Australian Government

Department of Health

Consultation Survey on MSAC Application 1754

Patient consultations and surgical procedures for gender affirmation in adults with gender incongruence

MSAC welcomes input on MSAC applications for public funding from individuals, organisations representing health professionals or consumers and/or carers, and from other stakeholders. Please use this template to prepare your input. You may also attach additional information if you consider it may be useful in informing MSAC and its sub-committees.

Sharing consultation input

Submitted consultation input will be routinely shared with the applicant and with MSAC and its sub-committees.

- The applicant will receive a summary of comments from individuals, with the individual's name and other identifying information removed.
- MSAC and its sub-committees will receive both the summary and copies of the comments, with the name of the individual and other identifying information removed.
- Consultation input from groups or organisations will be provided in a complete form to both the applicant and to MSAC and its sub-committees.

Consultation input may also be shared with HTA Assessment Groups from time to time to inform their reports to MSAC or with state and territory health representatives where the application is for a service to be delivered through public hospitals. Please do not include information in your input that you do not want shared as outlined above. In addition, to protect privacy, do not include identifying personal (e.g., name) or sensitive (e.g., medical history) information about third parties, such as medical professionals or friends/relatives.

How consultation input is used

MSAC and its sub-committees consider consultation input when appraising an application, including to better understand the potential impact of the proposed medical technology/service on consumers, carers, and health professionals. A summary of consultation input will be included in the Public Summary Document (PSD) published on the MSAC website once MSAC has completed its appraisal. The PSD may also cite input from groups/organisations, including the name of the organisation. As such, organisations should not include information or opinions in their consultation input that they would not wish to see in the public domain.

Consultation deadlines. Please ensure that your consultation input is submitted by the pre-PASC or pre-MSAC consultation deadline for this application. Consultation deadlines for each PASC and MSAC meeting are listed in the PASC, ESC, MSAC key dates available on the MSAC website. They are also published in the MSAC Bulletin. Consultation input received after the respective deadlines may not be considered.

For further information on the MSAC consultation process please refer to the MSAC Website or contact the Consumer Evidence and Engagement Unit on email: commentsMSAC@health.gov.au.
Thank you for taking the time to provide consultation input. Please return your completed survey to:

Email: commentsMSAC@health.gov.au

Mail: MSAC Secretariat,
MDP 960, GPO Box 9848,
ACT 2601.

PART 1 – PERSONAL AND ORGANISATIONAL INFORMATION

1. Respondent details

Name: [redacted] MPH, [redacted] CCRN, [redacted] MSW, Dr [redacted] PhD, Assoc Prof [redacted] MBBS (Hons), FRACP, PhD

Email: s47F

Phone No: [redacted]

2. Is the feedback being provided on an individual basis or by a collective group?

☐ Individual
☒ Collective Group

If an individual, specify the name of the organisation you work for

If a collective group, specify the name of the group

Trans Health Research

3. How would you best identify yourself?

☐ General Practitioner
☒ Specialist
☒ Researcher
☒ Consumer
☒ Care giver
☒ Other

If other, please specify

Public health and social policy professionals

PART 2 – CLINICAL NEED AND PUBLIC HEALTH SIGNIFICANCE

4. Describe your experience with the medical condition (disease) and/or proposed intervention and/or service relating to the application summary.

Trans Health Research's peer-reviewed research publications have consistently and unequivocally observed a link between the unmet need and lack of access to safe gender affirming surgery, and poor mental, physical, and social health outcomes. This has been established internationally and validated through our, and others, observations in the Australian context.

The team at Trans Health Research see the proposal not as a question of the potential beneficial actuarial, physical, or social outcomes for trans and gender diverse (trans) Australians despite the use of these statistics in our response. However, we do acknowledge the proposals' purpose; to provide parity and equity to trans people in Australia in access and provision of safe, evidence-based healthcare.

Trans Health Research are a research group within the Department of Medicine at The University of Melbourne. Our team is based at Austin Health, a teaching hospital affiliated with the University, located in Heidelberg, Melbourne. Our team includes trans men, trans women, non-binary people, and cisgender allies. We are nurses, endocrinologists, social workers, and trans researchers with community experience.

Trans Health Research conducts research with one goal: to provide robust evidence to improve the health and wellbeing of the trans community. Every question we ask, every project that we do, every collaboration that we start, is aligned with our goal, and must translate to better health and advocacy for our community. Our findings guide health and wellbeing programs, treatment guidelines, and health policy, to enable trans people to live a life without barriers and discrimination.

While trans health research is our core focus, as a leading trans health research group in Australia and authors of national gender-affirming hormone therapy guidelines, we are also advocates and passionate speakers, and we provide education and training in trans health to government representatives, health professionals, and community organisations nationwide.

Our research findings have been translated into policy and have contributed to government investment in two new multidisciplinary gender clinics in Victoria, and a state-wide training program for health professionals in trans health.

The authors:

[redacted] s47F

5. **What do you see as the benefit(s) of the proposed medical service, in particular for the person involved and/or their family and carers?**

Benefit: improved mental health, wellbeing & quality of life.

Access to gender affirming surgeries and the creation of for-purpose MBS codes will lead to an improvement in mental health and wellbeing for trans people accessing the medical service and related care (the intervention). Specifically, evidence strongly suggests that access to the intervention will result in reduced rates of depression, reduced risk of suicide and rates of suicidality, and improved quality of life.

Our previous research has shown that trans Australians face significant barriers to general and gender-affirming healthcare (Bretherton et al DOI:10.1089/lgbt.2020.0178; Zwickl et al, DOI: 10.3390/ijerph16245088).

Barriers to, or delays in access to gender affirming surgery are associated with increased risk of suicidality. Our research shows that wanting gender-affirming surgery in the future (but not having had it yet) is associated with a 71% higher odds of lifetime risk of suicide attempt (Zwickl et al https://doi.org/10.1186/s12888-021-03084-7). Additionally, cancelled or postponed of gender-affirming surgery due to COVID-19 disruptions, was associated with 56% higher odds of thoughts of self-harm or suicide (Zwickl et al https://doi.org/10.1080/26895269.2021.1890659).

Australian and international research consistently demonstrates that access to gender affirming surgery for those who desire it, is associated with reductions in depression, suicidality, and gender dysphoria, and improvements in quality of life. Our own research agrees with this conclusion, see: Zwickl et al. doi:10.1186/s12888-021-03491-w, Zwickl et al. doi:10.1080/26895269.2021.1890659.

Benefit: will improve access to address the significant unmet demand for gender affirming surgeries.

s471(a)(b) [redacted]

6. **What do you see as the disadvantage(s) of the proposed medical service, in particular for the person involved and/or their family and carers?**

We do not see any disadvantage to anyone involved, directly or indirectly.

7. **What other benefits can you see from having this intervention publically funded?**

A cost-effectiveness analysis (CEA) conducted in the USA compared the cost of state insurance coverage for medically necessary gender affirming care (which included but was not limited to gender affirming surgeries among the intervention costed) compared to the status quo – a denial of health coverage. Health states modelled for the non-intervention scenarios included an increased risk of depression, suicidality and suicidal ideation, death by suicide (premature death), harmful and/or dependent patterns of alcohol and/or drug use, unemployment, and HIV. In an Australian context, with exception of HIV, the health states experienced in the no-intervention scenarios would be similar even though prevalence and incidence between US and Australian populations is different. Taking a US societal perspective, the CEA found that funding coverage for medically necessary gender affirming care was cost-effective compared to the cost of refusal of coverage, over a ten-year horizon (Padula et al. DOI: 10.1007/s11606-015-3529-6).

Internationally, there is limited published literature of cost-effectiveness analysis and a health economic evaluation of medically necessary gender affirming care in the Australian context has never been conducted. However, we can make some informed assumptions that public funding of the proposed intervention will result in cost-savings to government, namely:
Health costs averted: reduced costs of psychological, psychiatric, and mental health care from reduced rates of depression, suicidality, and suicidal thoughts; related alcohol and drug treatment and care; among people receiving the intervention.
Social security costs averted: reduction in government transfers to individuals from increased rates of employment among people receiving the intervention.
Tax revenue protected: mitigates tax foregone because of premature death through reduced mortality rates, in addition to additional tax revenue from higher rates of employment among people receiving the intervention.
While not currently quantified, it is likely that the cost of the intervention is more cost-effective than not funding the intervention due to higher costs associated with the utility of probable negative health and social outcomes.

8. **What other services do you believe need to be delivered before or after this intervention, e.g. Dietician, Pathology etc?**

Due to the variability of proposed interventions, this is difficult to answer.
Speech pathology, physiotherapy, occupational therapy, counselling, nursing, pharmacy, and pathology may be involved either pre or post intervention.

PART 3 – INDICATION(S) FOR THE PROPOSED MEDICAL SERVICE AND CLINICAL CLAIM

9. **Do you agree or disagree with the proposed population(s) for the proposed medical service?**

- [x] Strongly Agree
- [ ] Agree
- [ ] Disagree

☐ Strongly Disagree

Specify why or why not:

The proposed medical service is suitable only for trans individuals – binary and non-binary – who experience gender incongruence and seek to remedy incongruence by accessing gender affirming surgery or surgeries. As stated in the PICO Set, not all trans people desire or seek gender affirming surgery/ies.

10. Have all the associated interventions been adequately captured in the application summary?

☒ Yes
☐ No

Please explain:

The proposed medical service and associated interventions are captured and supported by the evidence presented in the PICO set and our research outlined above. The amendment of existing MBS items will also address the significant unmet need for gender affirming surgery, by increasing access to patient consultation and multidisciplinary care planning items.

11. ☒ Do you agree or disagree that the comparator (s) to the proposed medical service?

Strongly Agree
☐ Agree
☐ Disagree
☐ Strongly Disagree

Please explain:

MBS codes and services currently utilised for consulting and providing medically necessary gender affirming surgeries are not fit for purpose. Existing MBS codes create uncertainty and inconsistency for health care practitioners and individuals. In addition, there is a real risk of harm for trans people if the current MBS codes were to persist in use, likely contributing to gender dysphoria for some individuals.

12. Do you agree or disagree with the clinical claim made for the proposed medical service?

☒ Strongly Agree
☐ Agree
☐ Disagree
☐ Strongly Disagree

Specify why or why not:

We do not see why there should be any differentiation between parties who have undertaken gender affirmation through MBS for-purpose item numbers and those funded through existing non-gender affirmation numbers or private out of pocket expenses.

PART 4 – COST INFORMATION FOR THE PROPOSED MEDICAL SERVICE

13. **Do you agree with the proposed service descriptor?**

- ☐ Strongly Agree
- ☐ Agree
- ☐ Disagree
- ☐ Strongly Disagree

Specify why or why not:

Trans Health Research will not comment as we do not hold any expertise in this area.

14. **Do you agree with the proposed service fee?**

- ☐ Strongly Agree
- ☐ Agree
- ☐ Disagree
- ☐ Strongly Disagree

Specify why or why not:

Trans Health Research will not comment as we do not hold any expertise in this area.

PART 5 – ADDITIONAL COMMENTS

15. Do you have any additional comments on the proposed intervention and/or medical condition (disease) relating to the proposed medical service?

The out-of-pocket cost for individuals accessing gender affirming surgery is a significant barrier to access. Experiences of unemployment, chronic health conditions, disability, neurodivergence, and mental health concerns, coupled with experiences of discrimination, stigma, prejudice, and vilification compound the earning potential of many trans people, which can result in people postponing surgeries or turning to mutual aid such as crowdfunding surgeries. Some community sources suggest that even with the highest level of private health insurance, there is still a significant gap in costs between what is charged and what is reimbursed. From a health equity perspective, there are few health conditions that require fundraising to meet the costs of medically necessary treatment.

While we acknowledge the limitations of MSAC in setting prices for specialists, we are concerned that only those who will be able to afford the intervention will be able to access the intervention, if access is primarily restricted to the private health system. Therefore, an individual's income, education attainment, and employment may predict uptake of the intervention, leaving an unmet need among some trans people.

Do you have any comments on this feedback survey? Please provide comments or suggestions on how this process could be improved.

The template formatting has been problematic to edit. We would suggest not including boxes/tables in the future in the Word template.

Again, thank you for taking the time to provide valuable feedback.

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The Health and Well-Being of Transgender Australians: A National Community Survey

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Abstract

Purpose: Transgender, including gender diverse and nonbinary (trans), people experience significant health disparities. We aimed to better understand the health status and needs of Australian trans people to guide resources and health and well-being programs.

Methods: This anonymous, cross-sectional online survey utilized nonprobability snowball sampling of Australian adults (18 years and over) who self-identified as trans between September 2017 and January 2018. This descriptive study assessed demographic data, community views on access to health care, health burden, access to health resources, and priorities for government funding in transgender health.

