engage in certain components of a genetic counseling session, particularly discussing the inheritance of SUD, when presented with hypothetical scenarios involving patients with a history of SUD. When utilizing the Social Distance Scale (SDS) to examine stigma towards individuals with SUD, we found that genetic counselors desired social distance from individuals with SUD in intimate relationships and that having personal and/or professional exposure to SUD did not significantly influence scores on the SDS. Our results show that genetic counselors are likely to offer components of genetic counseling to patients with a history of SUD in the hypothetical but they are not currently offering these services in their clinical practice. As our understanding of the genetics of SUD and the demand for psychiatric genetic counseling services rise, it is imperative that research on and efforts to improve practical, experiential training on SUD continue and that methods to recognize and combat SUD-related stigma be investigated.

**Key words:** genetic counseling, substance use disorders, substance use disorder training, stigma
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Introduction

**Substance Use Disorders**

Substance use disorders (SUDs) are a group of highly prevalent and highly heritable psychiatric conditions defined by the compulsion to seek and use a substance, uncontrolled use, and the presence of a negative emotional state when the substance cannot be accessed (Koob, 2011) with some clinicians using the term *addiction* to describe the most severe presentations (American Psychiatric Association, 2013). These disorders are often a comorbidity of other mental illnesses and individuals with SUD are about twice as likely to be diagnosed with a mood or anxiety disorder and vice versa, when compared to the general population (National Institute on Drug Abuse, 2011).

It is estimated that 20.8 million (7.8%) of people in the US aged 12 or older have a SUD (Center for Behavioral Health Statistics and Quality, 2016) which equates to a national cost of $740 billion per annum based on crime, lost productivity, and health care (National Institute on Drug Abuse, 2017) in addition to the personal and familial tolls these disorders take. While the proportion of adults affected with alcohol use disorder and most illicit drug use disorders has remained stable over the course of the current decade (Center for Behavioral Health Statistics and Quality, 2016), since the turn of the millennium usage rates for opioid pain relievers have soared. From 1999 to 2011 usages rates of hydrocodone increased by over 200% and rates for oxycodone use increased by about 500% (Kolodny et al., 2015). Concurrently, the rates of opioid related overdose deaths nearly quadrupled (Kolodny et al., 2015).
Although it is well established that the etiology of SUDs is multifactorial, the knowledge base surrounding their inheritance continues to grow. On a neurobiological level, SUDs arise from changes to neural pathways that regulate anticipation of reward, negative affect, and withdrawal, and changes to parts of the brain that control inhibition and executive control (Karoly, Harlaar, & Hutchison, 2013). Twin studies have provided much of the foundation for understanding the inheritance of vulnerability to addiction and on average the concordance ratio between monozygotic and dizygotic twins is 2:1 (Ducci & Goldman, 2012). With regards to identifying candidate genes for SUD risk little progress has been made. Genome wide association studies have been largely unsuccessful with the exception of identifying the association of cytochrome P450 2A6 (CYP2A6) and reduced risk for smoking (Ducci & Goldman, 2012). Twin studies have also shown limited success but have predicted the candidate genes alcohol dehydrogenase (ADH) and aldehyde dehydrogenase (ALDH2) which are now the most well-established genetic factors contributing to alcohol use disorders (Wang et al., 2012).

Without knowing genetic risk factors for every substance, empiric heritability rates have been established and range from 39% for hallucinogens to 72% for cocaine (Ducci & Goldman, 2012).

**Benefits of Genetic Counseling for Psychiatric Disorders**

Based on these heritability estimates it is clear that SUDs aggregate in families. Thus, SUDs theoretically fall within the scope of genetic counseling practice (defined as: “the process of assisting people to understand and adapt to the medical, psychological, and familial implications of genetic contributions to disease”) (Resta et al., 2006). Despite the pervasiveness of SUDs and other psychiatric disorders, research surrounding the practice of psychiatric genetic counseling has only recently emerged yet the evidence is mounting for the many potential benefits that genetic counseling can provide in this specialty. At its core, genetic counseling for
psychiatric disorders does not differ from genetic counseling in other settings; it is an encounter where patients receive tailored education as to what is known about the etiology of the disorder and recurrence risk, with psychosocial support provided throughout (Austin & Honer, 2007; Resta et al., 2006).

Austin and Honer (2007) enumerate the positive outcomes from a genetic counseling intervention for psychiatric indications including: decreasing stigma by moving the locus of control away from the individual through education surrounding genetic contributions to disease, identifying any other comorbid psychiatric illness, informing family planning for the proband or other relatives, addressing feelings of fatalism and hopelessness through explanation that the disorder is not predetermined, discussing teratogenicity of psychiatric medications, and providing an explanation of why genetic testing is not currently available. The non-directive nature of genetic counseling also creates a safe environment for discussion of psychiatric illness where patients can be assured that their choices will not be dictated (Austin & Honer, 2007).

More recently, a specialty psychiatric genetic counseling clinic has been established and the outcomes of genetic counseling interventions have been studied (Inglis, Koehn, McGillivray, Stewart, & Austin, 2015). At one month post-intervention both self-efficacy and empowerment improved over baseline which are important measures to patients as they limit hopelessness, helplessness, and secrecy, and promote the ability to cope, help seeking, and improved quality of life (Inglis et al., 2015). It is worth noting that as part of the interventions no genetic testing was recommended or provided (Inglis et al., 2015). A contemporary genetic counseling protocol was also recently tried for relatives of individuals with schizophrenia at community health clinics in Canada where no clinical geneticists or genetic counselors were employed (Costain, Esplen, Toner, Hodgkinson, & Bassett, 2014). Even without specialized genetics providers, the positive
outcomes of improved understanding of recurrence risk, decreased sense of stigma, and increased knowledge of the disorder in family members of affected individuals were replicated in the results (Costain et al., 2014). Of note, there was a high uptake rate of 63.9% for relatives of those affected with schizophrenia, suggesting strong interest in genetic counseling (Costain et al., 2014). In the last year the cumulative effect of genetic counseling for psychiatric disorders was evaluated in a meta-analysis which showed that genetic counseling has a statistically significant effect size of moderate intensity with benefits immediately post-intervention and at follow up, suggesting that the benefits can be maintained over time (Moldovan, Pintea, & Austin, 2017).

**Potential Barriers to Psychiatric Genetic Counseling**

While the positive impact of psychiatric genetic counseling is becoming evident, this is not to say that the practice is without its challenges. Chiefly, the level of uncertainty surrounding outcomes for psychiatric disorders is trying for both the counselor and patient and can lead counselors to endorse the myths that they have no information and no support to offer these patients (Peay et al., 2008). Additionally, when working with patients who are personally affected with a SUD some goals of the counselor may be in conflict, for instance promoting autonomy as a patient advocate versus doing what is best for the patient’s (and fetus’ in prenatal settings) health as a member of the healthcare team (Benkendorf & FitzGerald, 1990).

In the field of genetic counseling and beyond it has been established that health care professionals stigmatize those with mental illness. A 2014 review by Henderson et al. established that for patients with mental illness, 16 - 44% experience discrimination from mental health services and 17-31% from physical health services. The same review found that predominantly, general practitioners (GPs) had more negative attitudes towards those with mental illness than mental health workers, particularly when the illness in question was schizophrenia or a SUD
When Feret, Conway, and Austin (2011) exclusively examined a genetic counselor population using schizophrenia as a model condition, they identified similar trends. Genetic counselors desired social distance from those with schizophrenia in all intimate relationships and tended to typify these individuals with negative stereotypes, particularly as being dangerous and threatening, although the authors note that these beliefs did not appear to be strongly held (Feret, Conway & Austin, 2011). Specific to SUDs, healthcare professionals generally hold negative attitudes towards these patients, perceiving violence, manipulation, and poor motivation as roadblocks to delivery of their services (van Boekel, Brouwers, van Weeghel & Garretsen, 2013). Importantly, van Boekel et al. (2013) note that although evidence to the contrary has existed for decades, some health care providers still believe that patients with SUD have control over their substance use.

