Comparing the health of non-binary and binary transgender adults in a statewide non-probability sample

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Abstract

Background

In the U.S., non-binary refers to transgender people who have a gender identity not aligned with their assigned sex at birth, and who identify outside of the traditional male-female binary, such as genderqueer, genderfluid, or gender nonconforming. Few data are available to characterize the health of non-binary adults.

Methods

The current study sought to fill this gap by conducting a secondary analysis of data from a non-probability sample of transgender and/or gender nonconforming adults in Massachusetts (sample mean age 32.6 years, 63% female assigned sex at birth; 79.4% white non-Hispanic/Latinx). Multivariable models were fit to compare non-binary (e.g., genderqueer) vs. binary (e.g., man/trans man, woman/trans woman) respondents across a range of social and health indicators.

Results

Overall, 40.9% identified their gender identity as non-binary. Non-binary respondents significantly differed from binary respondents on (all p<0.05): demographics (younger age, more female assigned sex at birth); gender affirmation (older age of identity recognition, lower current uptake of and future desires for medical gender affirmation); healthcare utilization (lower rates of being up-to-date in annual wellness visit, less mental healthcare utilization in past year); mental health and substance use (higher past-week depressive distress, higher hazardous alcohol use); social history (more unstably housed, more current students), violence victimization (lower rates of lifetime intimate partner violence), and social support (less family support).
Conclusion

Gender diversity, including whether people endorse a binary or non-binary gender identity, is a prevalent and an important aspect of transgender health. Demographic measures of gender identity that include binary and non-binary response options are recommended to inform future research and clinical care.

Introduction

Transgender people have a current gender identity that differs from the sex assigned to them at birth, and comprise an estimated 1.4 million adults in the U.S.[1] In recent years, transgender public health, clinical epidemiology, and medicine have begun to garner increasing interest, attention, and support as “legitimate” areas of scientific inquiry and domains for clinical care innovation.[2–4] Accompanying this growth, and perhaps bi-directionally influencing it, has been a paradigmatic shift in the field of transgender health moving away from conceptualizing transgender as a “disorder” and toward conceptualizing transgender as an “identity.”[3] Indeed, as gender diversity is becoming increasingly de-pathologized, there is beginning to be greater recognition of the proliferation of gender identities and heterogeneous gender presentations that exist for transgender people.[5, 6] However, very little research and empirical data are available to understand similarities and differences in the health risks, conditions, and needs of diverse groups of transgender people, including those who identify outside the gender binary.[7–10]

Non-binary refers to transgender people who have a gender identity that does not align with their sex assigned at birth and who identify outside of the traditional female-male gender binary, such as genderqueer, genderfluid, or gender nonconforming.[8] Non-binary people may have an identity and/or expression that is either feminine or masculine, both feminine and masculine, or neither. Non-binary individuals may also be pangender (two or more genders), bigender (female and male), agender (without any gender), neutrois (neutral or genderless), and many other diverse gender identities. In the 2015 U.S. Transgender Survey (USTS), a U.S. national convenience sample of more than 22,000 transgender and gender nonconforming adults, more than one third (35%) of respondents identified as non-binary.[11] Non-binary-identified transgender people may have different sociodemographic characteristics than binary transgender people (e.g., those who identify with a binary gender such as transgender men or transgender women).[12] Non-binary participants tend to be younger than binary individuals, and more likely to have a non-heterosexual/straight sexual orientation vs. not.[13, 14] Other studies have not found significant differences between binary vs. non-binary gender groups by race, socio-economic status (SES), or other key characteristics known to shape health, such as relationship status, student status, sexual behavior, sex work, housing status, and military service.[11] A recent review of non-binary health research identified fewer than one dozen published studies.[10] Additional research is needed to characterize non-binary and binary people in order to enhance epidemiologic conclusions that can be drawn about these groups.

Minority stress frameworks have been used to understand health-related differences between transgender and cisgender (non-transgender) people,[15–17] wherein poor health is caused by the differential distribution of social stressors (e.g., stigma, mistreatment)[18] resulting from being a member of a marginalized group. However, minority stress frameworks also motivate hypothesized differences in the social history, healthcare utilization behaviors, and
health outcomes of non-binary vs binary transgender people.[19] People generally lack basic knowledge and competency of non-binary gender identities and experiences, including family members, employers, healthcare providers, and larger societal systems.[20] Not conforming to the male-female gender binary or gender social norms may expose non-binary transgender people to gender-related stressors from multiple sources. Conversely, it could be that non-binary people have better health because subverting gender norms or not identifying with societal male-female stereotypes offers freedom from gendered expectations and removes some stressors. Therefore, in addition to exploring the socio-demographic differences of transgender people who identify as binary vs. non-binary, understanding differences in healthcare utilization and health by gender identity sub-group is also important for ensuring access to necessary care for transgender people, including medical gender affirmation therapies and other affirming services such as mental health counseling.

While genderqueer and other non-binary transgender individuals have been defined as those who typically do not desire to medically affirm their gender,[21] empirical research suggests that many transgender individuals who identify outside the gender binary may still seek hormones or surgery.[11, 22] Indeed, findings from the USTS show that while 95% of binary transgender participants wanted hormone therapy, 49% of non-binary individuals also desired hormone therapy, although only 13% of these individuals had received it, relative to 71% of binary individuals.[11] These gender identity differences in desire for gender affirmation vs. actual hormone utilization could suggest unique access to care barriers for non-binary transgender individuals, such as stigma in clinical care settings, including the provision of medical gender affirmation in accordance with gender binary protocols.[20, 23] To that end qualitative data reveal that non-binary participants tend to be less likely than binary participants to have discussed their gender identity with their provider or disclose being transgender).[6, 24] In the context of research demonstrating that healthcare avoidance due to past or anticipated discrimination from one's healthcare provider influences access to care for transgender individuals,[18] experiences of discrimination and avoidance could be driving differences by gender identity in access to gender affirming care. Descriptive data support that possibility, as 39% of binary vs. 24% of non-binary participants in USTS had experienced negative healthcare experiences, although differences in avoidance of care due to discrimination were smaller for non-binary participants (20%) vs. binary participants (27%).[11] Similarly, in another study of 150 transmasculine adults of which 23% were non-binary, 68.7% of the sample reported experiencing mistreatment in healthcare settings in their lifetime which was positively associated with healthcare avoidance in the past 12 months.[25] These findings highlight the importance of using more robust statistical methods to further explore healthcare utilization and the mechanisms driving gender identity differences in barriers to care, including discrimination and other forms of stigma.