Results: Of 928 participants, 37% reported female, 36% reported male, and 27% reported nonbinary gender identities. Despite 47% having tertiary qualifications, the unemployment rate was 19%, with 33% reporting discrimination in employment due to being trans. Discrimination in accessing health care was reported by 26% and verbal abuse and physical assault were reported by 63% and 22%, respectively. Lifetime diagnosis of depression was reported by 73% and anxiety by 67%. Sixty-three percent reported previous self-harm and 43% had attempted suicide. Autism spectrum disorder and attention-deficit/hyperactivity disorder were reported by 15% and 11%, respectively. The most preferred method of receiving health information was through online resources, with the most popular source being Reddit, an online peer discussion board. Better training for doctors in trans health issues was the top priority for government funding.

Conclusions: Barriers, including widespread discrimination and unemployment, contribute to health inequity and prevalent mental health conditions. Better training for health professionals in the provision of safe, gender-affirming and general health care for trans people is urgently required.

Keywords: barriers to care, gender-affirming endocrine care, gender-affirming surgical care, gender dysphoria, transgender

Introduction

The number of transgender, including gender diverse and nonbinary (trans), individuals seeking gender-affirming health care worldwide is rising,[1] yet global studies have demonstrated that trans people face many barriers to accessing health care, including discrimination[2] and the inability to find doctors willing to provide care,[3] as well as high rates of depression and attempted suicide.[1,4] Mental health distress is driven, in part, by barriers to accessing health care as well as by discrimination.[1,5 8] In addition, co-occurring autism spectrum disorders (ASD) and attention-deficit/hyperactivity disorder (ADHD) may also be more prevalent among trans individuals for unclear reasons, with difficulties with attention or social interaction potentially posing greater barriers by affecting the ability to understand health information or engage in clinical care.[1,9]

There are little data describing the health of the Australian adult trans population. Due to a lack of population data, it is unknown how many Australians identify as trans. A nonpeer-reviewed publication described very high levels of mental health conditions, particularly depression and anxiety syndromes, poor quality of life, and high rates of discrimination among Australian trans adults in 2013 (Ref.[10]). Similarly, high rates of mental health conditions were observed in trans adults attending specialized

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gender affirmation clinics in the state of Victoria; however, these findings may not be generalizable.[1]

Australia's universal health care system provides free or low-cost, government-subsidized general health services, including general or specialist consultations, pathology collection, and medications, including gender-affirming hormones. However, in regions with fewer specialized gender services, access to low-cost options may be limited.

Access to gender-affirming interventions in Australia typically follows one of two pathways; either a formal assessment and approval by a mental health professional as per the World Professional Association for Transgender Health Standards of Care[11] or an alternative informed consent model of care where a decision to commence gender-affirming hormones is shared between a primary care general practitioner and a trans individual without mandating a formal mental health review.[12] Due to a lack of publicly funded gender-affirming surgery, this is provided almost entirely in the private health sector, which carries significant out-of-pocket costs.

This community-based survey sought to better understand the health needs of Australian trans individuals to direct local health resources to best meet health care needs. We hypothesized that transgender individuals have significant barriers to accessing health care, including socioeconomic disadvantage, high burden of co-occurring mental health conditions, and discrimination. The aim of this descriptive study was to assess the sociodemographic characteristics and medical and mental health conditions affecting adult trans Australians; to obtain views on health burden, ability to access health care, and ability to access health resources; and to understand community views on funding priorities for trans health.

Methods

This anonymous community survey utilized a nonprobability snowball sampling approach to survey trans Australian adults aged 18 years and over using an online survey platform (SurveyMonkey, Inc., USA) between September 1, 2017, and January 31, 2018. The full survey is listed in Supplementary Appendix SA1. Participants were recruited through the Trans Health Research group Facebook page and the study also was promoted at the Australian and New Zealand Professional Association for Transgender Health Biennial Meeting in Sydney, Australia, in September 2017 and at the Midsumma LGBTIQ+ Festival in Melbourne, Australia, in January 2018. Written informed consent was not possible given the anonymous online design; however, the survey preamble outlined that completion of the survey implied consent. The survey link was available as a URL and did not require access to a specific social media account. The study was approved by the Austin Health Human Research and Ethics Committee (HREC/17/Austin/372).

Inclusion criteria were assessed through a positive response to three screening questions: (1) residency in Australia; (2) identification as trans or had previously identified as such; and (3) aged 18 years or over. The inclusion of those who had previously identified as trans was intended to include those who identified as their affirmed gender (male or female) rather than with the term transgender. Individuals were eligible to complete the survey on one occasion only and duplicate responses from the same internet protocol address were excluded. All included individuals had discordance between their assigned sex at birth and their gender identity. Other than the initial screening questions, all subsequent survey questions were optional.

Demographic data

Participants' birth years and postcodes were obtained. Postcodes were coded as per the Australian Standard Geographical Classification Remoteness Area (RA) coding[13] to one of five groups; RA1 (inner cities) to RA5 (very remote). Participants were asked to select their sex assigned at birth (male, female, or intersex) and their gender identity (see Table 1 for options). To enable meaningful statistical analyses, gender identities were then further categorized into three groups: trans man/trans male/trans masculine and male gender identities were coded as male identities; trans woman/trans female/trans feminine and female were coded as female identities; and gender nonbinary, gender queer, gender neutral, gender fluid, intersex, and agender were coded as nonbinary gender identities. Those who selected ''other'' also entered free text and were reclassified accordingly. Formal education, requirement for government financial assistance, and employment status were assessed (responses as outlined in Table 1). Participants were able to select more than one employment status. To reflect engagement with the workforce, if two options were selected, individuals were classified in the group that reflected the most workforce engagement. For example, if a person was a student and casually employed, they were classified as casually employed.

Access to health care and health burden

Current smoking and past 12-month illicit drug use were self-reported, and self-perception of overall health was evaluated (responses available outlined in Table 2). Participants were asked about their access to various types of health care providers, including availability of general practitioners and their confidence in discussing health issues of concern with their treating doctor. As discrimination has been identified as a barrier to health care in previous surveys,[14] participants were asked if they had perceived discrimination in employment, housing, accessing health care, and government services and/or whether they had experienced physical assault, verbal abuse, and domestic violence because of their gender identity. trans individuals were asked whether they had experienced any difficulty accessing hormonal treatment (such as the inability to find a doctor who is willing to prescribe, financial costs of prescriptions, financial costs of doctor's appointments, or other [specify]). Participants were also asked if they had taken any hormonal treatments without a prescription.

To assess the community's value of mental health assessments before commencing gender-affirming hormonal treatment, participants were asked ''Do you feel that a mental health assessment for trans and gender diverse individuals should be performed prior to accessing hormonal treatment?'' Assessment of access to and desire for gender-affirming hormonal and surgical treatments and previous medical and mental health conditions relied on self-reporting, and no specific diagnostic tools were used. History of self-harm or attempted suicide was also ascertained.

Table 1. Sociodemographic Parameters of the Participants

Parameter	*Number of responses received*	*Frequency, n (%)*
State of residence	911	
Victoria		282 (31)
New South Wales		195 (21)
Queensland		143 (16)
Western Australia		126 (14)
South Australia		92 (10)
Tasmania		37 (4)
Australian Capital Territory		34 (4)
Northern Territory		2 (<1)
Age group (years)	928	
18 24		289 (31)
25 29		216 (23)
30 39		193 (21)
40 49		125 (13)
50 59		71 (8)
60 69		30 (3)
70 79		4 (<1)
Sex assigned at birth	928	
Female		520 (56)
Male		403 (43)
Intersex		5 (1)
Gender identity	928	
Male		91 (10)
Female		140 (15)
Trans man/trans male/trans masculine		239 (26)
Trans woman/trans female/trans feminine		202 (22)
Gender nonbinary		133 (14)
Gender queer		41 (4)
Gender neutral		11 (1)
Gender fluid		19 (2)
Intersex		2 (<1)
Agender		20 (2)
Other		30 (3)
Education level	928	
Never attended school		1 (<1)
Primary school		0
Some high school		98 (11)
Completed high school		222 (24)
Trade/technical certificate or apprenticeship		170 (18)
University or tertiary qualifications		437 (47)
Employment status	928	
Employed on a full-time basis		274 (30)
Employed on a part-time or casual basis		224 (24)
Home duties full-time		13 (1)
Student		176 (19)
Retired		20 (2)
Unemployed		177 (19)
Other (free text)		44 (5)

Access to health resources and priorities for government funding

Preferred methods (i.e., social media, online resources, videos, forums, and print) of receiving health information were assessed, including involvement in support groups and websites used to locate information on trans health. Desire for local, Australian-based, trans health resources was also determined. Participants selected the areas of priority to which they thought resources should be directed (education about gender diversity, gender clinics, support groups, trans advocacy groups, counseling, better training for doctors in trans issues, transgender medical research, psychology/psychiatry services, or other [free text]). Qualitative analysis results of several open-ended questions regarding health issues of concern have been reported separately.[15]

Statistical analysis

Statistical analysis was performed using SPSS Statistics, version 23 (IBM Corporation, Armonk, NY). Descriptive frequencies are reported and medians (interquartile range) are reported for non-normally distributed data.

Results

The survey social media post was shared by 275 individuals and transgender support groups on the social media site Facebook. A total of 964 responses to the survey were obtained. After excluding duplicates from the same IP address, blank surveys, or those that did not meet the inclusion criteria (based on the previously described screening questions), 928 eligible responses remained.

Sociodemographic data

As shown in Table 1, responses were received from every Australian state and territory. The greatest number of participants ($n=282$, 31%) resided in Victoria. Eighty-three percent ($n=752$) of those that responded resided in inner city areas (RA1). Median age was 28 years (interquartile range 23 39). Thirty-seven percent ($n=342$) reported female identities, 36% ($n=330$) reported male identities, and 27% ($n=256$) reported nonbinary gender identities. Participants had high levels of education, with 47% ($n=437$) holding a university qualification. The unemployment rate was 19% ($n=177$). The majority ($n=376$, 57%) reported receiving some form of government financial assistance.

Access to health care and health burden

Table 2 outlines responses describing access to health care and health burden. Current smoking in 15% ($n=141$) of participants is comparable with national data indicating that 11.6% of Australian adults reported smoking cigarettes daily.[16] Illicit drug use was high, with 33% ($n=305$) of respondents reporting use of illicit drugs in the past 12 months and is approximately double the general Australian population rate of illicit drug use of 16.4% in the preceding 12 months in 2019 (reported in people aged 14 years and over).[17] Nearly 80% ($n=711$) described at least good health and 80% ($n=732$) had a regular family doctor or general practitioner. When asked if individuals had ever experienced any difficulty accessing hormonal treatment, 41% ($n=372$) selected ''none.'' A third ($n=284$) reported that the pathway to accessing hormones was too difficult. Discrimination because of gender identity was widespread, with 33% ($n=304$) reporting discrimination related to employment and 26% ($n=244$) related to accessing health care. Verbal

Table 2. Access to Health Care and Health Burden

Parameter	Number of responses received	Frequency, n (%)
Self-perception of overall health	907	
Excellent		86 (9)
Very good		224 (25)
Good		401 (44)
Poor		171 (19)
Very poor		25 (3)
Health care providers utilized[a]	928	
GP		779 (84)
Psychologist		631 (68)
Psychiatrist		508 (55)
Endocrinologist		413 (45)
Surgeon		298 (32)
Nurse		235 (25)
Speech pathologist		117 (13)
Gender clinic within a hospital		103 (11)
Gynecologist		87 (9)
None		89 (10)
Other (free text)		32 (3)
Discrimination[a]	927	
Discrimination in employment		304 (33)
Discrimination in accessing health care		244 (26)
Discrimination in government services		149 (16)
Discrimination in housing		95 (10)
Verbal abuse		584 (63)
Physical assault		200 (22)
Domestic violence		133 (14)
Difficulty accessing hormonal treatment[a]	905	
None		372 (41)
Unable to find a doctor to prescribe		148 (16)
Financial costs of prescriptions		124 (14)
Financial costs of doctor's appointments		156 (17)
Pathway to accessing hormones was too difficult		284 (31)
Other (specify)		100 (11)
Views on informed consent	913	
Should trans people undertake a formal mental health practitioner assessment?		
Yes, in all cases		285 (31)
Yes, but only in some circumstances		392 (43)
No		187 (20)
Unsure		48 (5)
Masculinizing hormone treatments in birth-assigned females[a]	509	
None		191 (38)
Testosterone injections		267 (53)
Testosterone creams, gels, or patches		45 (9)
Testosterone implants		2 (<1)
GnRH analogs		2 (<1)
Progestins		4 (<1)
Other		7 (1)
Feminizing hormone treatments in birth-assigned males[a]	402	
None		75 (19)
Estradiol oral tablets		205 (51)
Estradiol transdermal patches		56 (14)
Estradiol gels		33 (8)
Estradiol implants		52 (13)
Combined oral contraceptive pill		14 (3)
Spironolactone		130 (32)
Cyproterone acetate		106 (26)
Bicalutamide		1 (<1)
GnRH analogs		2 (<1)
Progestins or micronized progesterone		63 (16)
Other (i.e., finasteride or estradiol injections)		11 (3)
Overseas surgery	914	
Yes		72 (8)
No		841 (92)
Unsure/prefer not to say		1 (<1)
Medical conditions	914	
Depression		663 (73)
Anxiety		613 (67)
Fractures (broken bone)		191 (21)
Autism spectrum or Asperger's syndrome		137 (15)
ADHD		96 (11)
Bipolar disorder		75 (8)
Diabetes mellitus		25 (3)
Cancer		19 (2)
Blood clots (pulmonary embolus or deep vein thrombosis)		16 (2)
Liver disease		13 (1)
Stroke		11 (1)
HIV/AIDS		5 (<1)
Ischemic heart disease		4 (<1)
Emphysema		3 (<1)
Kidney or renal disease		3 (<1)
None of the above options selected[b]		136 (15)

[a]Multiple responses were allowed for this question, so total responses do not sum to 100%.