**Rationale for Present Study**

Given the potential barriers to psychiatric genetic counseling and the fact that most of the previous psychiatric genetic counseling research has focused on psychotic and mood disorders (Andrighetti et al., 2016; Austin & Honer, 2008; Costain et al., 2014; Hippman et al., 2016; Inglis et al. 2015), the experiences and attitudes of genetic counselors regarding SUDs bear exploration. Although SUDs may not be the primary indication for referral to genetic counseling, counselors are likely to tangentially encounter SUD when taking personal and family medical histories because of its high incidence in the general population. It is certainly plausible that in the future genetic counseling for SUD could become part of regular clinical practice. In fact, in a recent study of people with a personal or family history of alcohol addiction, a majority (62%) perceived genetic counseling to be potentially beneficial even though less than one third of participants had previous knowledge of what genetic counseling was (Kalb, Vincent, Herzog, &
Austin, 2017). These results indicate that as public knowledge of genetic counseling and genetic contributions to SUDs rises, so will the public’s interests in receiving genetic counseling for these disorders.

Genetic counseling encounters could provide the opportunity to dispel misinformation surrounding SUD and address its multifactorial nature which could in turn reduce stigma. Yet, if these disorders are not being addressed or if bias towards these patients exists, then the aforementioned benefits may not come to fruition. This study sought to characterize genetic counselors’ encounters with SUDs in clinical practice and identify any obstacles to effective genetic counseling for patients with a personal or family history of SUD.
Methods

This was an exploratory, cross-sectional, quantitative study enriched by qualitative data. The study was carried out via an online anonymous survey administered by Qualtrics® comprised of 49 multiple choice, Likert-scale, and open-ended (text entry) questions. The Brandeis University Institutional Review Board ruled that this study was exempt from full review.

Participants

We recruited participants through two e-blast listserv services. The National Society of Genetic Counselors (NSGC) sent our recruitment notice containing a link to the survey to all of their members and the American Board of Genetic Counseling (ABGC) did the same for all certified genetic counselors on their listserv. The NSGC also sent a reminder recruitment notice to its membership approximately two weeks after the initial notice. Individuals met inclusion criteria if they were a member of the NSGC and/or ABGC, currently practicing as a genetic counselor, and in a role that included interaction with patients either face-to-face or by telemedicine. The survey was open for three weeks between February 12, 2018 and March 3, 2018.

Procedures

Participants accessed the survey directly through the link contained in the e-blasts. Their participation was voluntary and they could exit the survey at any time, skip any question, and return to finish incomplete surveys within two weeks.
The first two questions of the survey asked participants if they were students and if they were currently practicing as a genetic counselor in a role that included patient interaction. If the participant answered “yes” to the first question or “no” to the second question the survey would end for this individual.

The remaining questions in the survey addressed participants’ exposure to SUD both in their personal and professional lives; demographic information including years of practice, practice area, and place of practice; current practices in handling SUD when a patient discloses, training on SUD both in their graduate program and in post-graduate professional continuing education, comfort levels and attitudes towards hypothetical persons and patients with a personal or family history SUD, and factors influencing comfort level in offering genetic counseling to patients with a personal or family history of SUD. Additionally, the previously developed and validated Social Distance Scale (SDS) (Link, Cullen, Frank, & Wozniak, 1987) and Affect Scale (AS) (Penn at al., 1994) which assess mental illness stigma, were modified and administered through the survey. Both measures have been psychometrically validated when adapted to SUDs (Brown, 2011).

Once participants reached the end of the survey they were given the option to be entered into raffle for one of three $50 Amazon gift cards in thanks for their time. If they elected to participate in the raffle they were sent to a separate, unlinked Qualtrics® survey where they could provide their e-mail address as contact information should they win the raffle.

Data Analysis

We analyzed quantitative data using SPSS Statistics version 24, a statistical software program. Analyses through descriptive statistics, t-tests, and chi-square analyses were carried out as appropriate. For open-ended questions yielding qualitative data, we identified themes using
inductive coding. Responses to these questions were downloaded to Microsoft Excel and manually read and examined for key words.
Results

Participant Demographics and Background

We received a total of 240 responses to our survey. Ten responses were excluded from data analysis, as they did not meet selection criteria. Another ten responses were excluded since the respondents did not complete the majority of the survey. The remaining 220 respondents were currently practicing genetic counselors whose work included counseling patients, belonging to the NSGC and/or ABGC listserv, yielding a response rate of about 5.4% (NSGC, 2016).

All 220 respondents reported the NSGC-defined geographic region in which they practice. The distribution of respondents across the regions generally matches that of respondents to the 2016 NSGC Professional Status Survey (PSS) (NSGC, 2016), (Figure 1). The gender distribution of our sample, 94.1% female (207/220) and 5.9% male (13/220), also reflects that of the 2016 and other iterations of the PSS (NSGC, 2016).

<table>
<thead>
<tr>
<th>Region 1: CT, MA, ME, NH, RI, VT, CN, Maritime</th>
</tr>
</thead>
<tbody>
<tr>
<td>Region 2: DC, DE, MD, NJ, NY, PA, VA, WV, PR, VI,</td>
</tr>
<tr>
<td>Region 3: AL, FL, GA, KY, LA, MS, NC, SC, TN</td>
</tr>
<tr>
<td>Region 4: AR, IA, IL, IN, KS, MI, MN, MO, ND, NE,</td>
</tr>
<tr>
<td>Region 5: AZ, CO, MT, NM, TX, UT, WY, Alberta,</td>
</tr>
<tr>
<td>Region 6: AK, CA, HI, ID, NV, OR, WA, British</td>
</tr>
<tr>
<td>Non-U.S. or Canadian</td>
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</tbody>
</table>

Figure 1. The distribution of 220 respondents as compared to the 2205 genetic counselors who responded in the 2016 NSGC Professional Status Survey.
The preponderance (62.3%) of our respondents was between 20-30 years of age, followed by 31-40 (24.1%), 41-50 (8.6%), 51-60 (3.6%), and 61-70 (1.4%). Their years spent working as a genetic counselor reflected what would be expected given the distribution of age with 67.7% having worked 0-5 years, 6-10 years (14.5%), 11-15 years (7.3%), 16-20 years (5.0%), 21-25 years (2.3%), 26-30 years (1.4%), 31-35 years (1.4%), and 36-40 years (0.5%).

When asked in what practice area they spend the most time working, the largest portion (39.7%) of respondents chose “Cancer” (85/214), followed by 22.9% choosing “Prenatal” (49/214), and 14% “Pediatrics” (30/214) (Figure 2). In terms of what setting our respondents practice in, given the option to select all that apply, 44% (96/218) selected “University Medical Center”, 24.8% (54/218) selected “Public Hospital/Medical Facility”, 22.9% (50/218) selected “Private Hospital/Medical Facility”, 1.8% (4/218) selected “Diagnostic Laboratory (Commercial, Non-Academic”), 5.5% (12/218) selected “Physician’s Private Practice”, and 5.0% (11/218) selected “Other” which included non-profit organization, government hospital, telemedicine, and private genetic counseling practice.

![Figure 2. Distribution of 220 respondents over primary specialty areas of practice](image)
We also asked what kind of exposure respondents had to people with SUD both in a personal and professional capacity. Outside of their patient population, 19.1% of our participants had no other exposure or experiences with SUD. Out of the remaining 80.9%, when asked to choose all that apply, 2.7% had a personal history of SUD, 50.9% had a family history of SUD, 21.8% had a close friend with SUD, 6.4% have a work colleague with SUD, and 50% have an acquaintance with SUD. Forty-five (20.5%) of our respondents had worked with people with psychiatric disorders as a genetic counselor and/or in another professional role and of those 45, 57.8% reported that this work involved people with SUD.

Current Practices Involving SUD

Most of our participants (82.1%, n=218) indicated that they have never seen a patient whose primary indication for referral was SUD compared to just 1.4% who saw these patients on a weekly basis. In terms of when a history of SUD is brought up during a genetic counseling session, in general respondents delineated that this occurs more frequently in the context of taking a family history versus taking a personal medical history. On a scale of 1=“very frequently” to 5=“never” the average frequency of disclosure during family history intake was 2.45 compared to 3.48 for personal medical history intake. For those whose position involves cancer risk assessment, the largest portion of respondents (38.7%, n=119) reported that a personal and/or family history of SUD is disclosed “occasionally” in the context of performing a risk assessment. Additionally for those participants who offer teratogen counseling, the greatest portion of respondents (36.8%, n=87) noted that a history of SUD is disclosed “occasionally” in this situation. When a personal and/or family history of SUD is disclosed 71.8% (n=216) “always” or “often” included it in the patient’s pedigree, compared to 20% who would “always” or “often” discuss the hereditary nature of SUD and only 7% who would “always” or “often” discuss the hereditary nature of SUD.
offer a personalized risk assessment for SUD (Table 1). Regarding offering psychosocial support in response to an SUD disclosure, 38% of respondents reported that they would “always” or “often” while 11.1% would offer resources or referrals related to the SUD in the same frequency (Table 1).