Despite that non-binary people encompass a sizable proportion of the transgender population, much of the research characterizing the health and wellbeing of transgender people either treats transgender individuals as a homogenous population, or at best, stratifies transgender individuals by gender spectrum (e.g., female-to-male/transgender men/trans masculine vs. male-to-female/transgender women/trans feminine), particularly in research on discrimination and violence. Indeed, research demonstrates variable rates of violence across transgender communities with some studies showing a similar or higher prevalence of lifetime sexual and physical assault among trans masculine individuals,[26, 27] while other studies demonstrate a higher prevalence of physical violence[28] and sexual assault[29, 30] among trans feminine individuals. Among the little research that does exist by binary vs. non-binary identity, findings are mixed. Some research has found higher prevalence of harassment, trauma, and sexual assault for non-binary young adults relative to those who identify as binary.[19] The USTS
survey showed only slight differences in the prevalence of lifetime sexual assault by binary gender identity (44% binary vs. 46% non-binary); however, binary individuals were more likely to be physically attacked (29%) and sexually assaulted (15%) in grades kindergarten through 12th grade, relative to non-binary individuals (16%). In a clinical sample of patients at an urban health center, past-12 month intimate partner violence (IPV) rates were elevated for transgender women (12.1%), transgender men (6.6%), and non-binary individuals (8.2%) relative to cisgender women (2.7%) (p<0.05).[31] Another study of college students accessing college-based mental health counseling from the Center for Collegiate Mental Health’s 2012–2016 database, found non-binary transgender individuals had higher rates of harassment, sexual abuse, and exposure to traumatic events than binary transgender students.[19] Understanding gender differences in experiences of victimization and violence within the transgender community is critical, as these experiences have been linked to poor mental health in transgender populations.[16, 32]

Research shows that transgender individuals relative to cisgender individuals experience heightened levels of depression, anxiety, substance use, suicidality, and poor mental and overall self-rated health.[16, 33–38] The USTS reported that binary participants (49%) were more likely to report current serious psychological distress than binary participants (35%), yet were slightly less likely to report lifetime suicide attempts (43% binary vs. 39% non-binary).[11] While family and peer support have been shown to buffer against the mental health costs of violence and victimization,[39, 40] research suggests that rejection by one’s family and peers is common for transgender individuals. In the USTS sample, 46% of transgender participants reported experiencing some form of family rejection, 77% being bullied for being transgender as a child, and 19% of binary vs. 15% of non-binary individuals having to leave school due to harassment. In a smaller study of 150 trans masculine individuals, relative to those with a binary gender identity, those with a non-binary gender identity had higher odds of both clinically significant depression and anxiety symptoms, though results only approached significance (p = 0.06) as the analysis was likely underpowered.[25] Research is needed to examine multiple indicators of support including the degree (continuous instead of categorical measure of support), extent (e.g., number of friends), and timing (current vs. childhood) of support that transgender individuals experience by gender identity.

Lack of research exploring the differences in the health of non-binary transgender people relative to binary transgender people, may obfuscate the unique health needs of this sub-population. Further, the fields of public health and epidemiology need to consider gender diversity beyond the gender binary. In addition to the categories “transgender men” and “transgender women” that are often used in public health, non-binary vs binary represent another gender axis that should be included in research in order to shed light on health disparities faced by transgender people relative to cisgender individuals. In order to fill this research gap, the current study sought to characterize the health and wellbeing of non-binary adults in a statewide sample of transgender respondents in Massachusetts, comparing the demographic characteristics and health of those identifying their gender identity as non-binary with those self-reporting a binary identity. Such data are urgently needed to understand the epidemiology and health needs of this community, guide future public health efforts, and inform responsive clinical care.

Based on the review of research and application of minority stress frameworks (see above), this study hypothesized that non-binary respondents would differ from binary respondents on demographics (younger age, more female assigned sex at birth, more sexual minority identified, higher educational engagement, more privately insured), gender affirmation (lower levels of internalized transphobia, less current medical gender affirmation, higher visual gender non-conformity), healthcare utilization (less routine engagement in healthcare, more teaching of
healthcare providers to obtain appropriate care), mental health (more depression and anxiety, more unmet need for mental health services), substance use (greater alcohol misuse), and violence victimization (more experiences of victimization). No significant differences were anticipated in social history or social support for non-binary compared to binary respondents.

**Methods**

This is a secondary analysis of data from Project VOICE (Voicing Our Individual and Community Experiences), a stress and health needs assessment of transgender and gender nonconforming adults in Massachusetts, conducted between March and December 2013 by the Fenway Institute at Fenway Health (Fenway) and the Massachusetts Transgender Political Coalition (MTPC). This non-probability sample study used a participatory population perspective,[41] grounded in community-based participatory research principles, to work "with" not "on" transgender communities in the Commonwealth. The community sample was recruited using bi-model methods, either in person (via community events, programming, and gatherings) or online (via electronic listservs, emails, website postings at Fenway and MTPC, and social networking sites). Eligibility criteria were: (1) self-identified as transgender or gender nonconforming; (2) ages 18 years or older; (3) living in Massachusetts (or had lived in Massachusetts for at least 3 months of the past year); (4) had not previously completed the survey; (5) was able to read and understand English or Spanish. Whenever possible, the study utilized validated questions or adapted survey items from earlier research to ensure the comparability of findings, including those from such sources as the U.S. National Transgender Discrimination Survey[42] and Behavioral Risk Factor Surveillance System (BRFSS).[43] Project VOICE was approved by the Fenway Institutional Review Board (IRB). Additional details regarding study methodology are reported elsewhere.[44]

**Measures**

**Independent variable/ exposure: Non-binary vs. binary gender identity.** Gender identity was assessed using the recommended two-step method[45] with two items: (1) assigned sex at birth (female, male) and (2) current gender identity (man, female-to-male, trans man, trans male/ woman, male-to-female, trans woman, trans female/ genderqueer, gender variant, gender nonconforming, another gender). Participants were asked to select a single response option that best described their current gender identity. Participants were categorized as having a binary gender identity (e.g., male/trans male, female/trans female) or a non-binary gender identity (genderqueer, gender variant, gender nonconforming) based on their response to the current gender identity item. The two items were also cross-tabulated to categorize participants as trans feminine spectrum ($n = 167$) or trans masculine spectrum ($n = 285$).

**Dependent variables.** Demographic characteristics: Age in years (continuous), race/ethnicity (white, Black, Latino, Other, Mixed), sexual orientation (sexual minority vs. not), low education (high school diploma vs. college or above), current student status (yes vs. no), low income (<$35K annually, $35K annually or above), health insurance (public, private, other), survey mode (online, in-person).