[b]None was not an option in the survey but was presumed if no medical conditions were selected but answers were completed to the remaining questions in Section 2: Your Health of the survey.

ADHD, attention deficit/hyperactivity disorder; GnRH, gonadotropin releasing hormone; GP, general practitioner; trans, transgender, including gender diverse and nonbinary.

abuse because of their trans status was reported by 63% of respondents and physical assault because of their trans status was reported by 22%.

There were mixed responses to the need for a formal mental health assessment prior to commencement of hormonal therapy and it is acknowledged that wording of this question may have contributed to ambiguity (Table 2). There was a very high prevalence of self-reported depression and anxiety

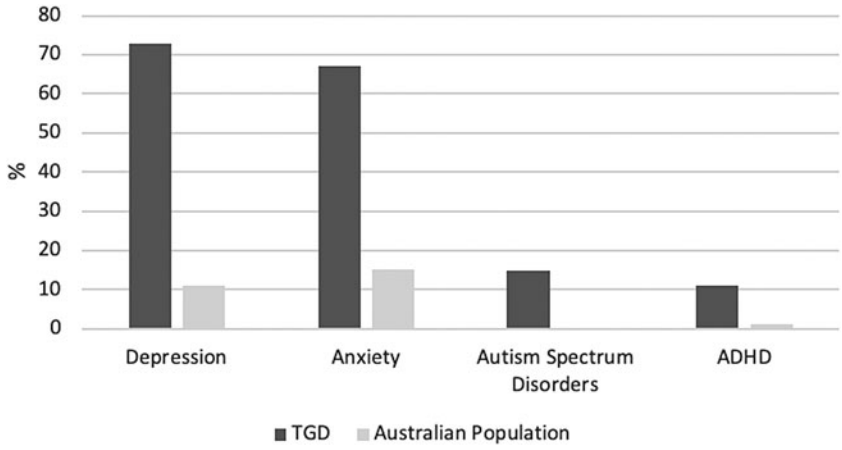

FIG. 1. Self-reported diagnoses in trans individuals versus the Australian population (age-matched).[18 20] ADHD, attention-deficit/hyperactivity disorder; trans, transgender, including gender diverse and nonbinary.

as well as ASD and ADHD (Fig. 1).[18 20] Intentional self-harm was reported by 63% ($n=577$) of participants and 43% ($n=394$) reported having previously attempted suicide.

Gender-affirming surgical interventions are summarized in Table 3. Genital reconstruction surgery was the most common procedure undertaken by those assigned male at birth ($n=71$, 18%); however, a further 64% ($n=243$) desired this surgery in the future. The most frequent procedure undertaken by those assigned female at birth was bilateral mastectomy or chest reconstruction ($n=159$, 31%). Similarly, a further 58% ($n=297$) desired this procedure in the future.

Access to health resources and priorities for government funding

The most preferred method of receiving health information was through online resources ($n=400$, 50%) (Table 4). Forty-three percent ($n=369$) of participants used existing online sources for health information. The most popular source reported in this study was Reddit, an online discussion board with user-generated content, followed by Facebook, Susan's Place, FtM Australia, Wikipedia, YouTube, and Tumblr. The majority (95%, $n=814$) supported the development of a comprehensive online website with local, Australian-based, trans health resources, and 89% of the participants ($n=768$) used social media daily. Better training for doctors in trans issues was the most frequently selected priority for government funding (32%, $n=267$); complete responses are listed in Table 4.

Discussion

This large community-based survey involving 928 participants described persistent, concerning health statistics among trans Australian adults: high rates of self-reported mental health morbidities, such as anxiety and depression, as well as high rates of self-reported self-harm (63%) and attempted suicide (43%). There were widespread experiences of discrimination, especially in health care settings (26%). Moreover, a majority of the participants had experienced verbal abuse (63%), with fewer reporting physical assault (22%) because of their trans status. There were barriers to employment (19% unemployed) despite high levels of tertiary education. Additional barriers to accessing health care existed, such as difficult ambiguous pathways for accessing gender-affirming hormonal therapy; difficulty finding doctors to prescribe treatment; and the potentially high, out-of-pocket financial costs of surgical care. Although the use of gender-affirming hormone therapy was common, significant difficulties existed in accessing gender-affirming surgery. Even though most of the participants accessed health information from peer-generated online websites, there was support for development of reliable, local health resources. Better training for doctors in trans health issues was highlighted as the top priority for government funding by 32% of participants.

Sociodemographic data

We observed a breadth of gender identities in the trans community across Australia with approximately equal

TABLE 3. ACCESS TO AND DESIRE FOR GENDER-AFFIRMING SURGERY

	Total number of responses	*Have had,* n *(%)*	*Want someday,* n *(%)*	*Don't want,* n *(%)*
Surgical procedures in birth-assigned males ($n=403$)				
Breast augmentation	362	32 (9)	196 (54)	134 (37)
Genital reconstruction surgery	384	71 (18)	243 (64)	70 (18)
Facial feminization surgery	372	23 (6)	235 (63)	114 (31)
Voice surgery	348	6 (2)	149 (43)	193 (55)
Surgical procedures in birth-assigned females ($n=520$)				
Chest surgery/mastectomy	511	159 (31)	297 (58)	55 (11)
Genital reconstruction surgery	481	10 (2)	213 (44)	258 (54)
Voice surgery	405	1 (<1)	15 (4)	389 (96)

Percentages are rounded to whole numbers.

Table 4. Access to Health Resources and Priorities for Government Funding

Parameter	*Number of responses received*	*Frequency,* n *(%)*
Most preferred method of receiving health information	799	
Online (websites and e-mail, etc.)		400 (50)
Social media (e.g., Facebook)		150 (19)
Videos or podcasts		57 (7)
Telephone contact		43 (5)
Hardcopy print materials (e.g., brochures)		41 (5)
Small local community talks/seminars		39 (5)
Apps (on mobile devices)		35 (4)
Online group forums (e.g., webinars)		24 (3)
Larger group gatherings (e.g., conferences)		10 (1)
Social media use	859	
Daily		768 (89)
Couple of times a week		55 (6)
Occasionally (e.g., once a week)		19 (2)
Rarely (e.g., once a fortnight)		10 (1)
Not at all		7 (<1)
Top priority for government funding	824	
Better training for doctors in trans issues		267 (32)
Gender clinics		205 (25)
Education about gender diversity (i.e., community or schools)		197 (24)
Trans or gender-related medical research		83 (10)
Psychology or psychiatry services		32 (4)
Support groups		18 (2)
Trans advocacy groups		14 (2)
Counseling		8 (1)
Other (free text)		0

thirds of the participants having female, male, and nonbinary identities. This contrasts with historical reports that the prevalence of trans female individuals outnumbered trans male individuals.[21] The high proportion of people with nonbinary gender identities is consistent with rates observed in our primary care clinics in Australia[1] and may reflect increasing societal views that challenge binary gender stereotypes.

The unemployment rate of 19% was three times that of the Australian general population rate of 5.5% in May 2018 and well above the youth unemployment rate (12.2%).[22] Notably, 33% of respondents perceived discrimination in employment. Unemployment may also occur due to difficulty with name and identity documents, discrimination in basic housing and health care,[5] and the impact of mental health conditions such as depression and anxiety on an individual's ability to seek or maintain employment. Conversely, levels of depression and anxiety may be higher due to unemployment.[23]

Access to health care and health burden

Similar to prior reports,[5] discrimination in all aspects of life was frequently reported by trans Australians, which is not only harmful but also perpetuates inequity. Most concerning is that safe access to health care, which should be accessible to all, is not a reality for trans Australians and this is supported by the participants' selected top priority for government funding being better training for doctors in trans health issues. Access to surgery is a major challenge in Australia, with (anecdotally) few surgeons experienced in providing gender-affirming surgery. Moreover, surgery is predominantly provided in the private health system, which is associated with prohibitive financial costs. There is a need for education and training to target the number of surgeons providing gender-affirming surgery.

Self-reported depression and anxiety were highly prevalent in ~70% of individuals, as were self-reported diagnoses of ASD and ADHD (Fig. 1). These are consistent with data from individuals attending specialized gender clinics[1] as well as from international reports.[24] Notably, a diagnosis of ADHD in childhood is associated with a higher risk of having at least one mental health condition and a higher risk of death by suicide.[25] As positive screening tools for ASD may reflect elevated social anxiety experienced by trans people, data describing the coexistence of ASD are conflicting and further research is needed.[9]

The most concerning data are the self-reported self-harm and attempted suicide rates, a reflection of the severe distress and despair that many trans individuals have faced. These suicidality rates are much higher than the lifetime prevalence of suicide attempts in Australian adults (3.3%).[26] Our Australian data mirror findings in the U.S. National Transgender Discrimination Survey of 6450 trans Americans, which first highlighted widespread discrimination in many aspects of life, including double the rate of unemployment; 19% being refused medical care due to their trans status; and 41% of suicide attempts (compared with 1.6% of the general population).[27] Lack of acceptance in the community and, at times, among health professionals leaves few resources for trans individuals to access help and support. This is a significant public health concern and there is an urgent need for a coordinated and combined suicide prevention response.

Health resources and priorities for government funding

The top priority for government funding was better training in trans health issues for doctors. Although greater awareness of and more coordinated training in trans health need to occur, in response to findings from this study, an evidence-based local position statement was published regarding the hormonal management of trans adults to provide a point-of-care resource for doctors caring for trans individuals.[12] In response to the community desire for Australian-based trans health information, we contributed to the development of trans community-led online health resources (Trans Health Research and TransHub).[28,29]

Limitations

There are multiple limitations to this study. The online-based recruitment may explain why a greater proportion of responders were younger individuals and may not accurately reflect the views of the older trans community. There may be

self-selection bias and not all areas of Australia were equally represented as recruitment was not targeted. There was a predominance of respondents from southeastern states, which may be related to physical promotion of the study at one event in Victoria and one in New South Wales. However, distribution of respondents was similar to a previous 2013 Western Australian-based survey.[10] Ethnicity data were not collected, so we were unable to ascertain if this was a factor associated with additional barriers when accessing health care. Medical conditions were self-reported, and we were not able to utilize any diagnostic measures to confirm diagnoses. Furthermore, we did not gauge temporal trends in diagnoses and did not distinguish current from past medical conditions, which may be particularly relevant in the interpretation of the prevalence of ADHD. Participants were asked whether a mental health assessment for trans and gender diverse individuals should be performed prior to accessing hormonal treatment. There was likely a response bias in favor of the mental health assessment model as we did not make it clear that we were referring to a formal mental health assessment by a psychologist or psychiatrist rather than by the primary care physician in the wording of this question.

However, this survey provided a platform for participants to express their views anonymously, which potentially facilitated the expression of more honest responses than a face-to-face interview or government statistics form. The fact that many of our findings, although self-reported (such as rates of self-harm), replicate those from prior similar studies conducted with other transgender populations supports both the validity and the generalizability of our findings. Despite the limitations, this is one of the largest published studies of adult trans individuals in the Australian population and provides valuable insight on the status of health and health needs of a traditionally marginalized community that is underrepresented in research.