**Response to Personal and/or Family History of SUD Disclosure**

<table>
<thead>
<tr>
<th></th>
<th>Always</th>
<th>Often</th>
<th>Sometimes</th>
<th>Rarely</th>
<th>Never</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inclusion in the Pedigree</td>
<td>39%</td>
<td>33%</td>
<td>21%</td>
<td>4%</td>
<td>4%</td>
</tr>
<tr>
<td>Discussion of the Hereditary Nature of SUD</td>
<td>6%</td>
<td>14%</td>
<td>28%</td>
<td>33%</td>
<td>19%</td>
</tr>
<tr>
<td>Offering Personalized Risk Assessment</td>
<td>2%</td>
<td>5%</td>
<td>13%</td>
<td>27%</td>
<td>53%</td>
</tr>
<tr>
<td>Offering Psychosocial Counseling</td>
<td>7%</td>
<td>31%</td>
<td>37%</td>
<td>15%</td>
<td>10%</td>
</tr>
<tr>
<td>Providing Referrals and/or Resources</td>
<td>4%</td>
<td>7%</td>
<td>26%</td>
<td>32%</td>
<td>32%</td>
</tr>
</tbody>
</table>

**Table 1**: Occurrence of various components of genetic counseling in cases where a patient has a personal and/or family history of SUD.

When asked what informational resources they use when providing risk assessment for a patient with a personal and/or family history of SUD, 14 participants wrote that they discuss multifactorial inheritance and five specifically mentioned the use of the NSGC’s “Mental Illness Jars” model as a counseling aid. Other commonly cited resources were empiric risks from the literature and “Harper’s Practical Genetic Counseling” either for the SUD itself or another psychiatric disorder for which the SUD is co-morbid. Those respondents who offer teratogen counseling as part of their practice mentioned REPROTOX®, TERIS, and MothertoBaby as resources that inform their risk counseling. Out of the 91 respondents who answered our survey question regarding what resources or referrals they have provided to patients with a personal
and/or family history of SUD, 71.4% (61) commented that they will refer to a licensed mental health professional with social worker, counselor, and psychiatrist as the top titles mentioned. Alternatively, nine of the 91 (9.9%) said that they direct the patient back to their primary care physician to make such a referral.

**SUD Training**

The survey next asked participants about any SUD training they had received either during their genetic counseling training program or as part of their professional continuing education. A large portion (41.2%, n=211) received SUD training in graduate school while only 10% (n=209) received such training in their post-graduate work as a genetic counselor. When asked how well their combined training as a student and professional has prepared them to discuss personal and family histories of SUD with patients, the majority of participants (65.7%, n=210) responded “slightly well” or “not well at all” while only 1% felt “extremely well” prepared (Figure 3).

![Feelings of SUD Counseling Preparedness Based on Training](image)

**Figure 3:** Degree of participants’ preparedness to offer genetic counseling for SUD based on graduate school and professional training.
We performed Chi-square analysis to determine if there was a relationship between participants’ years spent working as a genetic counselor (a proxy for how long ago they were in a training program) and if participants received training on SUD during their genetic counseling training program. No such significant relationship existed (p=.083). We ran a similar analysis to determine if there was a relationship between what setting the participants practice in (university medical center, physician’s private practice, etc.) and if they have received SUD training in their post-graduate continuing education. Again, no such significant relationship was found, (p= .267 - 1.00 depending on the work setting).

**Social Distance Scenarios**

We administered the Social Distance Scale (SDS) as a measurement of how likely the participants would be to engage in relationships of varying closeness with individuals who have various SUDs. Responses were recoded so that on the four point scale, a score of 1 represented “definitely unwilling” and a score of 4 represented “definitely willing”. Regardless of the SUD, respondents desired more social distance from the individual in more intimate relationships such as sharing an apartment or using the individual as a babysitter versus having the individual as a neighbor (Table 2). When we compared the average sum SDS scores in each pair of SUD

### Attitudes Towards Persons Using Various Substances: Social Distance

<table>
<thead>
<tr>
<th></th>
<th>Recreational Marijuana Mean (SD)</th>
<th>Prescription Oxycodone Mean (SD)</th>
<th>Heavy Drinker Mean (SD)</th>
<th>Intravenous Heroin Mean (SD)</th>
<th>Opioid Use in Treatment Mean (SD)</th>
<th>Alcohol in Treatment Mean (SD)</th>
<th>Cigarette Smoker Mean (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Share an apartment with that person</td>
<td>1.60 (0.95)</td>
<td>2.34 (0.93)</td>
<td>2.33 (0.99)</td>
<td>1.01 (0.12)</td>
<td>2.37 (0.93)</td>
<td>2.63 (0.96)</td>
<td>1.22 (0.61)</td>
</tr>
<tr>
<td>Have that person as a neighbor</td>
<td>2.84 (1.03)</td>
<td>3.13 (0.83)</td>
<td>3.10 (0.89)</td>
<td>1.39 (0.73)</td>
<td>3.16 (0.81)</td>
<td>3.37 (0.69)</td>
<td>2.61 (1.13)</td>
</tr>
<tr>
<td>Have that person as a babysitter for your child</td>
<td>1.42 (0.75)</td>
<td>1.79 (0.85)</td>
<td>1.84 (0.88)</td>
<td>1.00 (0.07)</td>
<td>1.93 (0.96)</td>
<td>2.28 (0.95)</td>
<td>1.68 (0.89)</td>
</tr>
<tr>
<td>Introduce to a friend as a relationship partner</td>
<td>1.85 (0.96)</td>
<td>2.01 (0.89)</td>
<td>2.24 (0.99)</td>
<td>1.04 (0.24)</td>
<td>2.20 (0.98)</td>
<td>2.57 (0.93)</td>
<td>1.90 (0.98)</td>
</tr>
<tr>
<td>Recommend that person for a job</td>
<td>2.00 (0.90)</td>
<td>2.26 (0.91)</td>
<td>2.56 (0.90)</td>
<td>1.07 (0.29)</td>
<td>2.74 (0.90)</td>
<td>2.99 (0.82)</td>
<td>3.32 (0.81)</td>
</tr>
</tbody>
</table>

**Table 2: Participants’ Attitudes Towards Persons With Various Chronic Substance Use**
scenarios, there was a statistically significant difference between the means except for the comparison of the alcohol use disorder scenario to the opioid use disorder treatment scenario (p=.27). In comparing the mean sum SDS scores, the intravenous heroin user scenario ranked lowest while the scenarios involving persons seeking treatment for opioid use and alcohol use disorders ranked highest (Figure 4).

![Figure 4. Comparison of the Mean Composite SDS Scores for Each Substance Use Scenario](image)

We further analyzed the SDS using independent t-tests to determine if participants’ age or years of experience as a genetic counselor influenced their average sum SDS scores for each scenario. Since roughly half of our participants were 30 years old or younger and half had zero to five years of experience we split our sample into two groups (≤30 years old vs. ≥31 years old and ≤5 years of experience vs. ≥6 years of experience). No significant differences were found between the age groups but in terms of experience, those with more experience showed greater desire for social distance with the person in treatment for an opioid use disorder (p=.021), the person described as a heavy drinker (p=.031), and the person using prescription oxycodone (p=.018).
We used similar independent t-test tests to examine if participants’ exposure to SUD (either in a professional setting or outside of their patient population) influenced their average sum SDS scores for each scenario. First we tested personal exposure, dividing our sample into one group who marked “no exposure or experiences” in response to the question, “Have you had any or exposure to, or experiences with people with SUD outside of your patient population (select all that apply)” and other group comprised of all other participants who answered this question. No significant difference was found between the two groups for their average SDS sums except for the SDS regarding the person who smokes marijuana daily with those with some personal exposure or experiences desiring less social distance (p=.047). Subsequently we tested professional exposure to SUD, by examining the participants who responded “yes” to working with people with psychiatric disorders either in a genetic counseling and/or other professional capacity and dividing them into two groups based on if they answered “yes” or “no” to the question “Did this work involve people with substance use disorders?” No significant difference was found on any of the SDS scales.