Gender affirmation characteristics: Age first recognized gender identity ("How old were you when you first became aware that you were transgender and/or gender nonconforming?"). Participants were asked whether a doctor had ever diagnosed them with gender identity disorder or gender dysphoria (yes, no). Social gender transition was assessed with the following item: “Do you consistently present (live 'full time') in your identified gender?” (yes, no). Medical gender affirmation was assessed with the following item: “Have you accessed any transgender-related medical interventions to affirm your gender (e.g., hormones, surgeries)?” (1 = yes
yes, no) followed by items asking about intervention types (hormones, chest surgery, abdominal surgery, genital surgery, other procedures). Non-prescription hormone use (yes, no), silicone use (yes, no). Visual gender-nonconforming (GNC) expression was assessed with the following item: “People can tell I’m transgender or gender nonconforming even if I don’t tell them.” This item was assessed on a 5-point Likert scale from 0 (never) to 4 (always). The item was coded into low GNC (never or occasionally), moderate GNC (sometimes), and high GNC (most of the time or always).

Healthcare utilization behaviors and experiences: Participants were asked when they had their last annual wellness visit to a doctor (within last year, within the last 1–2 years, within 3–5 years, 5+ years ago). Healthcare experiences in the last 12 months were queried, including: having to teach a doctor about transgender health in order to get appropriate care (yes, no), postponed or did not try to get medical care when needed it resulting in a medical emergency to the emergency room or urgent care clinic to get immediate help (yes, no), postponed healthcare when sick or injured (yes, no), postponed or did not try to get check-ups or other preventative medical care (yes, no), refused treatment or medical care (yes, no), and had one or more experiences of mistreatment or discrimination in healthcare (yes, no).

Social history, violence victimization, and social support: Respondents were asked about whether or not they were sexually active (yes, no), currently partnered (yes, no), had biological and/or adopted children (yes, no), had ever been homeless or unstably housed (yes, no), had ever engaged sex work or transactional sex for money, food, drugs, or other basic needs (yes, no), and had ever served in the military (yes, no). Violence victimization was assessed including: ever intimate partner violence (IPV) (“ever been slapped, punched, kicked, or otherwise physically or sexually hurt by your spouse (or former spouse), a boyfriend/girlfriend, or some other intimate partner”; yes, no); physical or sexual abuse as a child under age 15 (physical and/or sexual), coded as no abuse, yes both physical and sexual abuse, yes physical abuse only, yes sexual abuse only); and bullying in-person in childhood under age 18 (0 = Never to 4 = All the Time). Family support of gender was asked (“In general, how supportive of your gender identity or expression is your family?” 0 = Not at all supportive to 4 = very supportive). Social support was assessed including the number of close friends (people you can confide in) and number of close friends who are transgender.

Mental health: Internalized transphobia was assessed through a single-item question capturing the intersection of alienation and shame[46] (“I wish I was not transgender and/or gender nonconforming”, 1 = strongly disagree to 5 = strongly agree). Participants were asked whether they had ever in their lifetime engaged in self-harm (self-injurious behavior without suicidal intent; yes, no) and whether they had ever attempted suicide (yes, no). The validated 10-item short form of the Center for Epidemiologic Studies Depression Scale (CES-D-10) was used to screen respondents for past-week depression; participants were categorized as meeting current clinically significant depressive distress (yes score 10+, no score <10).[47] Respondents were asked whether a health professional had ever diagnosed them with depression, anxiety, PTSD, and/or gender identity disorder (GID)/gender dysphoria (GD). Response options were “1 = No, I don’t have this, 2 = Not sure if I have this, 3 = Yes, a health professional diagnosed me with this, 4 = Yes, I think I have this. Those indicating they had been diagnosed by a health professional were compared to all other categories (yes, no). Respondents were also asked about any mental health treatment utilization (e.g., individual psychotherapy, psychotropic medications) in the last 12 months (yes, no).

Substance use: Current smoking status was asked (“Currently, how often do you smoke cigarettes?” 0 = Not at all, 2 = Some days, 3 = Every day) and dichotomized as yes some days or every day vs. no not at all). Participants completed the AUDIT-C assessing for current alcohol use, with hazardous drinking indicated by AUDIT-C score 4+ (yes, no).[48] Past 12-month
illicit drug use was assessed using a check all that apply list. Two variables were operationa-
lized: any illicit drug use monthly or more frequently in the last 12 months, and two or more
illicit drugs used monthly or more frequently in the last 12 months. Participants were asked
whether they had ever in their lifetime received inpatient and/or outpatient substance abuse
treatment (yes, no).

Statistical analysis
SAS® version 9.4 statistical software was used for all data analyses. Univariate descriptive sta-
tistics were obtained for all variables of interest. Distributions of individual items were
assessed, including missingness. Because missingness violated assumptions required for
valid statistical inferences using listwise deletion, the data were multiply imputed.[49] A fully
conditional specification (FCS) imputation method was used.[50, 51] Five imputations with
accompanying appropriate diagnostics were conducted, including numerical summaries that
compared the observed and imputed datasets to identify any problems with imputed variables.
All subsequent statistical analyses were conducted using imputed data with appropriate
adjustments.

First, we examined sociodemographic characteristics associated with having a non-binary
vs. binary gender identity. Non-binary vs. binary status was regressed on each demographic
variable to estimate crude unadjusted odds ratios (OR) and 95% confidence intervals (95% CI).
Then a single multivariable model was fit with all sociodemographic variables simulta-
neously with non-binary (yes, no) as the outcome. Next, analyses compared non-binary to
binary transgender respondents across gender affirmation, healthcare utilization behaviors
and experiences, social history, violence victimization, and social support outcomes, and men-
tal health and substance use. For bivariate analyses, crude unadjusted regression models were
estimated with non-binary vs. binary gender as a statistical predictor of health and social out-
comes (logistic regression for binary variables, linear regression for continuous outcomes).
Logistic regression models estimated ORs and 95% CI for binary outcomes, and linear regres-
sion models calculated beta (β) with corresponding 95% confidence limits (95% CL) for con-
tinuous outcomes. A Poisson distribution was considered for several variables (e.g., bullying
frequency in childhood, number of close friends); however, model diagnostics favored a
Gaussian distribution.

Multivariable regression models were then fit with non-binary vs. binary as the main statis-
tical predictor of health and social outcomes, adjusted for the following control variables: age
(continuous), gender identity (trans masculine, trans feminine spectrum), race/ethnicity
(white, Black, Hispanic/ Latinx, Other, Mixed; ref = white), sexual minority (yes, no), low edu-
cation (high school diploma, college or above), low income (<$35K, $35K or above), health
insurance (public, private, other; ref = public). Survey mode (online, in-person) was treated as
a design covariate and modeled as a fixed effect in bivariate and multivariable analyses of
health and social outcomes. Adjusted OR (aOR) and 95% CI were estimated for binary out-
comes and adjusted beta (aβ) and 95% CL estimates for continuous outcomes. Variables are
presented in the tables for non-binary and binary respondents, as well as for the entire sample,
followed by comparisons of non-binary vs. binary respondents with bivariate and multivari-
able parameter estimates.