Conclusions

This large community survey highlights a myriad of challenges faced by trans adult Australians, including discrimination, abuse, unemployment, and inability to find doctors to access general health care and gender-affirming care. Reducing the high attempted suicide rate and burden of mental health conditions needs to be prioritized. The participants in this study identified the training of doctors in trans health as a priority. This should be one of the first steps to ensure that basic health needs are met. Urgent action is required from a policy perspective to address the concerning health disparities described herein and to ensure that all trans people are safe and empowered to live a life without barriers.

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Supplementary Material

Supplementary Appendix SA1

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Factors associated with suicide attempts among Australian transgender adults

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Abstract

Background: Transgender, including gender diverse and non binary people, henceforth referred to collectively as trans people, are a highly marginalised population with alarming rates of suicidal ideation, attempted suicide and self harm. We aimed to understand the risk and protective factors of a lifetime history of attempted suicide in a community sample of Australian trans adults to guide better mental health support and suicide prevention strategies.

Methods: Using a non probability snowball sampling approach, a total of 928 trans adults completed a cross sectional online survey between September 2017 and January 2018. The survey assessed demographic data, mental health morbidity, a lifetime history of intentional self harm and attempted suicide, experiences of discrimination, experiences of assault, access to gender affirming healthcare and access to trans peer support groups. Logistic regression was used to examine the risk or protective effect of participant characteristics on the odds of suicide.

Results: Of 928 participants, 73% self reported a lifetime diagnosis of depression, 63% reported previous self harm, and 43% had attempted suicide. Higher odds of reporting a lifetime history of suicide attempts were found in people who were; unemployed (adjusted odds ratio (aOR) 1.54 (1.04, 2.28), $p = 0.03$), had a diagnosis of depression (aOR 3.43 (2.16, 5.46), $p < 0.001$), desired gender affirming surgery in the future (aOR 1.71 (1.134, 2.59), $p = 0.01$), had experienced physical assault (aOR 2.00 (1.37, 2.93), $p < 0.001$) or experienced institutional discrimination related to their trans status (aOR 1.59 (1.14, 2.22), $p = 0.007$).

Conclusion: Suicidality is associated with desiring gender affirming surgery in the future, gender based victimisation and institutionalised cissexism. Interventions to increase social inclusion, reduce transphobia and enable access to gender affirming care, particularly surgical interventions, are potential areas of intervention.

Keywords: Transgender, Mental health, Suicide, Depression

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Background

Transgender, including gender diverse and non-binary (trans) people are a highly marginalised group in our community with alarmingly high rates of suicidality (ideation and non-fatal behaviours) and mental health morbidities [1–3]. High quality empirical evidence and data (such as from a census) describing the size of the trans population are limited, but a systematic review of studies published internationally from 2009 to 2019 found estimates ranged from 0.5 to 4.5% of the adult population [4]. Within an Australian-context, despite universal public health care and anti-discrimination laws at the State and Federal level, trans adults experience high levels of discrimination and are four times more likely than the general population to be diagnosed with depression, with over 40% self-reporting previous suicide attempts [5–7]. Various human rights challenges remain; in many Australian States and Territories, it is not possible to obtain legal gender recognition without first having gender affirmation surgery. Moreover, access to gender affirmation surgery is not covered by the national Medicare public health scheme and is cost prohibitive for many people.

Suicide attempts and suicide deaths occur due to a complex interaction between biological, psychological and psychosocial risk factors. This may include genetic predisposition to depression and anxiety [8, 9], minority stress and stressful life events, unemployment and financial stress [10–12], quality of support networks [13–17], discrimination, violence [18–20] and barriers to accessing healthcare and support services [21].

Trans-specific factors for suicidality is an under-researched area, but several risk and protective factors have been identified. Research has increasingly focused on how cissexism, or the belief that cisgender people are 'normal', 'natural' and 'superior' delimits opportunities for trans health and wellbeing [22]. Gender-based victimisation, including verbal abuse, peer rejection, threats of violence and physical assault has been well documented among trans adults [3, 23, 24]. Similarly, there is growing evidence of institutionalized cissexism, manifesting as heightened rates of trans unemployment, reduced access to housing, education and healthcare (including gender affirming healthcare), which contributes to diminished mental health and wellbeing by way of elevated feelings of shame, hopelessness and isolation [24–29]. Systemic barriers are associated with increased risk of housing instability, financial stress and violence [30].

Rather than focusing on the deleterious effects of cissexism, research has begun to illuminate factors that protect against suicidality and mental health comorbidities. For example, in trans people who wish to access hormones, being able to do so reduces mental distress, and improves quality of life [31, 32]. Similarly, trans adults who desire and are able to access gender affirming surgery report stronger mental health as compared to trans adults who cannot access surgeries [33]. Social support from family, friends and connection with the trans community and experiencing lower levels of structural discrimination are further protective factor against suicidality and suicide attempts [13–17].

Gender plays a role. In Australia, young cisgender men and those presumed to be men who live in non-metropolitan areas have the highest suicide rates and are less likely to seek assistance for depression or other mental health problems [34]. Data from many countries worldwide show that people presumed male have higher rates of suicide compared to people presumed female [35]. The precise reasons for the gender discrepancy are unclear, however possible explanations for higher rates of suicide in people presumed male include more violent, immediately lethal means of suicide, higher levels of suicidal intent and greater reticence to seek assistance from doctors for mental health support [36, 37].

In the general population, it is known that unemployment, physical assault and perceived discrimination increases risk for suicide ideation and suicide attempts [12, 38, 39]. We hypothesised that people who reported known risk factors for suicidal behaviour; residing in rural areas, unemployment, experienced difficulty accessing gender-affirming interventions, known history of depression or anxiety, had perceived discrimination and experiences of assault, would have a higher odds of reporting a history of suicide attempts. Given the lack of data describing risk or protective factors among Australian trans adults, this exploratory analysis aimed to assess factors associated with a lifetime history of attempted suicide in order to guide suicide prevention strategies and interventions.

Methods

This anonymous online survey of trans adults utilised a non-probability snowball sampling technique. Inclusion criteria for participants were assessed by a positive response to three screening questions: a) Australian residency; b) aged 18 years or older and c) self-identify as trans or gender diverse (defined as a 'yes' response to the question 'Do you currently identify or have you previously identified as transgender or gender diverse?'). The inclusion of those who had previously identified as trans was intended to include those who identified as their affirmed gender (male, female or non-binary) rather than with the term transgender. Individuals were eligible to complete the survey on one occasion only and duplicate responses from the same Internet Protocol address were excluded. All included individuals had discordance between their assigned sex at birth and their

gender identity. Survey questions were all optional. SurveyMonkey (SurveyMonkey Inc. San Mateo, California, USA) was used to collect responses to the survey between 1st September 2017 and 31st January 2018. Given that this was an anonymous survey, written informed consent was not possible and was waived by the institutional ethics committee; however, the survey preamble outlined that completion of the survey implied consent. The study was approved by the Austin Health Human Research and Ethics Committee (HREC/17/Austin/372).

Participants were asked a range of questions, with data pertaining to the health care needs and priorities of participants which are published elsewhere [7, 40]. The full version of the survey is available in the supplementary appendix at https://doi.org/10.1089/lgbt.2020.0178 [7]. Participants were asked 'Have you ever intentionally self-harmed?' (response options of 'yes', 'no' or 'prefer not to say') and 'Have you ever attempted suicide?' with response options of 'yes', 'no' or 'prefer not to say'. We specifically assessed if the following 10 factors were risk or protective factors for a positive ('yes') response for a lifetime history of attempted suicide.

1) Location of residence (metropolitan or rural), which was determined by coding postcodes as per the Australia Standard Geographical Classification Remoteness Area (RA). Rural location of residence was classified as anyone living outside of a major city area corresponding to Remoteness Areas 2 to 5.
2) Presumed gender at birth (male, female).
3) Employment status (unemployed, compared to employed on full-time basis, part-time basis, home duties full time, student, retired, other)
4) Access to gender affirming hormones. Participants were asked if they experienced any difficulty accessing gender affirming hormones with positive responses to the following multiple choice options: unable to find a doctor to prescribe; unable to afford costs of prescriptions; unable to afford cost of doctors' appointments; or pathway to accessing hormones too difficult, compared to no difficulty accessing gender affirming hormones.
5) Desire for gender affirming surgery in the future. Participants indicated whether they wanted gender affirming surgery someday, had already had surgery or did not want surgery, from the four options bilateral mastectomy/chest reconstruction surgery, breast augmentation, bottom surgery, voice surgery. Those that desired at least one type of gender affirming surgery were compared with other groups that did not.
6) Self-reported diagnosis of depression. Participants were asked if they had ever been medically diagnosed with depression (yes/no).
7) Self-reported diagnosis of anxiety. Participants were asked if they had ever been medically diagnosed with anxiety (yes/no).
8) Access to trans support groups. Participants were asked if they were a member of any trans support groups, including on social media (yes/no or unsure).
9) Perceived discrimination from employment, housing, healthcare and/or government services. Participants were asked 'Because of your trans status have you ever experienced any of the following (select all that apply)?' with multiple choice options of 'Discrimination from employment (i.e. lost a job or overlooked for a job)', 'Discrimination from housing (i.e. denied a rental application)', 'Discrimination from accessing healthcare', and 'Discrimination from government services (i.e. Centrelink)', 'Physical assault', 'Verbal abuse', 'Domestic violence', and 'None'. For the purposes of analyses positive responses to any of the four discrimination options (discrimination from employment, housing, accessing healthcare and government services) were combined to create one factor called 'institutional discrimination'.
10) Physical assault. Participants indicated whether they had ever experienced physical assault because of their trans status (yes/no).

Statistical analysis was performed using R version 3.6.3 (R Foundation for Statistical Computing). Participant characteristics are reported as frequency (percentage). Logistic regression was used to estimate the effects of the 10 factors listed above on the risk of attempted suicide. The 10 factors considered in the regression were selected prior to performing the analysis on the basis of previous known risk factors for suicidal behaviour. Results are reported as odds ratios (OR) with corresponding 95% confidence intervals (CI). Factors with low frequency categories were included in the regression, and a sensitivity analysis excluding low-frequency categories was performed where there is evidence of inflated standard errors and ORs. This is a complete case analysis with an alpha level of 5% ($P < 0.05$) to be considered statistically significant.

Results

There was a total of 964 responses to the survey, however, after excluding participants who did not fit the selection criteria and duplicate responses, there was a total of 928 eligible survey responses.

Participant characteristics are shown in Table 1. Responses were received from all states and territories of Australia, with the majority residing in major city areas. The median age of participants was 28 years

Table 1 Participant characteristics

Parameter	Number of responses received	Frequency n(%)
State of residence	911	
Victoria		282 (31%)
New South Wales		195 (21%)
Queensland		143 (16%)
Western Australia		126 (14%)
South Australia		92 (10%)
Tasmania		37 (4%)
Australian Capital Territory		34 (4%)
Northern Territory		2 (< 1%)
Location of residence (rural status)	905	
Major city areas (Remoteness Area 1)		752 (83%)
Inner regional areas (Remoteness Area 2)		122 (13%)
Outer regional areas (Remoteness Area 3)		25 (3%)
Remote and Very Remote areas (Remoteness Area 4 and Remoteness Area5)		6 (< 1%)
Age group (years)	928	
18 24		289 (31%)
25 29		216 (23%)
30 39		193 (21%)
40 49		125 (13%)
50 59		71 (8%)
60 69		30 (3%
70 79		4 (< 1%)
Presumed sex at birth	928	
Female		520 (56%)
Male		403 (43%)
Intersex		5 (1%)
Gender identity	928	
Trans Man/Trans Male/Transmasculine		239 (26%)
Trans Woman/Trans Female/Transfeminine		202 (22%)
Female		140 (15%)
Gender Non Binary		133 (14%)
Male		91 (10%)
Gender Queer		41 (4%)
Agender		20 (2%)
Gender Fluid		19 (2%)
Gender Neutral		11 (1%)
Intersex		2 (< 1%)
Other		30 (3%)
Employment status	928	
Employed on a full time basis		274 (30%)
Employed on part time or casual basis		224 (24%)
Home duties full time		13 (1%)
Student		176 (19%)
Retired		20 (2%)

Table 1 Participant characteristics *(Continued)*

Parameter	Number of responses received	Frequency n(%)
Unemployed		177 (19%)
Other (freetext)		44 (5%)
Depression and Anxiety	914	
Depression		663 (73%)
Anxiety		613 (67%)
Discrimination[a]	927	
Discrimination from employment		304 (33%)
Discrimination from accessing healthcare		244 (26%)
Discrimination from government services		149 (16%)
Discrimination from housing		95 (10%)
Verbal Assault		584 (63%)
Physical Assault		200 (21%)
Domestic violence		133 (14%)
Difficulty accessing hormonal treatment[a]	905	
None		372 (41%)
Pathway to accessing hormones was too difficult		284 (31%)
Unable to find a doctor to prescribe		148 (16%)
Financial costs of prescriptions		124 (14%)
Financial costs of doctors appointments		156 (17%)
Other (specify)		100 (11%)
Member of Trans Peer Support Groups	860	
Yes		689 (80%)
No		153 (18%)
Unsure/Prefer not to say		18 (2%)

[a]multiple responses allowed for this question so total responses do not sum to 100%

[interquartile range 23–39]. Sixty three percent of trans adults reported a lifetime history of intentional self-harm ($n = 577$), while 43% reporting ever having attempted suicide ($n = 394$). This compares to a lifetime prevalence of self-injury in the Australian general population of 8.1% and previous suicide attempts of 3.3% [41, 42]. From univariate analysis, there was no statistically significant difference in the proportion of suicide ($p = 0.6$) or self-harm ($p = 0.08$) between different states of residence. Access to and desire for gender affirming surgeries are presented in Table 2.