**SUD in Genetic Counseling Scenarios**

In the next section of the survey we asked participants to read three hypothetical genetic counseling scenarios that involved a patient with an apparent personal and/or family history of SUD to assess what topics genetic counselors would be likely to discuss and in general how comfortable they would be with the patient encounter.

The first scenario describes a 32-year old pregnant woman seen by a prenatal genetic counselor after multiple anomalies were found on ultrasound. She reports current heroin use and has a history of a previous pregnancy where the baby was born chemically dependent on opiates and was placed in foster care. We utilized the Affect Scale (AS) as a measure of the emotional
response of the participants towards this patient. It employs a seven point scale and 10 pairs of bipolar dimensions (ex. tensed – relaxed) although we modified the scale using only six pairs and recoded responses so that a score of “7” represented the most positive sentiment and “1” the most negative. The items were summed to obtain a composite score of the participant’s affective reaction to this patient. Of the 204 participants who answered this question, the minimum composite score was 8.0, the maximum was 42.0, the mean 25.7 with a standard deviation of 6.9. We further analyzed the AS for significant differences between our two age groups, two genetic counseling tenure groups, two personal experience with SUD groups, and two professional experience with SUD groups described above. The older group (≥31 years old) showed higher composite AS scores than the younger group (≤30 years old) (p=.041), indicating a more positive emotional response to the patient. No significant differences were found between the genetic counseling tenure groups or the personal or professional experience with SUD groups.

We then asked participants how likely they would be to discuss the effects of heroin on maternal health, fetal health, and resources for pregnant women facing SUD with this patient. The results are summarized in Figure 5. In general participants were likely to discuss all three topics with the patient, most likely to discuss the teratogenicity of heroin and least likely to discuss the impact of heroin on the woman’s health. When we analyzed the likelihood data for influences from graduate school SUD training and SUD training from post-grad continuing education no significant difference or correlations were found for this scenario.

The second scenario depicts a preconception genetic counseling session for a newly married couple in their late 20s. The husband has a strong family history of alcohol use disorder (a mother who passed away from an alcohol-related stroke at 55, a father with severe cirrhosis, and a sister who in her teens and early 20s was a heavy drinker and is now in Alcoholics
Anonymous but experiences relapse). The husband is estranged from his father but very close with his sister. Both the husband and wife report that they do not drink. We asked participants to rank how likely they would be to include five topics in the discussion with this couple: risk assessment, resources for families impacted by alcohol use disorder, psychosocial impacts of the family history while offering support, what is known about the hereditary nature of alcohol use disorder, and the teratogenicity of alcohol. While on average, participants reported that they would be more likely than not to discuss all five topics, the average score for offering a personalized risk assessment was 3.05, which closely represents the “neither likely nor unlikely” option, a score of 3.00, as opposed to the average scores for discussing the hereditary nature of alcohol use disorder and exploring the psychosocial impacts of alcohol use disorder while offering support which were 3.94 and 4.03 respectively, bordering on the score of 4.00, equivalent to “somewhat likely” (Figure 5). We then analyzed the likelihood data for influences from graduate school SUD training and SUD training from post-grad continuing education. Those with graduate SUD training or post-grad SUD training were more likely to provide a personalized risk assessment (p=.047, .004 respectively) than those with no training and those with post-grad SUD training were more likely to discuss what is known about the hereditary nature of alcohol use disorder and the effects of alcohol on the developing fetus (p= <.0001, .021 respectively) than those with no training in this scenario.

The third and final scenario details a cancer risk assessment session for a 45-year-old man with a family history of cancer suspicious for Lynch syndrome. On his intake form he reports alcohol consumption consistent with classification as a heavy drinker and upon taking the family history the genetic counselor discovers a paternal aunt and uncle who have passed away
in their 50s and had colon cancer. The patient is unsure of the definitive cause of their deaths and describes his whole paternal family as “alcoholics” with the caveat that his father is “functional”.

**Figure 5.** Participants’ likelihood to participate in various components of genetic counseling for a hypothetical prenatal scenario involving apparent maternal opiate use disorder, preconception scenario involving family history of apparent alcohol use disorder, and cancer risk assessment scenario involving personal and family history of apparent alcohol use disorder.
With regards to the likelihood that participants would discuss specific genetic counseling topics with this man, 79% reported that they were likely (“somewhat” or “extremely”) to counsel the man on the impact of drinking on his own cancer risk, 58% were likely to discuss what is known about the hereditary nature of alcohol use disorder, and 57% were likely to explore the circumstances surrounding the man’s personal and family history of alcohol use (Figure 5). We then analyzed the likelihood data for influences from graduate school SUD training and SUD training from post-grad continuing education. Both those with graduate SUD training and those with post-graduate SUD training were more likely to discuss what is known about the hereditary nature of alcohol use disorder (p=.047, .001 respectively).

At the conclusion of each scenario we asked participants to note their general degree of comfort in providing genetic counseling to the described patient based on a five point Likert scale with a score of “5” representing the highest comfort level and “1” representing the least. The mean comfort level for the prenatal scenario was 3.00 and 3.19 for both the preconception and cancer scenario.

We further analyzed the comfort level for significant differences between our two age groups, two genetic counseling tenure groups, two personal experience with SUD groups, and two professional experience with SUD groups described above. Those with personal experience with SUD indicated significantly higher comfort levels for the prenatal heroin use scenario (p=.008) as did those age 31 and older (p=.006) and those who have been working six years or longer as a genetic counselor (p=.009). Regarding the preconception, family history of alcohol abuse scenario the only significant difference was found between the tenure groups, with those working six years or more indicating greater comfort counseling this couple (p=.018). Finally, with respect to the cancer risk assessment, personal and family history of alcohol abuse scenario
the only significant difference was found between the age groups; those age 31 and older indicated greater comfort (p=.034). For all three scenarios no significant difference in comfort was found between those who did and did not have professional experience with SUD.

Factors Influencing Comfort Level and Concluding Thoughts

In the final section of the survey we asked respondents to identify what factors influence their level of comfort in providing genetic counseling to patients with a personal and/or family history of SUD from a list of options and provide any remaining thoughts or suggestions on this practice in an open-text response question. The factors selected most often (n=202) were “ambiguity of disease etiology” (75.7%), “lack of empiric data on recurrence risk for SUD” (74.8%), and “lack of professional experience providing genetic counseling for SUD patients” (64.4%). Conversely, only 8.9% of respondents selected “feelings of helplessness”.

While only 25 of our participants answered the concluding thoughts section most expressed a desire for more training for genetic counselors on SUD, more research on the genetics of addiction, and more information on empiric risks to provide patients. Other respondents indicated that they felt that providing counseling for SUD was outside the scope of practice for a genetic counselor. Most with this view acknowledged the mental health professionals trained in SUD who they would refer to if a patient needed support.
Discussion

To our knowledge this is the first study to examine genetic counselors’ practices and attitudes when working with patients with a personal and/or family history of SUD. We aimed to provide a basic, initial characterization of these encounters and identify conceivable barriers to effective genetic counseling for SUD with the hope of providing a framework for improvement on this practice.

Our study participants were mostly in their third decade, female, and living in a geographic distribution all consistent with the most recent NSGC PSS suggesting that our sample is representative of the genetic counseling population in the U.S. and Canada (NSGC, 2016). While the three most prevalent clinical genetic counseling specialties (cancer, prenatal, pediatrics) were also the most common in our study, the next most represented specialty was cardiology (4.2%). These counselors may be more represented in this study as the cardiovascular disease they counsel on (ex. Brugada and Long QT syndrome) can often be associated with substance abuse and thus their experiences may have made them uniquely drawn to participate.

Current Practices with SUD

It was not surprising that 82.1% of participants reported never having seen a patient with a primary referral indication of SUD, as genetic counseling for psychiatric conditions is a more recent practice and even with the increase in attention to this area, much of the focus is on disorders such as schizophrenia. When a history of SUD is disclosed outside of the reason for referral, our respondents reported that this disclosure occurs more often in a family history intake versus a personal history intake. This contrast could be due to shame surrounding having an SUD
that could be reduced when the SUD is in a relative and not the patient or, simply because there are more of a patient’s family members than the patient themselves so the chance of uncovering a SUD is greater in the family history as opposed to the personal history. In the context of teratogen counseling it is interesting that on a five point frequency scale with “1” representing “very frequently” and “5” representing “never” the average frequency score of disclosure for SUD was 2.85. While not every teratogen exposure involves substance abuse, considering that alcohol and cigarettes are two of the most common teratogens (Genetic Alliance, 2010), we expected the frequency of exposure to be higher in this setting.