Results

Sample characteristics
The mean age of the sample was 32.6 (standard deviation = 12.8); 63% were trans masculine;
79.4% were white non-Hispanic/Latinx, 87.8% were sexual minorities (gay, lesbian, bisexual,
The sample was highly educated with 85.6% college or higher education; 54.3% were higher income earning $35K annually or above. The majority (65.5%) had private health insurance, and 79.6% were recruited online. Overall, 40.9% of respondents were non-binary.

**Demographic characteristics (Table 1)**

Compared to binary respondents, non-binary participants were significantly younger in age ($\beta = 0.97$; 95% CI = 0.96, 0.98), a higher proportion were trans masculine vs. trans feminine (aOR = 1.78; 95% CI = 1.43, 2.21) and identified as sexual minority vs. not (aOR = 11.95; 95% CI = 6.98, 20.45), a lower proportion were Black (aOR = 0.40; 95% CI = 0.19, 0.82) vs. white, had lower educational attainment vs. higher (aOR = 0.66; 95% CI = 0.49, 0.90), a higher proportion were current students (aOR = 1.31; 95% CI = 1.04, 1.65) and a lower proportion had

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**Table 1. Comparing the demographic characteristics of non-binary and binary transgender adults (N = 452).**

|                          | Non-Binary | Binary | Crude Models | Multivariable Models | Total Sample |
|--------------------------|------------|--------|--------------|----------------------|--------------|
|                          | N = 185, 40.9% | N = 267, 59.1% |               |                      | N = 452, 100.0% |
| Age in Years (18–75)     | Mean (SD)  | Mean (SD) | $\beta$ (95% CL) | p-value | Mean (SD) |
|                          | 28.95 (9.97) | 35.13 (13.83) | 0.96 (0.95, 0.97) | <0.0001 | 32.60 (12.76) |
| Gender Identity          | N %        | n %     | OR (95% CI)   | p-value | N %        |
| Trans Feminine           | 42 22.7    | 125 46.8 | Ref           | Ref     | 167 36.9   |
| Trans Masculine          | 143 77.3   | 142 53.2 | 2.80 (2.31, 3.38) | <0.0001 | 285 63.1   |
| Race/Ethnicity           |            |         |               |         |            |
| White                    | 151 81.6   | 208 77.9 | Ref           | Ref     | 359 79.4   |
| Black                    | 2 1.1      | 11 4.1   | 0.31 (0.16, 0.62) | 0.0009  | 0.40 (0.19, 0.82) | 0.013 | 13 2.9   |
| Hispanic/Latinx          | 16 8.7     | 27 10.1  | 1.11 (0.81, 1.52) | 0.523   | 0.98 (0.70, 1.37) | 0.891 | 43 9.5   |
| Other                    | 4 2.1      | 9 3.4    | 0.69 (0.40, 1.19) | 0.179   | 0.84 (0.47, 1.53) | 0.578 | 13 2.9   |
| Mixed                    | 12 6.5     | 12 4.5   | 1.45 (1.00, 2.11) | 0.052   | 1.17 (0.78, 1.77) | 0.451 | 24 5.3   |
| Sexual Orientation       |            |         |               |         |            |
| Not Sexual Minority      | 3 1.6      | 52 19.5  | Ref           | Ref     | 55 12.2    |
| Sexual Minority          | 182 98.4   | 215 80.5 | 13.94 (8.22, 23.66) | <0.0001 | 11.95 (6.98, 20.45) | <0.0001 | 397 87.8 |
| Education                |            |         |               |         |            |
| College or Higher        | 168 90.8   | 219 82.0 | Ref           | Ref     | 387 85.6   |
| High School or Below     | 17 9.2     | 48 18.0  | 0.47 (0.35, 0.64) | <0.0001 | 0.66 (0.49, 0.90) | 0.008 | 65 14.4   |
| Current Student          | 69 37.3    | 56 21.0  | 2.10 (1.74, 2.54) | <0.0001 | 1.31 (1.04, 1.65) | 0.022 | 125 27.6   |
| Income                   |            |         |               |         |            |
| High                     | 102 55.0   | 144 53.9 | Ref           | Ref     | 246 54.3   |
| Low                      | 83 45.0    | 123 46.1 | 1.06 (0.89, 1.26) | 0.510   | 1.07 (0.88, 1.31) | 0.502 | 206 45.7   |
| Health Insurance         |            |         |               |         |            |
| Public                   | 34 18.6    | 102 38.1 | Ref           | Ref     | 136 30.1   |
| Private                  | 140 75.5   | 156 58.5 | 2.39 (1.94, 2.93) | <0.0001 | 1.59 (1.24, 2.04) | 0.0003 | 296 65.5   |
| Other                    | 11 5.9     | 9 3.4    | 3.25 (2.10, 5.01) | <0.0001 | 2.72 (1.70, 4.37) | <0.0001 | 20 4.4   |
| Survey Mode              |            |         |               |         |            |
| Online                   | 172 93.0   | 188 70.4 | Ref           | Ref     | 360 79.6   |
| In-Person                | 13 7.0     | 79 29.6  | 0.41 (0.30, 0.54) | <0.0001 | 0.75 (0.53, 1.05) | 0.096 | 92 20.4 |

$\beta =$ Beta Coefficient. $\hat{\beta} =$ Adjusted Beta Coefficient. 95% CI = 95% Confidence Limit. OR = Odds Ratio. aOR = Adjusted Odds Ratio. 95% CI = 95% Confidence Interval. Crude Models include survey mode as a design covariate. Multivariable models are adjusted for age, gender identity, race/ethnicity, sexual orientation, education, income, health insurance, and survey mode. Bolded text indicates statistical significance at the alpha 0.05-level.

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queer). The sample was highly educated with 85.6% college or higher education; 54.3% were higher income earning $35K annually or above. The majority (65.5%) had private health insurance, and 79.6% were recruited online. Overall, 40.9% of respondents were non-binary.
Table 2. Comparing gender affirmation characteristics of non-binary and binary transgender adults (N = 452).