Variables which were associated with increased odds of a lifetime history of suicide attempts are shown in Table 3. Self-reported unemployment, desiring gender-affirming surgery in the future, depression, physical assault, and institutional discrimination were all associated with higher odds of reporting a previous suicide attempt. There was no association with anxiety, difficulty accessing hormones or location of residence (rural versus metropolitan), nor was access to trans support groups a protective factor. Being presumed male at birth was associated with lower odds of reporting a lifetime history of suicide attempts. Due to the low number of intersex individuals ($n = 5$), a valid odds ratio cannot be estimated and hence was not reported in Table 2. A sensitivity analysis was performed excluding those 5 participants and the results remains unchanged.

Discussion

This large community survey provides preliminary insight into the factors associated with suicidality in the Australian trans community. Being unemployed, reporting a diagnosis of depression, desiring gender affirming surgery, a history of physical assault and experiences of institutional discrimination were all factors associated with increased odds of a lifetime history of suicide attempts. Being presumed male at birth was associated with lower odds of suicide attempt.

While the self-reported suicide attempt rate of trans participants is 10-times higher than that reported for the general Australian population, this rate converges with data on Australian trans youth and similar cohort studies conducted in Euro-Western settings [6, 41–43]. This

Table 2 Access to and desire for gender affirming surgery

	Number of responses recieved	Have had, n (%)	Want someday, n (%)	Don't want, n (%)
Surgical procedures in people presumed male at birth				
Breast augmentation	362	32 (9)	196 (54)	134 (37)
Genital reconscrutive surgery	384	71 (18)	243 (63)	70 (18)
Facial feminization surgery	372	23 (6)	235 (63)	114 (31)
Voice surgery	348	6 (2)	149 (43)	193 (55)
Surgical procedures in people presumed female at birth				
Chest reconstructive surgery / mastectomy	511	159 (31)	297 (58)	55 (11)
Genital reconscrutive surgery	481	10 (2)	213 (44)	258 (54)
Voice surgery	405	1 (< 1)	15 (4)	389 (96)

[a]multiple responses allowed for this question so total responses do not sum to 100%

pattern of convergence suggests that health disparities and systemic social inequities are not confined to a specific developmental time frame nor geographic locality. Notably, we found intentional self-harm rates (63%) were even higher than the rate of suicide attempt, but previous evidence has shown that in the Australian population, self-harm can occur in the absence of suicidal thoughts, often used as a means of managing difficult emotions [42]. While beyond the scope of the current analysis, it may be that persistent social exclusion and acts of erasure result in elevated feelings of shame, hopelessness and isolation-factors associated with self-harm [24–29].

Due to widespread cissexism and transphobia, physical assault is an all-too-common experience within the trans community. It was reported by 21% of respondents and was associated with a 100% increase in the odds of a lifetime suicide attempt. Physical assault has consistently been associated with poor mental health outcomes and a higher risk of suicide [19, 20, 44]. Critically, being physically assaulted because of a perpetrator's transphobic prejudice is associated with a higher probability of suicide attempt than a physical assault not attributed to prejudice, or experiencing institutional discrimination alone without assault [45].

Additionally, experiences of institutionalised discrimination were reported at a high frequency. In our study, this included discrimination while accessing healthcare (including gender affirming healthcare), in employment, housing, and accessing government services. In a US-based study of 6450 trans people, an extraordinary 90% reported experiencing harassment, mistreatment or discrimination in workplaces, housing and in healthcare settings due to prejudice related to their trans-status or took actions such as hiding their identity to mitigate risk [3]. Specifically, service denial in healthcare has a profound impact correlated with elevated rates of attempted suicide [21]. Social and institutional discrimination has been found to negatively impact trans people's mental health and has been consistently demonstrated to be a risk factor for attempted suicide, underscoring the need for multi-level interventions to enable timely, rights-based and culturally

Table 3 Variables and association with a lifetime history of suicide attempts

Variable	Unadjusted OR (95% CI)	*P*	Adjusted OR (95% CI)	*P*
Location (Living outside of a major city area in Remoteness Areas 2 5).	0.97 (0.68, 1.38)	0.8	0.93 (0.61, 1.41)	0.7
Presumed Male at Birth	0.65 (0.50, 0.85)	0.002	0.62 (0.45, 0.85)	0.003
Unemployment	1.88 (1.35, 2.63)	0.0002	1.54 (1.04, 2.28)	0.03
Access to gender affirming hormone therapy (difficulty accessing)	1.65 (1.25, 2.18)	0.0004	0.97 (0.70, 1.34)	0.8
Access to gender affirming surgery (wanting in future)	1.71 (1.20, 2.43)	0.003	1.71 (1.13, 2.59)	0.01
Depression	4.64 (3.27, 6.58)	< 0.0001	3.43 (2.16, 5.46)	< 0.0001
Anxiety	2.85 (2.11, 3.84)	< 0.0001	1.13 (0.74, 1.73)	0.6
Access to Trans Support Group	0.92 (0.66, 1.30)	0.7	0.79 (0.54, 1.16)	0.2
Physical Assault	2.55 (1.85, 3.51)	< 0.0001	2.00 (1.37, 2.93)	0.0004
Institutional Discrimination	1.91 (1.47, 2.49)	< 0.0001	1.59 (1.14, 2.22)	0.007

OR odds ratio, Unadjusted OR (95% CI) from univariate Logistic regression; Adjusted OR (95% CI) from Logistic regression with all variables included (complete case analysis $n = 785$), mutually adjusted for each other

safe access to gender affirming and general healthcare, end discrimination and protect the trans population across every domain of life [18, 29, 46, 47].

In addition to discrimination, unemployment was associated with a 54% higher odds of lifetime suicide attempt. The trans unemployment rate of 19% is three times higher than the general Australian population (5.5%) [48]. In general population studies, unemployment and financial precarity has been linked to suicidality, with the length of unemployment compounding the risk of suicide [10–12]. The impact of employment on mental and physical health, socioeconomic status and quality of life is profound [49, 50]. Perceived stress in everyday life is known to increase the risk of unemployment, yet unemployment and sustained economic hardship can also directly negatively affect physical, psychological and cognitive functioning [51–54]. Poverty arising from unemployment may additionally limit an individual's ability to access gender-affirming healthcare, particularly gender-affirming surgery which is associated with large out-of-pocket costs [3, 55]. Notably, there are many potential barriers to employment for trans people such as persistent challenges being affirmed and respected by employers and colleagues using the correct name, gender and pronouns, to being terminated, looked over for promotions and facing discrimination and violence at work, to discrimination in basic housing and healthcare and the impact of mental health conditions such as depression and anxiety on an individual's ability to seek or maintain employment [29, 56]. Moreover, 33% reported perceived discrimination from employment, and whilst it was not directly assessed in the survey questions, workplace environments that expose individuals to discrimination have been found elsewhere to impact on an individual's mental health and ability to maintain employment [29].

Self-reported lifetime diagnoses of depression were high in our participants, and this was associated with an over 200% increased odds of reporting a lifetime suicide attempt. Similarly, a lifetime history of major depressive disorder has been significantly associated with increased risk of suicidal ideation and attempted suicide in trans people worldwide [8, 9]. Depression in trans people is multifaceted, and there are various contributing factors; including discrimination, disclosure, social support, access to gender affirming healthcare, substance use and socioeconomic factors [57]. As such, strategies to lower the high rates of depression will need to be multifaceted, supported by accessible, specific and safe mental health support services for trans individuals, and improved access to gender affirming healthcare [58].

Anxiety, which is highly prevalent in the trans community, was not significantly associated with lifetime suicide attempt after adjustment, suggesting that the association is influenced by other confounders, such as depression. This is inline with some general population studies that have found that anxiety disorder alone is not associated with suicidality [59].

We demonstrate that trangender individuals who desire gender affirming surgery in the future experience 71% increased odds of reporting a lifetime suicide attempt. This is likely related to a number of intrapersonal and interpersonal factors, and barriers to healthcare access. Those individuals who desire gender affirming surgery generally experience body and/or social dysphoria related to that part of their body, resulting in mental health distress. Gender affirming surgeries may result in significant body changes that increase the likelihood that trans individuals will be read and understood by others as their affirmed gender. Those who desire but are yet to access surgeries may experience higher rates of misgendering, discrimination and violence due to gender non-conformity or ambiguous appearance [3, 60], which in turn may have an impact on mental health.

Access to gender-affirming surgery has been shown to improve mental health and quality of life indicators for those who have undertaken a surgical intervention to affirm their gender. [5, 33, 61] In an Australian study regarding surgery experiences and satisfaction, depression was reported in 34% of those individuals who had undergone at least some form of gender-affirming surgery, compared to 51% in those who desired but had not undergone surgery. [33] Our findings concur with previous research that those who want surgery but have yet to access it, are at significantly increased risk of suicide.

Desire for gender affirming surgery in the future may also be related to healthcare access. One of the biggest barriers reported by trans individuals is a lack of access to healthcare due to the lack of healthcare professionals skilled in gender affirming healthcare [62]. Access to gender affirming surgery, in particular, poses significant barriers due to a lack of experienced surgeons, high cost, the lack of public funding and "gate-keeping" requirements, which can typically involve multiple, detailed assessments with two mental health professionals prior to surgery. Barriers to access, may therefore also contribute to mental health distress and suicality, as individuals are faced with long, complicated and often prohibitively expensive options for gender affirming surgeries.

Greater training, programs and clinical supervision for surgeons already conducting or wishing to conduct gender affirming surgery, along with full public funding for all gender-affirming surgeries is critical to address this healthcare gap in access to such medically necessary interventions.

Interestingly our findings show that trans women and non-binary participants presumed male at birth appeared to have a lower odds of suicide attempt and the

converse is true for trans men and non-binary participants presumed female at birth. Whilst suicide deaths in the Australian population occur at higher rates in those recorded as male, there is a higher rate of suicidal ideation and suicide attempt in those presumed female at birth [63]. Certainly studies assessing suicide attempts in the trans community have shown variable gender distributions and inferences are unclear [64].

In the Australian general population, the rates of suicide tend to increase with increasing rurality. This is commonly associated with several factors, including essential services such as healthcare and mental health support. [65, 66] This study however, showed no statistically significant difference in lifetime suicide attempt between trans people living in inner city areas and those living in regional and remote areas. Protective factors that might mitigate the expected association between rurality and suicidality include reasons for living, the individual's resilience and ability to self-regulate suicidal thoughts and feelings, familial and social support and optimism. [67, 68] However, there is relatively little research directly examining protective factors in the trans population and the experience of trans individuals and communities in regional and remote areas, an effect termed the 'metronormative' bias of trans research. [69] Seminal qualitative research conducted in the USA illuminates how trans experiences of resilience in regional and rural places rests upon other social positions (e.g., race, queerness, disability and sexuality). [70]

Previous research suggests that a lack of social support is associated with higher odds of psychological distress and lifetime suicide attempts, and that social support from the trans community is a protective factor against suicidal ideation and suicide attempts [17, 71]. Contrary to those studies, our study indicates that there is no significant association between being part of a trans support group and suicide attempts. Notably, our survey did not ask about community connection which is different from being a member of a support group, nor did the survey assess other forms of social support, such as that from family and friends, which has been shown to be a protective factor [13, 14, 16, 68].

Not all trans people desire gender affirming hormones in their transition. However, for those people who do, the ability to access hormones reduces mental distress [31, 32]. The highest rates of depression in trans people are in those who want hormones but have yet to use them or are unable to access them [5]. Despite the strong link between depression and suicidality, this study found no significant difference in suicidality solely based on access to hormones. Given that there may be many confounding factors that impact mental health independently of hormone therapy, such as access to other gender affirming medical procedures and psychotherapy, as well as social support, it is difficult to determine the independent effects of hormone therapy on quality of life [32]. There is also evidence that any form of gender affirming transition is beneficial, such as social transition and social acceptance [67].