In examining which standard components of a genetic counseling session our respondents apply to SUD we found that they, on average, “often” include it in the patient’s pedigree, “sometimes” offer psychosocial counseling and discuss the hereditary nature of SUD, and “rarely” provide a personalized risk assessment or resources/referrals. As noting a disorder on a pedigree requires little effort or background knowledge it follows that this would be common practice. On the other hand, providing risk assessment for SUD seems to pose a substantial challenge to genetic counselors likely due to the lack of empiric data for recurrence risk and etiologic ambiguity of SUD. These two factors were also those most frequently selected by participants as having impact on their comfort in providing counseling for SUD.

**SUD Training**

A large portion of our respondents (41.2%) received SUD training in their graduate training program while only 10% reported such training once they began practicing genetic counseling. Despite the notable segment with graduate school training, only 7.7% indicated that they felt “very well” or “extremely well” prepared to offer genetic counseling on SUD. This is consistent with Low, Dixon, Higgs, Joines, & Hippman’s survey of recent genetic counseling
graduates where 7.4% of their respondents described their training for psychiatric genetic counseling as “adequate”, although they did not examine training for SUD specifically (2017). It is possible that the training our respondents received was focused more on the medical (education on teratogens, medical risks associated with SUD, etc.) and less on the practical, how to have conversations with patients about their SUD, which would leave them knowledgeable about SUD but ill prepared to provide counseling.

However, in the hypothetical scenarios those with SUD training were more likely to engage in certain components of the genetic counseling session than their untrained counterparts. Those with post-graduate SUD training were more likely to discuss the hereditary nature of alcohol use disorder and the effects of alcohol on a developing fetus in the preconception scenario. Additionally, both those with graduate and/or post-graduate training were more likely to discuss the hereditary nature of alcohol use disorder in the cancer scenario and provide personalized risk assessment in the preconception scenario. This was unanticipated given the paucity of respondents who noted that they offer personalized risk assessment for patients with a personal and/or family history of SUD in their current clinical practice. The incongruity here may suggest that those with training are aware of the possibility of providing risk assessment for SUD and feel able to do so but in practice, for yet unknown reasons, do not offer this service.

There were no significant differences between the trained and untrained participants in terms of likelihood to discuss any of the components from the prenatal scenario. This may be the result of the extreme stigma and potential resultant discomfort surrounding heroin use (as opposed to the alcohol use in the other two scenarios) that could trump any feelings of preparedness from training. Indeed we found that participants desired nearly twice as much social distance (a measure of stigma) from someone intravenously using heroin compared to
someone with heavy alcohol use. Another explanation could be that the components of the prenatal scenario were more concrete (health and resource related) so specialized SUD training would not have as much of an influence on the likelihood for these topics to be addressed. In fact, across our sample participants were most likely to address the three components of the prenatal scenario out of all components of all three scenarios.

**SUD Stigma**

Our findings from the administration of the SDS to our sample population using scenarios involving persons with various apparent SUDs echo the work of Feret et al. (2011) who similarly found that genetic counselors desire social distance in intimate relationships with those with schizophrenia when they examined genetic counselors’ stigmatizing attitudes towards these individuals. Although our use of the SDS did not include a genetic counseling context, responses to our open-ended question asking participants to describe a case where they counseled a patient with SUD and any ensuing challenges offered insight as to why genetic counselors may hold a negative attitude towards these patients based on clinical experience. Eight of 79 respondents (10.1%) mentioned difficulty communicating with patients with SUD. Some recounted patients who were under the influence of a substance and lacked focus, which made it problematic for the counselor to know if they were following the session. Others described cases when they had prior knowledge of the SUD and the patient did not disclose or lied about their usage and the secrecy presented a barrier to open dialogue. More generally, knowing the problems SUD can cause for an individual, their health, and their family can make it hard to stay out of judgment when a patient continues their use. One participant expressed quite openly,

"The most severe case I've ever seen was with a woman who has a long history of alcoholism during her pregnancies. She had previously been in multiple rehabilitation facilities, both during and between pregnancies, and had a child with symptoms of FAS. Tis [sic] was a difficult patient for me and her previous genetic counselor
because it was challenging to maintain unconditional positive regard. Her extreme alcohol abuse caused significant physical problems for her, significant problems in her marriage, and ral [sic] effects for her child.”

In examining demographic factors that could impact stigma measured as scores on the SDS we found that having professional experience (as a genetic counselor or otherwise) working with people with SUD did not influence SDS scores. Having personal exposure to SUD (ranging from being personally affected to having an acquaintance(s) with SUD) only made a significant difference on the mean sum of the SDS for the person who smokes marijuana daily with those with some personal exposure or experiences desiring less social distance. These findings are consistent with Feret el al. (2011) who found that the degree of their participants’ exposure to schizophrenia and/or mental illness did not correlate with significant differences in desires for social distance. Anderson & Austin (2012) similarly identified this phenomenon when they used the SDS as a measure of stigma before and after a documentary film intervention designed to decrease stigma; a personal history or experience with mental illness did not show a correlation with desire for social distance from individuals with mental illness.

**Substance Use in Response to Genetic Testing Results**

Our study was designed under the premise of genetic counseling in response to SUD and did not consider the idea that SUD could manifest as a response to genetic counseling or rather, the genetic testing process. Thus we did not specifically query respondents about patients who exhibit substance abuse as a maladaptive coping mechanism post-results disclosure although this was a theme that emerged when we asked participants to describe challenges associated with patients with SUD in an open ended response. The following quote illustrates this idea:

“If I had a patient who was at 50% risk for a known familial mutation in TP53. When exploring with the patient how she might react to positive or negative results, she disclosed a personal history of substance abuse. She was concerned that positive results would cause her to have a relapse…. The main challenge was that her desire to avoid “bad news” which she thought might provoke a relapse of her substance abuse was in conflict with her desire to be proactive about cancer risk...”
Study Limitations

A few limitations befell our study. The small sample size (n=220) relative to the genetic counselor population at large means that our findings may not be generalizable to the population as a whole. Selection bias was also likely present as the survey was voluntary and may have attracted a disproportionate number of participants who are interested in mental health and/or SUD, often address SUDs with patients in a session, and/or have a personal connection to SUD. Survey responses, especially those related to SUD stigma (Social Distance Scale and Affect Scale), may be subject to social desirability bias meaning participants answered in a manner that would be viewed favorably by others which may not convey their true attitudes in turn impacting the validity of the results. Finally, not every participant answered every question in the survey, particularly those with open-text responses, thus the themes that emerged may not be applicable to our sample or genetic counselors as a whole.

Implications for Genetic Counseling

Our findings indicate that genetic counselors are willing to discuss the inheritance (based on their high likelihood to do so in our three hypothetical genetic counseling scenarios) of SUD and are aware of its multifactorial nature (23.3% \( n=60 \) mentioned this as information they use in their risk assessment) but only “sometimes” raise this discussion in their clinical practice. Peay et al. (2008) note that many families with a history of psychiatric disorder already ascribe the etiology of their disease to a combination of genetics, biology, and lifestyle making them primed for further etiology education which the authors also state is an effective tool for combating self-stigmatization. It is clear that discussing SUD etiology has value for genetic counseling patients and it is likely that increased and more operational training is needed for this to be put in practice.
More specifically, Low et al. (2017) predict that providing, “active opportunities to engage with the material and practice psychiatric genetic counseling and supporting students in learning how to identify and provide appropriate resources and referrals for mental illness” can have the greatest impact in preparing students to put psychiatric genetic counseling into practice. Such, “active opportunities” could include standardized patient encounters through role-play or hired actors. Since the majority of our participants describe not feeling prepared to counsel on SUD based on their training, implementing these changes in SUD education, beginning at the graduate school level could be a vehicle for improvement.

Lastly, our study confirms the work of others that implies stigma against those with mental illness (in our case SUDs) exists in the genetic counseling community when measured as a desire for social distance. On average, our participants desired the least social distance from individuals in treatment for their SUD and not actively using. In parallel, in our open-ended question asking participants to describe a case of SUD and associated challenges, several noted that focusing on the benefits of sobriety (and commending the patient if they are currently sober) while using value neutral language can help to establish rapport with a patient and form a therapeutic alliance. Increased awareness of this stigma and subsequently focusing on the potential for positive change could help to ameliorate SUD-associated shame for these patients.