|                                | Non-Binary n = 185, 40.9% | Binary n = 267, 59.1% | Crude Models | Multivariable Models | Total Sample N = 452, 100.0% |
|--------------------------------|---------------------------|-----------------------|--------------|----------------------|-----------------------------|
|                                | Mean (SD)                 | Mean (SD)             | β (95% CL)   | p-value              | aβ (95% CL)  | p-value | Mean (SD) |
| Age of Transgender Realization (0–54) | 16.43 (8.33)             | 12.32 (8.59)          | 4.25 (3.53, 4.97) | <0.0001              | 3.64 (2.89, 4.41) | <0.0001 | 14.0 (8.72) |
| Social Gender Affirmation (Live Full-Time) | 125 67.4                  | 219 81.9              | 0.47 (0.39, 0.57) | <0.0001              | 0.37 (0.30, 0.47) | <0.0001 | 344 76.1 |
| Legal Name Change               | 29 15.7                   | 153 59.5              | 0.13 (0.11, 0.16) | <0.0001              | 0.13 (0.10, 0.16) | <0.0001 | 182 40.3 |
| Current and Future Medical Gender Affirmation |                      |                      |              |                      |               |         |
| Yes, Current                    | 50 27.0                   | 199 74.5              | Ref          | Ref                  | Ref           |         | 249 54.9 |
| No, But I Plan to               | 40 21.6                   | 45 16.9               | 3.72 (2.93, 4.72) | <0.0001              | 3.44 (2.65, 4.45) | <0.0001 | 85 18.8 |
| No, I Don’t Plan to             | 57 30.8                   | 6 2.2                 | 38.66 (25.80, 57.92) | <0.0001              | 56.65 (34.51, 92.99) | <0.0001 | 63 13.9 |
| Don’t Know                      | 24 13.0                   | 7 2.6                 | 15.64 (10.35, 23.64) | <0.0001              | 28.38 (16.93, 47.58) | <0.0001 | 31 6.9 |
| Missing                         | 14 7.6                    | 10 3.7                | 6.60 (4.46, 9.78) | <0.0001              | 6.37 (4.12, 9.85) | <0.0001 | 24 5.5 |
| Unable to Access Transition Related Care in Last 12 Mo | 30 16.2                   | 59 22.1              | 0.65 (0.52, 0.81) | <0.0001              | 0.51 (0.41, 0.65) | <0.0001 | 89 19.7 |
| Medical Interventions and Body Modification Procedures |                      |                      |              |                      |               |         |
| Hormones                       | 45 91.8                   | 196 98.5              | 0.06 (0.02, 0.18) | <0.0001              | 0.02 (0.04, 0.13) | <0.0001 | 241 97.2 |
| Non RX Hormones                | 9 4.9                     | 36 13.5               | 0.34 (0.24, 0.47) | <0.0001              | 0.38 (0.26, 0.55) | <0.0001 | 45 10.7 |
| Chest                          | 16 33.3                   | 76 38.2               | 0.74 (0.55, 0.99) | 0.047                 | 0.56 (0.39, 0.79) | 0.0009 | 92 37.1 |
| Abdominal                      | 3 6.1                     | 24 12.1               | 0.49 (0.25, 0.95) | 0.006                 | 0.38 (0.20, 0.71) | 0.003  | 27 10.9 |
| Genital                        | 2 4.1                     | 21 10.7               | 0.34 (0.17, 0.66) | 0.002                 | 0.73 (0.36, 1.51) | 0.402  | 23 9.3 |
| Other Procedure                | 4 8.3                     | 15 7.6                | 1.04 (0.62, 1.75) | 0.875                 | 3.04 (1.62, 5.70) | 0.0005 | 19 7.7 |
| Silicone                       | 1 0.5                     | 5 1.9                 | 0.38 (0.14, 1.00) | 0.051                 | 0.90 (0.28, 2.85) | 0.854  | 6 1.3 |
| Visual Nonconformity            |                         |                      |              |                      |               |         |
| Low                            | 70 37.8                   | 160 59.8              | Ref          | Ref                  | Ref           |         | 230 50.9 |
| Moderate                       | 65 35.2                   | 68 25.6               | 2.07 (1.70, 2.52) | <0.0001              | 1.84 (1.48, 2.28) | <0.0001 | 133 29.4 |
| High                           | 50 27.0                   | 39 14.6               | 3.04 (2.42, 3.83) | <0.0001              | 2.84 (2.21, 3.65) | <0.0001 | 89 19.7 |

β = Beta Coefficient. aβ = Adjusted Beta Coefficient. 95% CL = 95% Confidence Limit. OR = Odds Ratio. aOR = Adjusted Odds Ratio. 95% CI = 95% Confidence Interval. Crude Models include survey mode as a design covariate. Multivariable models are adjusted for age, gender identity, race/ethnicity, sexual orientation, education, income, health insurance, and survey mode. Bolded text indicates statistical significance at the alpha 0.05-level. The denominator for medical interventions and body modification procedures is the number who report current medical gender affirmation (n = 50 non-binary, n = 199 binary, n = 249 total).

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Gender affirmation (Table 2)

Compared to binary respondents, non-binary respondents recognized themselves as transgender and/or gender nonconforming at older ages (aβ = 3.64; 95% CL = 2.89, 4.41; Table 2). A significantly lower proportion had socially affirmed their gender (i.e., lived full-time: aOR = 0.37; 95% CI = 0.30, 0.47) and legally changed their name (aOR = 0.13; 95% CI = 0.10, 0.16). The distribution of current and future medical gender affirmation in non-binary participants was 27.0% currently affirmed their gender (referent group), 21.6% had plans to, 30.8% did not plan to, and 13.0% did not know yet (each of these proportions was significantly higher relative to currently having medically affirmed vs. binary participants). Among participants who had currently medically affirmed their gender, a lower proportion of non-binary vs. binary respondents accessed hormones in general, and non-prescription hormones specifically, as well as private (aOR = 1.59; 95% CI = 1.24, 2.04) or “other” health insurance (aOR = 2.72; 95% CI = 1.70, 4.37) vs. public (see Table 1).
A lower proportion of non-binary vs. binary respondents reported having been unable to access transition-related care in the last 12 months (aOR = 0.51; 95% CI = 0.41, 0.65). Non-binary participants had higher levels of gender nonconformity (moderate vs. low: aOR = 1.84; 95% CI = 1.48, 2.28; and high vs. low: aOR = 2.84; 95% CI = 2.21, 3.65).

### Healthcare utilization behaviors and experiences (Table 3)

The proportion of non-binary respondents reporting longer time since last seeing a doctor for an annual wellness visit was significantly higher than for binary people and comparing within the last 12 months to two years (aOR = 2.58; 95% CI = 2.00, 3.35), five years (aOR = 3.08; 95% CI = 2.09, 4.54), and five years or longer (aOR = 7.14; 95% CI = 3.89, 13.08) (see Table 3). Relative to binary respondents, a lower proportion of non-binary respondents reported having to teach their doctor about transgender people to get appropriate care (aOR = 0.61; 95% CI = 0.49, 0.75).