Limitations

There are multiple limitations to this online study utilising a non-probability snowball sampling approach. The online-based recruitment may explain the proportion of younger participants and the views of older trans people may not be accurately reflected. There may be self-selection bias and not all areas of Australia were represented equally as recruitment was not targeted. There was a predominance of respondents in South-Eastern states, which may be related to physical promotion of the study at one event in Victoria and New South Wales. However, distribution of respondents was similar to a previous 2013 Western Australian-based survey [5]. Depression, self-harm and suicide attempts were self-reported. Hence, it is not possible to confirm diagnosis or determine how individuals define their experiences (e.g. what constitutes self-harm versus a suicide attempt; diagnosis of clinical depression). We did not study completed suicide, however suicide attempts are a risk factor for suicide and reflect significant distress experienced. The survey was also designed to broadly explore healthcare and wellbeing in the trans community and as such, did not focus extensively on mental health and suicidality. This survey was, however, a platform for trans people in Australia to express their experiences and opinions anonymously and honestly. It provides valuable insight on the health needs and wellbeing of a marginalised community.

Conclusion

This large community survey highlights the high rates of attempted suicide, self-harm and depression in the trans community. Suicide attempts occur due to a complex interaction between socio-political, environmental, interpersonal and structural risk factors. Rather than suicidality perceived as inherent to the trans experience, trans people appear to exhibit higher rates of suicidality as a manifestation of social discrimination. Addressing these factors that contribute to suicidality and the mental health burden in the trans community must be made a priority. Dismantling barriers to gender affirming healthcare is paramount; as is tackling pervasive cissexism in order to reduce incidents of discrimination, stigmatization and violence. There is also an ongoing need to shift the discourse of the health and health needs of trans people away from a focus on risk and deficit, to align with a strength-based approach to illuminate factors that protect against suicidality and to promote resilience.

Authors' contributions
Conceptualization, S.Z., A.F.Q.W., I.B., E.D., J.D.Z., and A.S.C.; Methodology, S.Z., A.F.Q.W., E.D., I.B., T.C., and A.S.C.;; Investigation, S.Z., A.F.Q.W., and I.B.; Formal Analysis, S.Z., A.F.Q.W., S.Y.L., P.S.F.Y., and A.S.C.; Writing Original Draft, S.Z., A.F.Q.W., and A.S.C.; Writing Review & Editing, S.Z., A.F.Q.W., E.D., S.Y.L., I.B., T.C., J.D.Z., P.S.F.Y., and A.S.C.; Funding Acquisition, A.S.C.; Supervision, A.S.C. The authors read and approved the final manuscript.

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Availability of data and materials
The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request.

Ethics approval and consent to participate
The study was approved by the Austin Health Human Research and Ethics Committee (HREC/17/Austin/372). All methods were carried out in accordance with relevant guidelines and regulations. Given that this was an anonymous survey, written informed consent was not possible and was waived by the institutional ethics committee; however, the survey preamble outlined that completion of the survey implied consent.

Competing interests
No competing financial interests exist. No conflict of interest.

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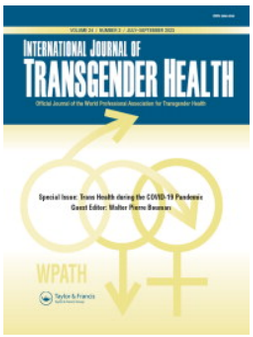

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The impact of the first three months of the COVID-19 pandemic on the Australian trans community

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ABSTRACT

Background: Trans and gender diverse individuals (people who identify with a gender different to what was presumed for them at birth) are one of the most medically and socially marginalized groups in our community. The COVID-19 pandemic may compound preexisting depression and thoughts of self-harm or suicide.

Aim: We aimed to explore the impact of the COVID-19 pandemic on the Australian trans community.

Methods: An online cross-sectional survey was conducted between 1st May 2020 and 30th June 2020, amidst strict Australia-wide social restrictions. Australian trans people aged ≥16years were eligible to participate. Survey questions explored the impact of the COVID-19 pandemic on living situation, employment, financial situation, and healthcare. Logistic regression to assess negative impacts due to COVID-19 on depression and thoughts of self-harm or suicide (measured by Patient Health Questionnaire-9 (PHQ-9) are presented as odds ratios (95% confidence interval)).

Results: Of 1019 participants, 49.6% reported experiencing financial strain, 22% had reduced working hours, and 22.4% were unemployed (three times the national rate). Concerningly, 61.1% experienced clinically significant symptoms of depression (Patient Health Questionnaire-9 score ≥10), considerably higher than pre-COVID rates for the trans community and over twice the national rate. Moreover, 49% reported thoughts of self-harm or suicide (over three times the national rate) which was more likely if a person experienced cancelation or postponement of gender-affirming surgery (OR 1 56 (1.04, 2 35)), financial strain (OR 1.80 (1.36, 2.38)), or felt unsafe or afraid in their household (OR 1.96 (1.23, 3.08)).

Discussion: Given rates of clinically significant depression and thoughts of self-harm or suicide are far higher in trans people than the general population, specific strategies to improve mental health in the trans community during the COVID-19 pandemic must be made a priority for policymakers, researchers, and health service providers to prevent suicide.

KEYWORDS
Coronavirus; COVID-19; depression; suicidality; transgender

Introduction

Transgender and gender diverse (referred to herein as *trans*) refers to people who have a gender that is different to what was presumed for them at birth and includes binary (male or female) and non-binary gender identities. Trans individuals comprise an estimated 0.5–4.5% of the adult population (Åhs et al., 2018; Crissman et al., 2017; Lai et al., 2010) but face numerous health disparities and are one of the most medically and socially marginalized groups in our community (Bockting et al., 2013; Bretherton et al., 2021).

Prior to the COVID-19 pandemic, trans people in Australia faced high rates of discrimination, sexual assault, physical and verbal abuse, homelessness, and multiple barriers to healthcare access (Bretherton et al., 2021; Strauss et al., 2020). Few Australian studies have used a validated diagnostic measure to estimate the rate of depression and thoughts of self-harm or suicide in the trans community. Pitts et al. (2009) reported 36.2% of trans adults in Australia met the criteria for a current major depressive episode and 25% reported thoughts of self-harm or suicide in the prior two weeks, as assessed by the Primary Care

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Evaluation of Mental Disorders Patient Questionnaire. More recently, Hyde et al. (2013) reported that 43.7% of trans adults experienced clinically significant depression and 53.6% reported thoughts of self-harm or suicide in the preceding two weeks, as assessed by the Patient Health Questionnaire-9 (PHQ-9). Comparatively, only 3.7% of a random sample of the Australian population in 2015 met criteria for clinically significant depression based on the PHQ-9 (Kiely & Butterworth, 2015). Over 40% of trans adults (Bretherton et al., 2021) and young people (Strauss et al., 2020) have attempted suicide, and deaths by suicide in trans people have been reported to be significantly higher than the general population (Wiepjes et al., 2020). Similar high rates of depression and suicidality in trans communities have been reported internationally (Adams et al., 2017; Bockting et al., 2013).

As many as one in five have experienced discrimination from healthcare providers and consequently, many trans people struggled to access health services even before the COVID-19 pandemic (Bretherton et al., 2021; Jaffee et al., 2016). Social disadvantage is likely to increase the risk of illness and mortality during the COVID-19 pandemic, increasing fear and anxiety experienced by marginalized groups.

Recent research has also begun to explore resilience and protective factors against depression, suicidality, and other mental health comorbidities in the trans community. For example, access to gender-affirming hormones and surgery (Riggs et al., 2014; White Hughto & Reisner, 2016) and social support and connection with the trans community (Moody & Smith, 2013; Sherman et al., 2020) have been shown to improve mental health and improve quality of life.

In Australia, the early months of the COVID-19 pandemic were characterized by relatively low positive cases and deaths due to strict social restrictions. International borders were closed and non-essential travel within and between states and territories was limited. Schools and universities transitioned to home-based online learning, and employees were instructed to work from home where possible. Many allied health services, including psychology and non-essential businesses were closed or changed to an online model for service delivery (i.e., telehealth). All elective surgery, including gender-affirming surgery was canceled or postponed to conserve healthcare resources. Rates of domestic violence were reported to have exponentially increased during extended periods of "lockdown" restrictions worldwide (Bradbury-Jones & Isham, 2020). With government orders to stay at home, trans people were potentially isolated with family or household members who may not have accepted their gender identity.

The COVID-19 pandemic has brought significant psychological distress on a global scale to many populations (Fisher et al., 2020; Pierce et al., 2020). Suicidal behavior is likely to be present for longer and peak later than the pandemic (Gunnell et al., 2020), and concern for the trans community has been raised as a priority (Wang et al., 2020). As such, we aimed to explore and understand the impact of the COVID-19 pandemic on the living situation, employment, financial status, depression, and thoughts of self-harm or suicide of the trans community in Australia. We hypothesized that the trans community would experience higher rates depression and thoughts of self-harm or suicide during the COVID-19 pandemic, as COVID-19-related stressors were likely to compound the impacts of preexisting social marginalization, discrimination and abuse.

Materials and methods

We conducted an online cross-sectional survey of trans Australians utilizing a non-probability snowball sampling approach. The survey was open to Australian residents ≥16 years of age who identified as trans between 1st May 2020 and 30th June 2020. The survey was designed collaboratively by our core team of researchers who are members of the Australian trans community (SZ, AWFQ, AG, TC, KE, ED), with support from clinicians experienced in trans healthcare (LMA, ASC). Survey data were collected and managed using REDCap electronic data capture tools hosted at The University of Melbourne. The study received ethical and governance approval by the Austin Health Human Research Ethics Committee (Reference Number HREC/57155/Austin-2019), ACON Research Ethics Review Committee

(Reference Number 2020/03), and the Thorne Harbour Health Community Research Endorsement Panel (Reference Number THH/CREP 20-006).

The survey preamble outlined that completing the survey implied consent. Inclusion criteria were assessed *via* three screening questions: (a) currently living in Australia; (b) identification as trans ("is your gender different to what was presumed for you at birth?"); and (c) aged 16 years or older. Participants were asked to first complete an enrollment survey (as part of a larger longitudinal project) with demographic questions. An individualized link to the "COVID-19 survey" was subsequently sent by email. Duplicate responses or incomplete responses were excluded. All survey questions were optional. Reimbursement (AUD$5 gift card) was provided to participants following completion of the survey.

The survey was posted on social media (Facebook and Instagram). Furthermore, over 100 trans community support groups and organizations in Australia were directly contacted to share the survey within their networks.

Demographic data, including state of residence, age, presumed gender at birth, and gender identity were ascertained. To facilitate data analysis, participants were then asked to self-select the most appropriate gender category of three: trans man, trans woman, or non-binary (see Table 1).

Participants were asked "Has your living situation changed in response to COVID-19?" with Yes or No response options; as well as "What statement best describes your current living situation at the moment?" with fixed-response and open-ended options, as outlined in Table 2. To explore safety during social isolation, participants

Table 1. Demographic characteristics of the study sample.

Demographic variable	*N*	%	National data (%)
Age (N = 1017)			
16–25	368	36.2	12.8
26–35	344	33.9	14.4
36–45	121	12.0	13.5
46–55	95	9.4	13.3
56 – 65	61	6.0	11.8
66–75	24	2.4	8.9
76–85	3	0.3	4.8
Sex presumed at birth (N = 1019)			
Male	469	46.0	49.1
Female	532	52.2	50.9
Unsure/prefer not to say	18	1.8	NA
Variation of sex characteristics (Intersex) (N = 1019)			
No	827	81.2	NA
Yes	88	8.6	NA
Unknown	100	9.8	NA
Prefer not to say	4	0.4	NA
Gender category (N = 1019)			
Trans woman	396	38.9	NA
Trans man	362	35.5	NA
Non-binary	261	25.6	NA
Aboriginal or Torres Strait Islander (N = 1019)			
Aboriginal	89	8.7	3.0
Torres Strait Islander	21	2.1	0.2
Both Aboriginal and Torres Strait Islander	12	1.2	0.1
Non-Indigenous	885	86.9	96.7
Prefer not to say	12	1.2	NA
Country of birth (N = 1019)			
Australia	859	84.3	70.3
Other	160	15.7	29.7
State/territory of residence (N = 1019)			
Australian Capital Territory	53	5.2	1.7
New South Wales	255	25.0	32.1
Northern Territory	11	1.1	0.9
South Australia	132	13.0	7.0
Queensland	66	6.5	19.8
Tasmania	25	2.5	2.1
Victoria	375	36.8	26.2
Western Australia	102	10.0	10.2

NA equals not applicable. Source of National Data: Australian Bureau of Statistics 2020, and Australian Institute of Health and Welfare 2019 Profile of Indigenous Australians.