**Future Directions**

Although the demographics of our sample were largely consistent with the current NSGC membership, our study represented only a small portion of the genetic counselor population. A larger study facilitated by a longer recruitment period or alternate methods of recruitment and perhaps the elimination of inclusion criteria of being a currently practicing, clinical counselor could yield more generalizable data. Additionally, while we gathered data about what modes
participants’ SUD training took place through (readings, lectures, films, etc.) not presented in this paper, we did not ask about the content of SUD training. Understanding what information and skills related to counseling patients with SUD are being presented in such training could have utility in identifying gaps in education on this topic. Finally, our participants’ responses to an open-ended question about challenges faced in providing genetic counseling to patients with SUD raised the issue of SUD manifestation in response to coping with a genetic diagnosis and/or genetic testing results. Further research into maladaptive coping mechanisms such as substance abuse could help genetic counselors to screen for patients who make be at risk for such a response to the genetic testing process.
Conclusion

Genetic counselors rarely see patients whose primary indication for referral is a personal and/or family history of SUD. However, they are likely to indirectly encounter these disorders in their clinical practice and have the potential to use their skills to increase empowerment, self-efficacy, knowledge, and risk perception accuracy while combating stigma for affected individuals and families. While genetic counselors are likely to offer components of genetic counseling (explanation of inheritance, risk assessment, referral to informational and support resources) to patients with a history of SUD in the hypothetical, they indicate they are not currently offering these services in their clinical practice. Probable explanations for this inconsistency are lack of practical, experiential training in providing genetic counseling to patients with a personal and/or family history of SUD as well as a lack of well-defined empirical recurrence risks. It is imperative that research on and efforts to improve SUD training for genetic counselors continue as our understanding of the genetics of SUD and the demand for psychiatric genetic counseling services rise.
References


Appendix A: Recruitment Notices to NSGC & ABGC

Initial e-blast

Subject: Substance Use Disorders: Genetic Counselors’ Practices and Attitudes

Seeking Practicing Genetic Counselors to Participate in a Research Study

Dear NSGC/ABGC member,

My name is Allie White, I am a second-year student at the Brandeis University Genetic Counseling Training Program. I would like to invite you to participate in a research study as part of my master’s thesis exploring genetic counselors’ practices and attitudes regarding patients facing substance use disorders.

The specific goals of this study are to:

1. Characterize genetic counselors’ encounters with substance use disorders in their practice.
2. Assess attitudes towards individuals facing substance use disorders and how attitudes may influence clinical practice.

Study Information:

All currently practicing genetic counselors who interact with patients, either face-to-face or via telemedicine, in any practice area are welcome to participate.

The online survey will take an average of 15 minutes to complete.

You will not be asked to provide any personally identifying information.

Participation in this study is entirely voluntary; you may stop at any time.

In thanks for your time, all participants will be given the opportunity to enter a drawing for one of three $50 Amazon gift cards. Following the completion of the survey you will have the option of entering your e-mail address which will not be linked to your anonymous survey responses.

Please click here to access the survey
https://brandeis.qualtrics.com/jfe/form/SV_007rYBHwWXDvWtv

This study was reviewed and approved by the Brandeis University Institutional Review Board. If you have any questions, comments, or concerns, please do not hesitate to contact me (alliewhite@brandeis.edu) or my faculty advisor, Gretchen Schneider MS, CGC (gretchen@brandeis.edu) by email.

Thank you for your time and consideration.
Sincerely,

Allie White, B.S.  
Master’s Degree Candidate, Class of 2018  
Genetic Counseling Program  
Brandeis University

Gretchen Schneider, MS, CGC  
Director, Genetic Counseling Program  
Professor of the Practice  
Brandeis University
Subject: Substance Use Disorders: Genetic Counselors’ Practices and Attitudes

Seeking Practicing Genetic Counselors to Participate in a Research Study

Dear ABGC member,

My name is Allie White, I am a second-year student at the Brandeis University Genetic Counseling Training Program. I would like to invite you to participate in a research study as part of my master’s thesis exploring genetic counselors’ practices and attitudes regarding patients facing substance use disorders.

The specific goals of this study are to:

1. Characterize genetic counselors’ encounters with substance use disorders in their practice.
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Study Information:

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The online survey will take an average of 15 minutes to complete.

You will not be asked to provide any personally identifying information.

Participation in this study is entirely voluntary; you may stop at any time.

In thanks for your time, all participants will be given the opportunity to enter a drawing for one of three $50 Amazon gift cards. Following the completion of the survey you will have the option of entering your e-mail address which will not be linked to your anonymous survey responses.

Please click here to access the survey
https://brandeis.qualtrics.com/jfe/form/SV_007rYBHwWXDvWtv

This study was reviewed and approved by the Brandeis University Institutional Review Board. If you have any questions, comments, or concerns, please do not hesitate to contact me (alliewhite@brandeis.edu) or my faculty advisor, Gretchen Schneider MS, CGC (gretchen@brandeis.edu) by email.

Thank you for your time and consideration.

Sincerely,
Allie White, B.S.
Master’s Degree Candidate, Class of 2018
Genetic Counseling Program
Brandeis University

Gretchen Schneider, MS, CGC
Director, Genetic Counseling Program
Professor of the Practice
Brandeis University
Appendix B: Study Instrument

Q1 Thank you for your participation in this study of genetic counselors’ attitudes and current practices regarding patients facing a personal and/or family history of substance use disorder. This is an anonymous survey estimated to take 15 minutes to complete. Your participation in this survey is voluntary. You may skip any question you do not wish to answer and you may exit the survey at any time. Please only take the survey once. As a participant you may benefit from the study by feeling that you are contributing to the genetic counseling and scientific literature. The risks to you as a participant are minimal, however, potential risks could include feeling distressed when answering questions about personal experience with substance use disorders and patient encounters involving substance use disorders. All participants who complete this survey may enter a drawing for one of three $50 Amazon gift cards. If you enter the drawing you will be directed to a separate survey, not linked to your survey responses, to provide your e-mail address. This study was reviewed and approved by the Brandeis University Institutional Review Board. If you have any questions, comments, or concerns, please do not hesitate to contact me (alliewhite@brandeis.edu) or my faculty advisor, Gretchen Schneider MS, CGC (gretchen@brandeis.edu) by email. By clicking "Yes, I consent" you acknowledge that you have read the information above and you consent to participate in this survey.

- Yes, I consent (1)
- No, Thank You (2)

Skip To: End of Survey If Q1 = No, Thank You

Q2 Are you a genetic counseling student?

- Yes (1)
- No (2)

Skip To: End of Survey If Q2 = Yes

Q3 Are you currently practicing as a genetic counselor and interact with patients as part of your work, either face-to-face or via telemedicine?

- Yes (1)
- No (2)

Skip To: End of Survey If Q3 = No

Q4 For the purposes of this survey please use the following definition: Substance Use Disorder (SUD): A class of neurobiological disorders defined by the compulsion to seek and use a substance, uncontrolled use of the substance, and the presence of a negative emotional state when the substance cannot be accessed. Examples include: alcohol use disorder (includes alcoholism), cannabis use disorder, and opioid use disorder.
Q5 What is your gender?

- Male (1)
- Female (2)
- Other (3)
- Prefer not to answer (4)

Q6 What is your age?

- 20-30 (1)
- 31-40 (2)
- 41-50 (3)
- 51-60 (4)
- 61-70 (5)
- 71+ (6)

Q7 Have you had any or exposure to, or experiences with people with SUD outside of your patient population (select all that apply)?

- Personally affected with SUD (1)
- Family member(s) with SUD (2)
- Close friend(s) with SUD (3)
- Work colleague(s) with SUD (4)
- Acquaintance(s) with SUD (5)
- No exposure or experiences (6)
Q8 In which NSGC-defined region do you currently practice genetic counseling?

- Region 1: CT, MA, ME, NH, RI, VT, CN, Maritime Provinces (1)
- Region 2: DC, DE, MD, NJ, NY, PA, VA, WV, PR, VI, Quebec (2)
- Region 3: AL, FL, GA, KY, LA, MS, NC, SC, TN (3)
- Region 4: AR, IA, IL, IN, KS, MI, MN, MO, ND, NE, OH, OK, SD, WI, Ontario (4)
- Region 5: AZ, CO, MT, NM, TX, UT, WY, Alberta, Manitoba, Saskatchewan (5)
- Region 6: AK, CA, HI, ID, NV, OR, WA, British Columbia (6)
- Non-U.S. or Canada (7)

Q9 How many years have you been working as a genetic counselor?