### Social history, violence victimization, and social support (Table 4)

Non-binary respondents had decreased odds of being sexually active (aOR = 0.73; 95% CI = 0.56, 0.94) and increased odds of having ever been homeless (aOR = 1.34; 95% CI = 1.07, 1.67) relative to binary respondents (Table 4). No differences were found in relationship status, parental status, and previously or currently being in the military. A significantly lower proportion of non-binary respondents reported lifetime IPV vs. binary respondents (aOR = 0.80; 95% CI = 0.65, 0.97); no other statistically significant differences in violence victimization were

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Table 3. Healthcare utilization behaviors and experiences of non-binary and binary transgender adults (N = 452).

| Last Annual Wellness Visit | Non-Binary n = 185, 40.9% | Binary n = 267, 59.1% | Crude Models | Multivariable Models | Total Sample N = 452, 100.0% |
|----------------------------|---------------------------|----------------------|--------------|---------------------|-----------------------------|
|                            | n | % | n | % | OR (95% CI) | p-value | aOR (95% CI) | p-value | N | % |
| Within 1 Year              | 100 | 57.8 | 213 | 81.9 | Ref | Ref | 313 | 72.3 |
| Within 2 Years             | 44 | 25.4 | 30 | 11.5 | 2.96 (2.34, 3.74) | <0.0001 | 2.58 (2.00, 3.35) | <0.0001 | 54 | 17.1 |
| Within 5 Years             | 19 | 11.0 | 10 | 3.9 | 3.82 (2.67, 5.47) | <0.0001 | 3.08 (2.09, 4.54) | <0.0001 | 29 | 6.7 |
| 5 Years or Longer          | 10 | 5.8 | 7 | 2.7 | 5.16 (3.04, 8.78) | <0.0001 | 7.14 (3.89, 13.08) | <0.0001 | 17 | 3.9 |
| Missing n = 39             | | | | | | |

Healthcare Experiences, Last 12 Months

| Had to Teach Doctor to Obtain Appropriate Medical Care | 46 | 24.9 | 87 | 32.6 | 0.66 (0.54, 0.79) | <0.0001 | 0.61 (0.49, 0.75) | <0.0001 | 133 | 29.4 |
| Postponed Care Resulting in Emergency Room or Urgent Care Medical Visit | 20 | 10.8 | 28 | 10.5 | 0.98 (0.75, 1.29) | 0.886 | 1.01 (0.74, 1.36) | 0.974 | 48 | 10.6 |
| Postponed Medical Care When Sick or Injured | 36 | 19.5 | 51 | 19.1 | 0.96 (0.77, 1.19) | 0.699 | 0.79 (0.62, 1.00) | 0.052 | 87 | 19.2 |
| Postponed Routine Preventive Care | 49 | 26.5 | 56 | 20.9 | 1.24 (1.02, 1.52) | 0.032 | 0.87 (0.70, 1.09) | 0.219 | 105 | 23.2 |
| Refused Treatment | 10 | 5.4 | 14 | 5.2 | 1.00 (0.69, 1.46) | 0.997 | 0.92 (0.61, 1.39) | 0.691 | 24 | 5.3 |
| Experienced Discrimination in a Healthcare Setting | 48 | 26.0 | 68 | 25.2 | 1.03 (0.85, 1.25) | 0.765 | 1.10 (0.89, 1.37) | 0.369 | 116 | 25.7 |

OR = Odds Ratio. aOR = Adjusted Odds Ratio. 95% CI = 95% Confidence Interval. Crude Models include survey mode as a design covariate. Multivariable models are adjusted for age, gender identity, race/ethnicity, sexual orientation, education, income, health insurance, and survey mode. Bolded text indicates statistical significance at the alpha 0.05-level.

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observed. Non-binary respondents had lower levels of family support for their gender than binary respondents ($\beta = -0.26$; 95% CI = -0.36, -0.16); no significant differences were found in the number of friends or transgender friends.

**Mental health and substance use (Table 5)**

Compared to binary respondents, non-binary respondents had lower levels of internalized transphobia ($\beta = -0.26$; 95% CI = -0.38, -0.14; Table 5). Non-binary respondents also had decreased odds of lifetime self-harm (aOR = 0.76; 95% CI = 0.63, 0.92), diagnosis of anxiety (aOR = 0.56; 95% CI = 0.47, 0.68), diagnosis of depression (aOR = 0.83; 95% CI = 0.69, 0.99), and diagnosis of GID/ GD (aOR = 0.72; 95% CI = 0.55, 0.96) relative to binary respondents. Despite having increased odds of clinically significant depressive distress in the last 7 days (aOR = 1.42; 95% CI = 1.14, 1.77) relative to binary respondents, non-binary respondents had decreased odds of receiving any mental health treatment in the last 12 months (aOR = 0.75; 95% CI = 0.62, 0.91). For substance use, non-binary respondents had an increased odds of a positive AUDIT screen for hazardous alcohol use (aOR = 1.24; 95% CI = 1.01, 1.52) relative to binary respondents.
Discussion

In this community-recruited sample of transgender and gender nonconforming adult respondents in Massachusetts, 40.9% identified their gender identity as non-binary, a proportion of the sample comparable to other research with transgender people in the U.S.[11] Consistent with hypotheses, described in detail below, differences were found by participant demographics, gender affirmation status, mental health, substance use, social history, violence/victimization, and social support for non-binary and binary respondents. Findings suggest that gender diversity in transgender people, specifically, whether a person has a self-identified, non-binary or binary gender identity, is an important consideration for transgender health research and clinical care. Findings add to the nascent health research literature about the social and health status of non-binary people.[10] Gender identity measures that include binary and non-binary response options are recommended to inform future research and clinical care with transgender populations.

In the statewide sample of transgender adults, a number of socio-demographic differences were found between non-binary and binary participants. As expected, on average, non-binary participants were younger in age than binary respondents, consistent with other research.[11, 14] Gender differences also emerged, such that a higher proportion of non-binary vs. binary adults were trans masculine rather than trans feminine (e.g., assigned a female sex at birth compared to male sex)–a finding which aligns with previous research.[14, 52] This difference may, at least in part, reflect how gender non-conformity is more socially acceptable for individuals assigned a female sex at birth than those with a recorded male birth sex.[53, 54] The