Table 2. Living situation, employment, and finances.

Living situation, employment and financial variable	*N*	%	National data (%) (Fisher et al., 2020; Morgan et al., 2020)
Change of living situation during COVID-19 (N = 1013)			
Yes	273	27.0	NA
No	740	73.1	NA
Current household composition (N = 1017)			
With family (logical or chosen)	300	29.5	NA
With partner(s)	288	28.3	NA
Alone	187	18.4	19.2
With friends or housemates	185	18.2	6.9
With some but not all partners	30	3.0	NA
Mixed household (e.g. parent and housemates)	11	1.1	NA
No regular place of residence	4	0.4	NA
Assisted living/care facility	4	0.4	NA
Boarding school or residential college	4	0.4	NA
Shared custody arrangement	3	0.3	NA
Foster care	1	0.1	NA
Feeling unsafe or afraid in household (N = 1016)			
Yes	119	11.7	11.6
No	897	88.3	88.4
Change in employment status due to COVID-19 (N = 909)			
No change in employment	289	31.8	NA
Contact with work colleagues greatly reduced	217	23.9	NA
Working reduced hours	200	22.0	NA
Unemployed prior to the pandemic	142	15.6	NA
Lost employment	106	11.7	11.2
Other (e.g. increase in work hours)	146	16.1	NA
Current employment status (N = 1015)			
Full time employment	309	30.4	NA
Student	237	23.4	NA
Unemployment	227	22.4	7·4
Part time employment	185	18.2	NA
Casual employment	156	15.4	NA
Pension	97	9.6	NA
Volunteer	50	4.9	NA
House duties	44	4.3	NA
Retired	21	2.1	NA
COVID-19 related financial strain (N = 1019)			
Rent/mortgage	240	23.6	NA
Utilities (e.g. electricity, gas, water, internet)	260	25.5	NA
Food/groceries	318	31.2	NA
Financially supporting others	145	14.2	NA
Other (e.g. medication, healthcare)	106	10.4	NA

NA – not applicable. National data are for the same time period. Source of National Data: Fisher et al. (2020) and Morgan et al. (2020). Canberra: Australian Institute of Criminology, 2020, and Employment, hours worked and unemployment rise in June. Australian Bureau of Statistics 2020.

were asked "Does anyone in your household make you feel unsafe or afraid?" with Yes or No response options. Changes in employment as a result of the COVID-19 pandemic were assessed with fixed-responses to "What best describes your current employment status?" and "How has your employment status changed because of the COVID-19 pandemic?" specifically with the option to select all that applied from (a) I lost my job; (b) I am working reduced hours; (c) Contact with work colleagues reduced; (d) I was unemployed prior to the COVID-19 pandemic; (e) it has not been affected; and (f) other. For the purposes of statistical analysis, "job loss" was categorized as any participant who selected "I lost my job".

Participants were asked "Has the COVID-19 pandemic put financial strain on any of the following?" with the option to select all that applied from; (a) rent/mortgage; (b) utilities (e.g. electricity, gas, water, internet); (c) food/groceries; (d) provision of financial support to others; (e) other (open-text response). For purposes of analysis, "financial strain" was categorized as any participant who had indicated one or more of the forms of financial strain.

Depression and thoughts of self-harm or suicide were assessed using the PHQ-9 (Arroll et al., 2010; Kroenke et al., 2001). The PHQ-9 was chosen given the availability of Australian normative data (Fisher et al., 2020), and validation against formal diagnostic psychiatric interviews (Arroll

et al., 2010; Staples et al., 2019). PHQ-9 is an easy to understand, self-reported 9-item scale, whereby respondents select the severity of nine depressive symptoms as "0" (not experienced) to "3" (experienced nearly every day). The sum of all nine responses provide a total score. PHQ-9 scores ≥10 are 88% sensitive and 85% specific for detecting clinically significant major depression (Levis et al., 2019). PHQ-9 scores of 5–9 represent mild, 10–14 moderate, 15–19 moderately severe, and ≥20 severe depressive symptoms. Specifically, PHQ-9 Item 9 assessed thoughts of self-harm or suicide ("thoughts that you would be better off dead or of hurting yourself in some way").

Descriptive frequencies were reported, and median (interquartile range) values were included for not normally distributed data. Statistical analysis was performed using R version 4.0.2 (R Foundation for Statistical Computing, Vienna, Austria). Logistic regression was performed to explore associations between experiences of COVID-19-related stressors and depression and thoughts of self-harm or suicide. Models for depression and responses to item-9 (thoughts that one would be better off dead or of hurting themselves) were analyzed separately with four types of experiences of COVID-19 – job loss (participants who indicated "I lost my job"), feeling unsafe or afraid in household, financial strain (participants who indicated financial strain in relation to at least one of housing, utilities, groceries, financial supporting others, or "other"), and surgery canceled or postponed. All models were adjusted for age, being born overseas, gender category, and living situation to allow for similar comparisons with a national survey (Fisher et al., 2020).

Results

A total of 1162 responses were received. After removing duplicates, ineligible responses and incomplete surveys, 1019 participants remained.

Demographic data

Demographic data are summarized in Table 1. The median age of participants was 29 years (range 16–80). Responses were received from participants living in all Australian states and territories, though were not represented proportionately to the population. There was a greater number of younger individuals, and a higher proportion of First Nations Aboriginal or Torres Strait Islander people in our sample than national averages (Table 1). The proportion of individuals identifying as trans women, trans men, and non-binary in this sample were similar to another trans adult community survey in Australia (Zwickl et al., 2019).

Living situation

Since the onset of the COVID-19 pandemic, 27% ($n = 273$) of participants reported that their living situation had changed. Reasons for a change in living situation included job loss, financial strain, and attempts to ensure ongoing access to informal supports during social restrictions by combining formerly separate households. Household composition is outlined in Table 2. A total of 11.7% reported that they were living with someone that made them feel unsafe or afraid, which is comparable to Australian general population reports of 11.6% during the early stages of the COVID-19 pandemic (Morgan et al., 2020).

Employment and financial situation

The majority of the participants experienced some negative change in employment status as outlined in Table 2. Over a third had reduced working hours or had become unemployed. Approximately, one in four experienced social impacts, such as reduction in contact with work colleagues. Almost half of participants ($n = 550$) reported experiencing financial strain related to the COVID-19 pandemic.

Patient health questionnaire-9 (PHQ-9)

The PHQ-9 was completed by 985 participants (Table 3). Of note, 61.1% ($n = 602$) of participants experienced clinically significant symptoms of depression (PHQ-9 score ≥10). This is significantly higher than 27.6% reported in the general

Table 3. Depression and thoughts of self-harm or suicide (PHQ-9).

Mental health variable	Trans men *N* (%)	Trans women *N* (%)	Non-binary *N* (%)	Total *N* (%)	National data (%) (Fisher et al., 2020)
*PHQ-9 score and depression severity (N = 985)**					
0–4 (minimal or none)	46 (13.3)	72 (18.9)	22 (8.6)	140 (14.2)	NA
5–9 (mild)	95 (27.4)	104 (27.3)	44 (17.1)	243 (24.7)	26.5
10–14 (moderate)	77 (22.2)	77 (20.2)	64 (24.9)	218 (22.1)	A total of 27.6
15–19 (moderately severe)	66 (19.0)	66 (17.3)	57 (22.2)	189 (19.2)	(score ≥ 10)
20–27 (severe)	65 (18.7)	62 (16.3)	70 (27.2)	195 (19.8)	
*PHQ-9 – item 9 Thoughts that you would be better off dead or of hurting yourself in some way (last two weeks) (N = 985)***					
Not at all	189 (54.5)	205 (53.8)	108 (42.0)	502 (51.0)	85.4
Several days	73 (21.0)	91 (23.9)	71 (27.6)	235 (23.9)	8.9
More than half the days	51 (14.7)	49 (12.9)	31 (12.1)	131 (13.3)	3.0
Nearly every day	34 (9.8)	36 (9.5)	47 (18.3)	117 (11.9)	2.7

NA equals not applicable. Source of National Data: Fisher et al. (2020).
*Overall p value from Chi-squared test comparing between non-binary and binary (trans men $p = 0.004$ and trans women $p < 0.0001$).
**Overall p value from Chi-squared test comparing between non-binary and binary (trans men $p = 0.001$ and trans women $p = 0.002$).

Australian population in response to COVID-19 during May 2020 (Fisher et al., 2020), and higher than in trans Australians prior to the pandemic (36% and 44% reported to have PHQ-9 score ≥10 in 2009 by Pitts et al. and in 2013 by Hyde et al. respectively). In a subgroup analysis by gender (trans men, trans women, or non-binary shown in Table 3), the non-binary group was more likely to experience clinically significant symptoms of depression compared to binary groups (74.3% in non-binary group compared to 59.9% in trans men and 53.8% in trans women, all overall p values <0.01).

Notably, 49% ($n = 483$) of participants reported that they had thought that they would be better off dead or of hurting themselves in the two preceding weeks, which is almost double the rate reported by Pitts et al. (2009), though similar to Hyde et al. (2013). A total of 11.9% ($n = 117$) reported that they experienced these thoughts nearly every day. The occurrence of such thoughts during the COVID-19 pandemic in 49% of trans Australian adults was significantly higher than 14.9% of the general Australian population (Fisher et al., 2020). Individuals with non-binary identities reported a higher prevalence of having thoughts that they would be better off dead or of hurting themselves in the prior two weeks compared to individuals with binary identities (Table 3). A descriptive table of the PHQ-9 and Item 9 scores by state and territory has been included as a Supplementary Table.

Predictors of clinically significant depression or a participant selecting that they had experienced "thoughts that you would be better off dead or of hurting yourself in some way" are outlined in Table 4. Contrary to national data, job loss due to COVID-19 restrictions was not statistically associated with a higher risk of depression or thoughts that they would be better off dead or of hurting themselves in Australian trans individuals. Notably, the unemployment rate was 22.4% which is three times higher than the national rate (Table 2). Feeling unsafe or afraid in the household and financial strain posed a higher risk for both depression and having thoughts that they would be better off dead or of hurting themselves. Cancelation or postponement of gender-affirming surgery due to COVID-19 was associated with a 56% increase in the risk of having thoughts that they would be better off dead or of hurting themselves (Table 4).

Discussion

This large community survey involving 1019 participants is one of the first studies describing the impact of the COVID-19 pandemic on the trans community in Australia. These data quantify the magnitude and severity of depression and thoughts of self-harm or suicide in the first three months of the COVID-19 pandemic. Concerningly, 61% of trans Australians met criteria based on PHQ-9 for clinically significant depression, considerably higher than prior to the pandemic (rates of 36% reported in 2009 by Pitts et al. and 44% in 2013 by Hyde et al.) and more than twice the rate seen in the Australian general population during the pandemic (Fisher

Table 4. Associations between experiences of COVID-19 and depression and thoughts of self-harm or suicide.

	Mental health outcome (last two weeks)			
	Clinically significant symptoms of depression (PHQ9 score >10)		Thoughts that you would be better off dead or of hurting yourself in some way	
(*N* = 985)	Trans sample OR (95% CI)*	National data (Fisher et al., 2020)	Trans Sample OR (95% CI)*	National data (Fisher et al., 2020)
Job loss due to COVID-19 restrictions	0.70 (0.44, 1.11)	**1.50 (1.31, 1.72)**	1.11 (0.71, 1.73)	**1.31 (1.11, 1.55)**
Feeling unsafe or afraid in household	**1.75 (1.06, 2.89)**	NA	**1.96 (1.23, 3.08)**	NA
Financial strain	**1.85 (1.69, 2.47)**	NA	**1.80 (1.36, 2.38)**	NA
Gender-affirming surgery canceled or postponed	1.35 (0.88, 2.07)	NA	**1.56 (1.04, 2.35)**	NA

NA equals not applicable. Bold values indicate odds ratios where its corresponding 95% confidence interval does not cross 1.
*Odds ratio (95% CI) for all four types of experiences of COVID-19 are mutually adjusted for each other with age, being born overseas, gender, and living situation also included as covariates. National data from Fisher et al. (2022).

et al., 2020). Additionally, almost half the participants (49%) reported thoughts of self-harm or suicide in the preceding two weeks, which was significantly more likely in people who reported feeling unsafe or afraid in their household, experienced financial strain, or had cancelation or postponement of planned gender-affirming surgery. Rates of experiencing thoughts of self-harm or suicide are higher than the general Australian population (Fisher et al., 2020) but are similar to previous reports in trans Australians (Hyde et al., 2013).