- 0-5 (1)
- 6-10 (2)
- 11-15 (3)
- 16-20 (4)
- 21-25 (5)
- 26-30 (6)
- 31-35 (7)
- 36-40 (8)
- 41+ (9)
Q10 In what practice area(s) do you currently work as a genetic counselor? (select all that apply)

Adult (1)
Cancer (2)
Research (3)
General (4)
Laboratory (5)
Pediatrics (6)
Preconception (7)
Cardiology (8)
Prenatal (9)
Neurology (10)
Metabolics (11)

Other (please specify) (12) ____________________________

Carry Forward Selected Choices - Entered Text from "Q10"
Q11 Out of the areas that you practice in, in which do you spend the most time?

- Adult (1)
- Cancer (2)
- Research (3)
- General (4)
- Laboratory (5)
- Pediatrics (6)
- Preconception (7)
- Cardiology (8)
- Prenatal (9)
- Neurology (10)
- Metabolics (11)
- Other (please specify) (12)

Q12 In what work setting do you currently practice as a genetic counselor? (select all that apply)

- University Medical Center (1)
- Public Hospital/Medical Facility (2)
- Private Hospital/Medical Facility (3)
- Diagnostic Laboratory (Commercial, Non-academic) (4)
- Physician's Private Practice (5)
- Other (please specify) (6) ______________________________________________________
Q13 Do you currently or have you in the past worked as a genetic counselor in a research setting or specialty clinic that focuses on psychiatric disorders?

- Yes (1)
- No (2)

Q14 Do you currently or have you in the past worked in a non-genetic counseling role with people with psychiatric disorders?

- Yes (1)
- No (2)

Display This Question:
If Q13 = Yes
Or Q14 = Yes

Q15 Did this work involve people with substance use disorders?

- Yes (1)
- No (2)

Q16 Please respond to the following questions based on your current position as a genetic counselor.

Q17 Approximately how often have you seen patients for genetic risk assessment and counseling whose primary referral indication was SUD?

- Never (1)
- Less than once/month (2)
- Once/month (3)
- 2-3 times/month (4)
- Weekly (5)
Q18 How often, in each of the following contexts, do patients disclose a personal and/or family history of SUD if it is not the primary indication?

<table>
<thead>
<tr>
<th>Context</th>
<th>Very Frequently (1)</th>
<th>Frequently (2)</th>
<th>Occasionally (3)</th>
<th>Rarely (4)</th>
<th>Never (5)</th>
<th>N/A to my practice area (6)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Taking a personal medical history (1)</td>
<td>×</td>
<td>×</td>
<td>×</td>
<td>×</td>
<td>×</td>
<td>×</td>
</tr>
<tr>
<td>Taking a family history (2)</td>
<td>×</td>
<td>×</td>
<td>×</td>
<td>×</td>
<td>×</td>
<td>×</td>
</tr>
<tr>
<td>Cancer risk assessment (3)</td>
<td>×</td>
<td>×</td>
<td>×</td>
<td>×</td>
<td>×</td>
<td>×</td>
</tr>
<tr>
<td>Teratogen counseling (4)</td>
<td>×</td>
<td>×</td>
<td>×</td>
<td>×</td>
<td>×</td>
<td>×</td>
</tr>
<tr>
<td>Other (please specify) (5)</td>
<td>×</td>
<td>×</td>
<td>×</td>
<td>×</td>
<td>×</td>
<td>×</td>
</tr>
</tbody>
</table>
Q19 If a personal and/or family history of SUD is present how often do you...

<table>
<thead>
<tr>
<th></th>
<th>Always (1)</th>
<th>Often (2)</th>
<th>Sometimes (3)</th>
<th>Rarely (4)</th>
<th>Never (5)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Include it in the pedigree?</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>(1)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Discuss what is known about the hereditary nature of SUD?</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>(2)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Offer the patient a personalized risk assessment?</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>(3)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Offer psychosocial counseling in response?</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>(4)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Provide referrals and/or resources to the patient?</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>(5)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Q20 What informational resources do you use when providing risk assessment to patients with a personal and/or family history of SUD? (If you have never provided this kind of risk assessment please write “N/A”)

________________________________________________________________

Q21 What kind of referrals or resources have you provided to patients with a personal and/or family history of SUD? (If you have never provided these referrals or resources please write “N/A”)

________________________________________________________________

Q22 If you have an example of a time when you counseled a patient with a personal history of a substance use disorder please describe the session below. Please include any issues you faced in providing genetic counseling.

________________________________________________________________

Q23 The next set of questions addresses your training both in your graduate program and in your continuing professional education.

Q24 Did you receive any training on SUDs in your genetic counseling training program?

○ Yes (1)

○ No (2)
Q25 What type of training did you receive? (please select all that apply)

- Readings (1)
- Movies/Documentaries (2)
- Guest Lecturers (3)
- Discussions (4)
- Field Trips (5)
- Role Plays (6)
- Other (please specify) (7) _____________________________________________________________________

Q26 Have you received any SUD training in your post-graduate continuing education?

- Yes (1)
- No (2)
Q27 What type of training did you receive? (please select all that apply)

- Webinar (1)
- Presentation from professional who works with individuals with SUD (2)
- Readings (3)
- Movies/Documentaries (4)
- Presentation from an individual with a personal and/or family history of SUD (5)
- Other (please specify) (6) ________________________________________________

Q28 How well do you feel your overall training as a genetic counselor has prepared you to discuss family and personal histories of SUD with patients?

- Extremely well (1)
- Very well (2)
- Moderately well (3)
- Slightly well (4)
- Not well at all (5)

Q29 The next set of questions in this survey will address hypothetical scenarios both related and unrelated to genetic counseling.
Q30 Please indicate how willing you would be to engage in each social interaction with the described individual.
A person who smokes marijuana recreationally three times a day, on most days of the week

<table>
<thead>
<tr>
<th>Interaction</th>
<th>1 definitely willing (1)</th>
<th>2 (2)</th>
<th>3 (3)</th>
<th>4 definitely unwilling (4)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Share an apartment with that person (1)</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
</tr>
<tr>
<td>Have that person as a neighbor (2)</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
</tr>
<tr>
<td>Have that person as a babysitter for your child (3)</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
</tr>
<tr>
<td>Introduce to your friend as a relationship partner (4)</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
</tr>
<tr>
<td>Recommend that person for a job (5)</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
</tr>
</tbody>
</table>
Q31 Please indicate how willing you would be to engage in each social interaction with the described individual.

A person who has taken oxycodone pills daily for two years with a valid and current prescription from their doctor. The original prescription was for a knee injury two years ago. Their knee healed after six months but the person still reports frequent pain.

<table>
<thead>
<tr>
<th>Interaction</th>
<th>1 definitely willing (1)</th>
<th>2 (2)</th>
<th>3 (3)</th>
<th>4 definitely unwilling (4)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Share an apartment with that person (1)</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Have that person as a neighbor (2)</td>
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<tr>
<td>Have that person as a babysitter for your child (3)</td>
<td></td>
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<tr>
<td>Introduce to your friend as a relationship partner (4)</td>
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<tr>
<td>Recommend that person for a job (5)</td>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>
Q32 Please indicate how willing you would be to engage in each social interaction with the described individual.

A person who has a drink every weekday evening and then at least 5 drinks on Saturdays and Sundays

<table>
<thead>
<tr>
<th>Interaction</th>
<th>1 definitely willing (1)</th>
<th>2 (2)</th>
<th>3 (3)</th>
<th>4 definitely unwilling (4)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Share an apartment with that person (1)</td>
<td></td>
<td>○</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Have that person as a neighbor (2)</td>
<td></td>
<td>○</td>
<td></td>
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</tr>
<tr>
<td>Have that person as a babysitter for your child (3)</td>
<td></td>
<td>○</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Introduce to your friend as a relationship partner (4)</td>
<td></td>
<td>○</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Recommend that person for a job (5)</td>
<td></td>
<td>○</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Q33 Please indicate how willing you would be to engage in each social interaction with the described individual.