### Table 5. Comparing mental health and substance use for non-binary and binary transgender adults (N = 452).

|                        | Non-Binary n = 185, 40.9% | Binary n = 267, 59.1% | Crude Models | Multivariable Models | Total Sample N = 452, 100.0% |
|------------------------|---------------------------|-----------------------|--------------|----------------------|-----------------------------|
|                        | Mean (SD)                 | Mean (SD)             | β (95% CL)   | p-value              | aβ (95% CL)                 | p-value | Mean (SD) |
| **Mental Health**      |                           |                       |              |                      |                            |         |           |
| Internalized Transphobia (Wish Not Transgender) (0–4) | 2.41 (1.11)            | 2.74 (1.32)            | -0.35 (-0.46, -0.23) | <0.0001             | -0.26 (-0.38, -0.14)      | <0.0001 | 2.61 (1.25) |
| Self-Harm, Lifetime    | 93                        | 50.2                  | 152          | 46.8                 | 1.11 (0.93, 1.31)          | 0.245   | 0.76 (0.63, 0.92) |
| Suicide Attempt, Lifetime | 59                     | 31.9                  | 90           | 33.7                 | 0.97 (0.81, 1.16)          | 0.732   | 1.20 (0.98, 1.46) |
| Depression CES-D-10, Past 7 Days | 48             | 25.9                  | 59           | 22.1                 | 1.20 (0.99, 1.47)          | 0.068   | 1.42 (1.14, 1.77) |
| Depression Diagnosis, Lifetime | 85             | 46.0                  | 128          | 47.9                 | 0.93 (0.78, 1.10)          | 0.376   | 0.83 (0.69, 0.99) |
| Anxiety Diagnosis, Lifetime | 70             | 37.8                  | 120          | 44.9                 | 0.75 (0.63, 0.90)          | 0.001   | 0.56 (0.47, 0.68) |
| PTSD Diagnosis, Lifetime | 39            | 21.1                  | 59           | 22.1                 | 0.96 (0.78, 1.18)          | 0.706   | 0.98 (0.78, 1.23) |
| GID/ GD Diagnosis, Lifetime | 22            | 11.9                  | 34           | 12.7                 | 0.93 (0.72, 1.20)          | 0.563   | 0.72 (0.55, 0.96) |
| Any Mental Health Treatment, Last 12 Months | 76             | 41.3                  | 129          | 48.3                 | 0.79 (0.67, 0.94)          | 0.007   | 0.75 (0.62, 0.91) |
| **Substance Use**      |                           |                       |              |                      |                            |         |           |
| Current Smoker         | 73                        | 39.5                  | 94           | 35.2                 | 1.25 (1.05, 1.48)          | 0.014   | 1.10 (0.91, 1.34) |
| AUDIT-C Hazardous Drinking | 72            | 44.7                  | 92           | 38.3                 | 1.25 (1.04, 1.50)          | 0.016   | 1.24 (1.01, 1.52) |
| Any Illicit Drug, Last 12 Mo | 83            | 44.9                  | 111          | 41.6                 | 1.19 (1.00, 1.41)          | 0.051   | 1.13 (0.94, 1.37) |
| Two or More Illicit Drugs, Last 12 Mo | 33            | 17.8                  | 43           | 16.1                 | 1.18 (0.94, 1.47)          | 0.158   | 1.22 (0.95, 1.56) |
| Substance Abuse Treatment, Lifetime | 14           | 7.6                   | 31           | 11.6                 | 0.66 (0.50, 0.91)          | 0.010   | 1.05 (0.75, 1.48) |

OR = Odds Ratio. aOR = Adjusted Odds Ratio. 95% CI = 95% Confidence Interval. Crude Models include survey mode as a design covariate. Multivariable models are adjusted for age, gender identity, race/ethnicity, sexual orientation, education, income, health insurance, and survey mode. Bolded text indicates statistical significance at the alpha 0.05-level.

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overwhelming majority of non-binary respondents (98.4%) self-identified as having a sexual minority sexual orientation, which is also consistent with findings from other research.[11, 32] This substantial overlap between non-binary gender and sexual minority status is intriguing and supports the conceptualization that “non-traditional” gender identities (i.e., outside the gender binary) and sexual orientation are distinct yet interrelated constructs. More research is needed to understand the terms non-binary people use to describe and identify their sexual orientation identity, as well as the processes of gender identity and sexual orientation identity development.

Genderqueer and other non-binary identity terms have been critiqued for disproportionately representing the experiences of white non-Hispanic/Latinx people and more highly educated and better-resourced subgroups of transgender people.[13] Consistent with these critiques, we found that a lower proportion of non-binary participants were people of color and a higher proportion of participants were more highly educated as well as current students. Additionally, while no significant differences emerged by gender identity in terms of income level, non-binary individuals did have a higher frequency of private and “other” health insurance compared to binary respondents. It is possible that white transgender people and those with higher SES may be afforded the privilege to live outside the gender binary and thus be more likely to utilize non-binary identity terms. Gender identity terms and gender expression may also differ by race and class,[45] and thus is possible that a higher proportion of low SES transgender individuals and people of color actually live outside the gender binary but do not use non-binary identity terms such as genderqueer or gender fluid. Mixed methods research is needed to further explore socio-demographic differences according to gender identity as well as expression.

In the present sample, hypothesized differences were also found with respect to gender affirmation. On average, non-binary participants realized they were transgender at an older mean age than binary respondents, potentially suggesting a different developmental trajectory and age pattern of gender identity self-recognition. This finding, while aligning with previous research,[52] is particularly striking given that non-binary respondents were younger, on average, than binary respondents. Further, a significantly lower proportion of non-binary vs. binary respondents had socially, legally, and medically affirmed their gender, which is consistent with findings from other research.[11, 52] Still, more than one-fourth (27.0%) of non-binary participants had medically affirmed their gender, with 21.6% planning to pursue medical gender affirmation and 30.8% not planning to pursue it. More than 1 in 10 (13.0%) non-binary participants were not sure whether or not they planned to access medical gender affirmation in the future. Among those who had accessed medical gender affirmation, a significantly lower proportion of non-binary vs. binary respondents reported non-prescription hormone use (4.9% vs. 13.5%). The heightened use of non-prescription hormone use among binary participants may be reflected by the fact that 22.1% of binary participants reported being unable to access transition-related care in the last 12 months, a proportion significantly higher than for non-binary respondents (16.2%). These findings are consistent with prior research suggesting that transgender individuals may use non-prescription hormones when unable to access care through a healthcare provider.[55] The heterogeneity of medical affirmation desires and utilization underscores the importance of ensuring access to care for all transgender individuals, as well as individualized and patient-centered care by gender identity subgroups. Developing clinical tools that will facilitate delivering patient-centered care is important to meeting the gender affirmation needs of diverse transgender adults, including non-binary individuals.[56]

As hypothesized, differences were also observed in some areas of healthcare utilization according to gender identity. Specifically, non-binary participants had increased odds of not
having an annual wellness visit for primary care within the last two or more years, indicating lower levels of routine healthcare engagement. Contrary to hypotheses, a lower proportion of non-binary respondents reported having to teach their doctor or provider about transgender people in order to get appropriate care (24.9% vs. 32.6%), relative to binary participants. The USTS found that 84% of binary individuals reported discussing their gender identity with their healthcare provider, relative to 52% of non-binary respondents. Given the USTS findings and the fact that non-binary participants in the present study were less likely to access medical gender affirmation than binary participants, it may be that non-binary individuals do not feel the need to disclose their identity to providers, therefore limiting the need to educate their provider about transgender or non-binary people. However, non-binary individuals were significantly more likely to be visually gender nonconforming than binary participants, thus it is likely that providers observed their patients’ visual nonconformity, which may help to explain the lack of significant differences between binary and non-binary participants with respect to other aspects of healthcare utilization. For example, the rates of postponing healthcare and experiencing discrimination in the past 12 months were nearly equal for non-binary and binary participants (e.g., experiencing mistreatment in healthcare 26.0% vs. 25.2%; being refused healthcare 5.4% vs. 5.2%; and postponing care when sick or injured 19.5% vs. 19.1%).