A person who intravenously uses heroin on average four times per day

<table>
<thead>
<tr>
<th></th>
<th>1 definitely willing (1)</th>
<th>2 (2)</th>
<th>3 (3)</th>
<th>4 definitely unwilling (4)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Share an apartment with that person (1)</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
</tr>
<tr>
<td>Have that person as a neighbor (2)</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
</tr>
<tr>
<td>Have that person as a babysitter for your child (3)</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
</tr>
<tr>
<td>Introduce to your friend as a relationship partner (4)</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
</tr>
<tr>
<td>Recommend that person for a job (5)</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
</tr>
</tbody>
</table>
Q34 Please indicate how willing you would be to engage in each social interaction with the described individual.

A person who was in a treatment program for opioid use disorder and has not used for six months

<table>
<thead>
<tr>
<th></th>
<th>1 definitely willing (1)</th>
<th>2 (2)</th>
<th>3 (3)</th>
<th>4 definitely unwilling (4)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Share an apartment with that person (1)</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Have that person as a neighbor (2)</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Have that person as a babysitter for your child (3)</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Introduce to your friend as a relationship partner (4)</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Recommend that person for a job (5)</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>
Q35 Please indicate how willing you would be to engage in each social interaction with the described individual.

A person who was in a treatment program for an alcohol use disorder and has not had a drink for six months

<table>
<thead>
<tr>
<th>Interaction</th>
<th>1 definitely willing (1)</th>
<th>2 (2)</th>
<th>3 (3)</th>
<th>4 definitely unwilling (4)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Share an apartment with that person (1)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Have that person as a neighbor (2)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Have that person as a babysitter for your child (3)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Introduce to your friend as a relationship partner (4)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Recommend that person for a job (5)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Q36 Please indicate how willing you would be to engage in each social interaction with the described individual.

A person who smokes a pack of cigarettes per day

<table>
<thead>
<tr>
<th></th>
<th>1 definitely willing (1)</th>
<th>2 (2)</th>
<th>3 (3)</th>
<th>4 definitely unwilling (4)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Share an apartment with that person (1)</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
</tr>
<tr>
<td>Have that person as a neighbor (2)</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
</tr>
<tr>
<td>Have that person as a babysitter for your child (3)</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
</tr>
<tr>
<td>Introduce to your friend as a relationship partner (4)</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
</tr>
<tr>
<td>Recommend that person for a job (5)</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
</tr>
</tbody>
</table>

Q37 Please answer the following questions based on the hypothetical scenario below as if you are the genetic counselor described.

A 32-year-old woman comes to see you in the prenatal clinic after an ultrasound revealed multiple abnormal findings. Upon taking the woman’s medical history you find that she is using heroin. Her pregnancy history includes a pregnancy two year ago where the baby was born with a chemical dependency to opiates and is currently in foster care.
Q38 Use the following scale to indicate how you would feel towards this patient in the session.

<table>
<thead>
<tr>
<th>Emotion</th>
<th>1 (1)</th>
<th>2 (2)</th>
<th>3 (3)</th>
<th>4 (4)</th>
<th>5 (5)</th>
<th>6 (6)</th>
<th>7 (7)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Optimistic</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Supportive</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Empathetic</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Comfortable</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Patient</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Relaxed</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Pessimistic</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Resentful</td>
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<td></td>
</tr>
<tr>
<td>Disgusted</td>
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<td></td>
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<tr>
<td>Apprehensive</td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Irritable</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tense</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

Q39 How likely are you to discuss the following with this patient?

<table>
<thead>
<tr>
<th>Topic</th>
<th>Extremely unlikely (1)</th>
<th>Somewhat unlikely (2)</th>
<th>Neither likely nor unlikely (3)</th>
<th>Somewhat likely (4)</th>
<th>Extremely likely (5)</th>
</tr>
</thead>
<tbody>
<tr>
<td>The effects of heroin on maternal health (8)</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>The effects of heroin on fetal health (9)</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Resources for pregnant women facing substance use disorders (10)</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
</tbody>
</table>
Q40 In general, how comfortable would you be in offering this woman counseling for her personal history of heroin use?

- Uncomfortable (1)
- Somewhat uncomfortable (2)
- Neutral (3)
- Somewhat comfortable (4)
- Comfortable (5)

Q41 Please answer the following questions based on the hypothetical scenario below as if you are the genetic counselor described.

A recently married couple in their late 20s comes to see you for preconception counseling in the general genetics clinic, they are concerned about a family history of alcohol use. The man’s parents have both been affected by alcohol use disorder, his mother died from an alcohol-related stroke at age 55 and his father has severe cirrhosis and is awaiting a liver transplant. The man has little contact with his father. He has one sister who was a heavy drinker in her teens and early twenties, has since completed a rehabilitation program, and is now in an alcoholics anonymous program although she relapses from time to time. The man and his sister have a close relationship and she sometimes stays with the couple for an extended period of time. The man and his wife both report that they do not drink.

Q42 How likely are you to...?

<table>
<thead>
<tr>
<th></th>
<th>Extremely likely (1)</th>
<th>Somewhat likely (2)</th>
<th>Neither likely nor unlikely (3)</th>
<th>Somewhat unlikely (4)</th>
<th>Extremely unlikely (5)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Provide personalized risk assessment (1)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Offer outside resources for families impacted by alcohol use disorder (2)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Assess the psychosocial impacts of alcohol use disorder on the man and his</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Discuss what is known about the hereditary nature of alcohol use disorder (4)

Describe the effects of alcohol exposure on a developing fetus (5)

Q43 In general, how comfortable would you be in offering this couple counseling for the man's family history of alcohol use disorder?

- Uncomfortable (1)
- Somewhat uncomfortable (2)
- Neutral (3)
- Somewhat comfortable (4)
- Comfortable (5)

Q44 Please answer the following questions based on the hypothetical scenario below as if you are the genetic counselor described.

A 45 year old man is scheduled to see you in the cancer risk assessment center for a strong paternal family history of colon, uterine, and bladder cancer. Based on the records you have gathered previous to the man’s appointment you suspect Lynch syndrome (Hereditary Nonpolyposis Colorectal Cancer). In reviewing the lifestyle questionnaire he has filled out in the waiting room you note that the man has marked his alcohol consumption at 3 drinks per day (heavy drinker). When you take his family history you discover that his paternal uncle and paternal aunt both passed away in their 50s. He is unsure of the cause of their deaths; he knows that they both had colon cancer but also reveals that his father’s side of the family is “all alcoholics”. He explains that this includes his own father but that he is “functional”.
Q45 How likely are you to...

<table>
<thead>
<tr>
<th></th>
<th>Extremely likely (1)</th>
<th>Somewhat likely (2)</th>
<th>Neither likely nor unlikely (3)</th>
<th>Somewhat unlikely (4)</th>
<th>Extremely unlikely (5)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Counsel the man on the impact of his drinking on his own cancer risk? (1)</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
</tr>
<tr>
<td>Discuss what is known about the hereditary nature of alcohol use disorder? (2)</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
</tr>
<tr>
<td>Explore the circumstances surrounding the man's personal and family history of alcohol use (loss, dread of cancer diagnosis, etc.)? (3)</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
</tr>
</tbody>
</table>

Q46 In general, how comfortable would you be in offering this man counseling for his personal and family history of alcohol use?

- o Uncomfortable (1)
- o Somewhat uncomfortable (2)
- o Neutral (3)
- o Somewhat comfortable (4)
- o Comfortable (5)
Q47 What factors influence your comfort level in offering genetic counseling to patients with a personal and/or family history of SUD? (please select all that apply)

- Time constraints of session (1)
- Lack of empiric data on recurrence risk for SUD (2)
- Ambiguity of SUD disease etiology (3)
- Variability of outcomes for someone who may be at increased risk for SUD (4)
- Feelings of helplessness (5)
- Anticipated poor response of patients towards uncertainty of SUD (6)
- Lack of graduate school training specific to SUD (7)
- Lack of professional experience(s) providing genetic counseling for SUD patients (8)
- Concern for patient's family member dynamics (9)
- Other (please specify) (10) ____________________________

Q48 Please use the space below for any final thoughts/comments/suggestions on genetic counseling for patients with a personal and/or family history of SUD.

________________________________________________________

Q49 Thank you for completing this survey! If you would like to be entered for a chance to win a $50 Amazon gift card, select "yes," and you will be directed to another survey to fill out the appropriate information. The information that you provided in this survey will not be linked to the draw.

- Yes (1)
- No, thank you (2)