Differences in social history and social support were not anticipated by gender identity; however, several key differences did emerge. Non-binary participants were more likely to have ever been homeless/unstably housed than binary individuals, which may be explained by the fact that non-binary participants also had lower levels of support from family regarding their gender identity than binary respondents. These findings are consistent with the USTS, which found that the prevalence of homelessness was substantially higher among respondents whose immediate family had kicked them out of the house, with nearly three-quarters (74%) of these respondents experiencing homelessness. While family rejection was higher for non-binary participants in the present sample, contrary to what was anticipated, no significant differences were found in the prevalence of childhood sexual abuse, bullying, lifetime physical and sexual assault, or relevant protective factors such as number of close friends. Indeed, non-binary participants did report significantly lower lifetime experiences of IPV relative to binary participants, which could be explained in part by the finding that non-binary individuals were less likely to be sexually active, though no differences were found according to current relationship status. Additional research examining health risk trajectories and protective factors across the life-course is needed to contextualize experiences of victimization and support among transgender individuals by gender identity subgroup.

Finally, mental health and substance use outcomes differed by gender identity, albeit differently than hypothesized. In terms of mental health, non-binary participants were less likely to report lifetime self-harm, which may be explained by the significantly lower prevalence of internalized transphobia experienced by non-binary participants relative to binary participants. Non-binary individuals in this sample were also less likely than binary individuals to
have been diagnosed with depression and anxiety by a healthcare provider. The lower prevalence of depression and anxiety diagnoses among non-binary participants in the study likely reflects differential access to opportunities to receive a medical diagnosis as, consistent with other studies,[8, 11, 57] a significantly higher proportion of non-binary screened-in for current clinically significant depressive distress, yet were less likely to have received mental health care treatment in the last 12 months relative to binary individuals. Additionally, a higher proportion of non-binary vs. binary respondents screened positive for hazardous drinking, which may in part be due to the younger age of the non-binary respondents. However, elevated hazardous drinking may also suggest an attempt to self-medicate, particularly in light of this subpopulation’s lower engagement in behavioral healthcare. Findings suggest a potential unmet need for mental/behavioral healthcare services for non-binary transgender people, particularly in the context of current depressive distress and problematic alcohol use. Efforts may be needed to increase screening for current mental/behavioral health problems in clinical care settings, including in community-based healthcare centers with large transgender patient panels.

Findings from this study should be interpreted in light of several limitations. Non-probability sampling methods were used; thus, results are likely not generalizable to other states or geographic locales. The cross-sectional nature of these data means that results are associational only; findings require replication in other studies with different study designs (e.g., longitudinal) to overcome the limitations of these data. Additionally, the current study was not able to look at multiple gender identity groupings and permutations; future research might pursue this line of work to consider intersectional identities. Due to sample size limitations, it was not possible to stratify models by gender identity spectrum (e.g., as trans masculine vs. trans feminine) in considering non-binary vs. binary health; however, all multivariable models were adjusted for gender identity spectrum. For some health indicators, the association of non-binary status and health may be moderated by gender identity spectrum. Future research is needed with larger sample sizes in order to test for effect modification by assigned sex at birth for non-binary health associations. Additionally, one of the criteria for inclusion in this study was being transgender and/or gender nonconforming. This way of operationalizing the study sample differs quite dramatically from other approaches, particularly those that use clinical diagnostic thresholds for gender dysphoria.[58] It may be that non-binary respondents were more likely to identify as gender nonconforming than transgender, and may not have selected into a study of transgender people only. Unfortunately, we did not collect data that would allow us to answer this question. Future research would benefit from an understanding of how the population definition influences non-binary people’s participation.

The present study used a two-step method for gender identity whereby participants were asked to select a single response option that best described their current gender identity, and were subsequently categorized as non-binary and binary. The two-step method is recommended to capture transgender status based on current gender identity and sex assigned at birth.[45] The method was developed to identify transgender respondents and enable between-group comparisons of transgender and cisgender for population health surveys. Findings from the current study demonstrate that the two-step method can also be applied to characterize within-group differences among transgender people, such as this study where we compared the health of non-binary and binary transgender identity groups. Formal validation testing of the two-step method for capturing non-binary vs. binary gender identities has not, to our knowledge, been conducted. However, a cognitive testing study of the two-step method did find that non-binary respondents most frequently checked the response option “do not identify as male, female, or transgender”, rather than male, female, or transgender response options.[59] Given the high proportion of non-binary individuals in this sample, and in other
recent research with transgender people,[11] the use of the two-step method is recommend with response options that will allow for non-binary identities to be categorized. This might include a response option of “genderqueer” or “non-binary”, in addition to “transgender man” or “transgender woman”; or it may be “do not identify as male, female, or transgender.” Another option, if skip patterns are possible, would be to ask individuals who self-identify as transgender subsequent questions about their specific gender identity. While this method is recommended for all research assessing gender identity, it should be noted that transgender individuals might identify as multiple gender categories (i.e., as trans men and non-binary). Participants in the present study were not given the option to “check all that apply” for gender identity; however, future work with this population should consider providing respondents with two gender identity questions that include a forced (“pick the best one”) and “check all that apply” option in order to assess the range of possible identity categories endorsed by transgender populations.

Limitations notwithstanding, this study provides much-needed data about non-binary people and compares the health and social history of this group to binary-identified transgender adults, motivated by minority stress frameworks.[15–17] The growing recognition that gender diversity does not equate to gender pathology is bringing medical care for transgender people into the “mainstream.” Primary care, general internal medicine, and family practice physicians need more epidemiological knowledge and information to manage the diverse clinical presentations they see in practice with transgender patients.[12, 20] Implementing informed consent protocols for treatment will bring physicians into greater contact with transgender patients, including those who present with diverse gender identities and presentations.[60] Demographic measures of gender identity that include binary and non-binary response options are recommended to inform future research and clinical care with transgender populations.

What is already known on this subject?
Transgender health research and epidemiology has yet to consider whether people who identify as non-binary have different health profiles than those endorsing a binary gender identity. These data are urgently needed to guide public health efforts and inform clinical care responsive to the lived experiences of diverse transgender people.

What this study adds?
Non-binary people differ on key demographic, social, and health indicators than binary-identified transgender people. Gender diversity is an important consideration for transgender health. Demographic measures of gender identity that include binary and non-binary response options are recommended to inform future public health research and clinical care.

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