Trans Australians with non-binary identities reported higher rates of both depression and thoughts of self-harm or suicide compared to those with binary identities which is consistent with findings from prior to the pandemic (Cheung et al., 2020; James et al., 2016). This may be related to a lack of social and legal recognition of non-binary genders (McLemore, 2015; Valentine, 2016) and is unlikely to be attributed to the COVID-19 pandemic.

The overall high rates of clinically significant depression and thoughts of self-harm or suicide are likely the result of the preexisting effects of social marginalization, discrimination, and high rates of physical and verbal abuse and associated high rates of depression and suicidality experienced by the trans community (Bretherton et al., 2021; Strauss et al., 2020), *compounded by* COVID-19 pandemic-related stressors. In addition to ongoing challenges faced by the trans community, trans Australians may have faced isolation from trans community and wider support networks and some have experienced disruptions to their gender-affirming healthcare through cancelation of surgeries.

Feeling unsafe or afraid in the household posed a higher risk for both depression and thoughts of self-harm or suicide. Rates of feelings unsafe or unafraid in the household were comparable with the general population (Fisher et al., 2020), and therefore it cannot be presumed that such experiences are related to one's trans status. There is, however, some evidence that many trans people face discrimination and violence within the home (James et al., 2016; Riggs et al., 2015; Smith et al., 2014) and that this is associated with poorer mental health (Riggs et al., 2015).

There were significantly greater odds of thoughts of self-harm or suicide in trans people experiencing cancelation or postponement of their gender-affirming surgery. Gender-affirming surgery can be a critical part of transition and affirmation for many trans people, with previous data demonstrating that access to gender-affirming surgery is protective against suicidal ideation and suicide risk (Bauer et al., 2015; Tucker et al., 2018). Despite the 95% confidence interval crossing 1 for reporting depression, the point estimate indicates an increased odds ratio of 1.35 for cancelation of surgery. Statistically, whilst the concordance rate between depression and suicide is high (76%), there is a group of individuals (18%) who met criteria for clinically significant depression but did not have thoughts of self-harm or suicide. Amongst those who had thoughts of self-harm or suicide and had surgery canceled, the majority (93%) also had depression. In contrast, amongst those who had surgery canceled

and no thoughts of self-harm or suicide, only 29% had depression. This may suggest that cancelation of surgery may not be a primary risk factor for some individuals with depression but no thoughts of self-harm or suicide. This is likely contributing to the (relatively) smaller effect size between surgery canceled and depression, in contrast to the effect size for thoughts of self-harm or suicide. With resumption of elective surgery, prioritization of gender-affirming surgery may help alleviate symptoms of depression and thoughts of self-harm or suicide in the trans community which are clearly higher than the general population.

The increased financial strain resulting from the COVID-19 pandemic is associated with 80% higher odds of experiencing depression or thoughts of self-harm or suicide, which disproportionately impacted an already economically marginalized community. Contrary to general population data, job loss itself during the COVID-19 pandemic was not statistically associated with a higher risk of depression or thoughts of self-harm or suicide in trans Australians. Notably, the national data (Fisher et al., 2020) was collected in the first month of COVID-19 restrictions in Australia (3rd April–2nd May 2020) and found an increased odds of reporting depression or thoughts of self-harm/suicide with job loss at a time prior to any tangible government assistance. This survey was conducted between the 1st May and 30th June 2020. From the first week of May 2020, the Australian Government began paying businesses who were adversely affected by the COVID-19 pandemic a wage subsidy (known as JobKeeper) to enable them to keep employees in jobs. This flat payment of AUD$1500 per fortnight was the equivalent of 70% of the national median wage. This likely provided financial relief and job certainty for at least six months for many individuals and for some, JobKeeper payments were higher than their usual income, providing positive financial benefits. This complexity likely explained the lack of associations with job loss in our survey. There are also potential confounding effects with financial strain, in which despite evidence of an association in univariate analysis, there is a considerable change in the estimated odds ratio of job loss (>10%) when financial strain was included in the model.

With ongoing uncertainty surrounding the pandemic and intermittent implementation of social restrictions, there is likely to be ongoing issues of unemployment, financial strain, and unsafe living situations, coupled with fear and social isolation. These are all likely to have a long-term adverse impact on mental health. Suicidality is likely to present for longer and peak later than the pandemic (Gunnell et al., 2020), with great fears for a suicide epidemic in the trans community (Wang et al., 2020).

Overall, mental health services and support are critical to addressing the high rates of depression and thoughts of self-harm or suicide in the Australian trans community during and after the COVID-19 pandemic. Whilst Australia's mental health sector has been agile in responding to the needs exposed by the COVID-19 pandemic, including expanding telehealth, mainstream services are often inept in their understanding of the trans experience and therefore the complex mental health needs of many trans people (Strauss et al., 2020; Zwickl et al., 2019). Certainly, previous research has found that LGBTIQA + individuals avoid mainstream telephone crisis counseling because they anticipate discrimination (Waling et al., 2020). Given the unique and complex challenges that trans people often face, mainstream mental health services should be provided with additional trans competency training, and specialized LGBTIQA + and trans-specific services require additional funding and resources to increase their capacity to meet the increase in demand. Safe and affirming mental health support strategies that can be delivered safely within COVID-19 social restrictions need to be explored, and potentially online-based peer support programs, smartphone-based applications, or text messaging may be useful options. The financial accessibility of mental health support should also be considered, given the high rates of unemployment and financial strain experienced by the trans community. In addition, given that loss of employment and financial strain are well-recognized risk factors for suicide in the general population (Blakely et al., 2003; Classen & Dunn, 2012; Nordt et al., 2015), both issues require urgent government attention.

Limitations

There are multiple limitations to this cross-sectional study and based upon a non-probability snowball sampling approach. This study identified associations but not causal relationships. The online-based recruitment may explain why a greater proportion of responders were younger individuals and hence may not accurately reflect the views of the older trans community, those who are less computer proficient or in people who may have difficulty with English fluency. Not all areas of Australia were represented equally, as recruitment was not targeted. However, the predominance of respondents in south eastern states is in line with previous Australian trans community surveys (Bretherton et al., 2021; Strauss et al., 2020). The lack of an objective measure of anxiety is also a significant limitation of this study, given that there has been a noted increase in anxiety in the general population during the pandemic (Fisher et al., 2020). Additionally, the survey did not clarify whether feeling unsafe or afraid in one's household was related to being trans.

Nonetheless, this survey provided a platform for participants to express their views at a time when in-person interviews are not feasible during COVID-19 social restrictions. This is one of few studies describing the impact of the COVID-19 pandemic on trans people who are traditionally marginalized and underrepresented in research. Our use of the standardized PHQ-9 additionally allows comparisons with the general population during COVID-19 social restrictions and outside of COVID-19.

Conclusion

An urgent, targeted public health response co-created with trans individuals is needed to address the alarming rates of depression and thoughts of self-harm and suicide in trans Australians. COVID-19 pandemic-related stressors appear to have further exacerbated preexisting high rates of depression. Strategies to ensure the safety of trans people to live without discrimination, abuse or violence are needed, particularly in home environments during social restrictions. Moreover, our findings highlight the importance of gender-affirming surgery for trans people and reinstating access may aid in preventing suicide.

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Authors' contributions

Conceptualization: SZ, LMA, AWFQ, AG, KE, TC, ED, JDZ, and ASC; Methodology: SZ, LMA, AWFQ, AG, KE, TC, ED, and ASC; Data Curation: LMA; Investigation: SZ, LMA, AWFQ, AG, KE, TC, and ASC; Formal analysis: SZ, SYL, AWFQ, AG, and KE; Writing – Original Draft Preparation: SZ and ASC; Writing – Review & Editing SZ, LMA, AWFQ, AG, KE, TC, ED, SYL, JDZ, and ASC; Funding Acquisition: ASC; Supervision: JDZ and ASC. All authors had full access to all of the data (including statistical reports and tables) in the study, approved the final manuscript as submitted and agree to be accountable for all aspects of the work.

Data sharing statement

Deidentified participate data are available upon reasonable request from the corresponding author via email (adac@unimelb.edu.au), provided that the related research is deemed to be of benefit to the trans and gender diverse community and has undergone Austin Health Human Research Ethics Committee approval in the form of an amendment.

Declaration of interests

The authors have nothing to disclose.

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Societal Implications of Health Insurance Coverage for Medically Necessary Services in the U.S. Transgender Population: A Cost-Effectiveness Analysis

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BACKGROUND: Recently, the Massachusetts Group Insurance Commission (GIC) prioritized research on the implications of a clause expressly prohibiting the denial of health insurance coverage for transgender-related services. These medically necessary services include primary and preventive care as well as transitional therapy.

OBJECTIVE: To analyze the cost-effectiveness of insurance coverage for medically necessary transgender-related services.

DESIGN: Markov model with 5- and 10-year time horizons from a U.S. societal perspective, discounted at 3 % (USD 2013). Data on outcomes were abstracted from the 2011 National Transgender Discrimination Survey (NTDS).

PATIENTS: U.S. transgender population starting before transitional therapy.

INTERVENTIONS: No health benefits compared to health insurance coverage for medically necessary services. This coverage can lead to hormone replacement therapy, sex reassignment surgery, or both.

MAIN MEASURES: Cost per quality-adjusted life year (QALY) for successful transition or negative outcomes (e.g. HIV, depression, suicidality, drug abuse, mortality) dependent on insurance coverage or no health benefit at a willingness-to-pay threshold of $100,000/QALY. Budget impact interpreted as the U.S. per-member-per-month cost.

KEY RESULTS: Compared to no health benefits for transgender patients ($23,619; 6.49 QALYs), insurance coverage for medically necessary services came at a greater cost and effectiveness ($31,816; 7.37 QALYs), with an incremental cost-effectiveness ratio (ICER) of $9314/QALY. The budget impact of this coverage is approximately $0.016 per member per month. Although the cost for transitions is $10,000–22,000 and the cost of provider coverage is $2175/year, these additional expenses hold good value for reducing the risk of negative endpoints —HIV, depression, suicidality, and drug abuse. Results were robust to uncertainty. The probabilistic sensitivity analysis showed that provider coverage was cost-effective in 85 % of simulations.

CONCLUSIONS: Health insurance coverage for the U.S. transgender population is affordable and cost-effective, and has a low budget impact on U.S. society. Organizations such as the GIC should consider these results when examining policies regarding coverage exclusions.

KEY WORDS: transgender health; cost effectiveness analysis; budget impact analysis; preventive care; health law; health insurance coverage.
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INTRODUCTION

U.S. health insurance plans categorically deny transgender enrollees coverage for medically necessary services such as transition-related and preventive care.[1]

In 2013, the Commonwealth of Massachusetts Group Insurance Commission (GIC), the state's administrator of employment-based health benefits to 420,000 subscribers, prioritized research on whether the cost-effectiveness of providing benefit coverage for transgender enrollees would support the removal of exclusions of coverage for transition-related services. Current evidence indicates that transition-related care is medically necessary and effective for transgender patients.[2,3] Furthermore, recent changes in federal and state laws may place health insurer accreditation status at risk based on absence of coverage for transition-related care.[4,5] Since negative health outcomes are associated with denial of these services, it may be in payers' financial interests to cover transgender health benefits.[2] Payers could increase net monetary benefit and avoid noncompliance with regulations by offering coverage in accordance with guideline-recommended care.[3]

The American College of Physicians' position on the health care of transgender persons is that all services should be covered as they would for other beneficiaries, and that coverage should not discriminate on the basis of gender identity.[6] However, health insurance policies frequently prohibit coverage for transgender people under a clause expressly prohibiting coverage for transitional care, or based on carriers' contract interpretation.[7] Transgender exclusions result in denial of coverage when subscriber gender marker and physiology are incongruent.[8]

In 2014, the U.S. Department of Health and Human Services lifted a 33-year ban on coverage of transitional care for Centers for Medicare and Medicaid Services (CMS) beneficiaries, citing that existing literature demonstrates the efficacy, safety, and effectiveness of "sex reassignment surgery" and that "exclusions of coverage are not reasonable."[4,5] This stance stemmed from the U.S. Department of Justice's interpretation of Title VII of the Civil Rights Act that sex discrimination prohibitions extend to health benefits of transgender people.[9] This federal decision could influence how public and commercial payers define medically necessary services.

The most effective approach to transition uses individualized treatment plans,[10] which may require hormone replacement therapy (HRT), mastectomy, phalloplasty, vaginoplasty, psychotherapy, or other services.[8] The prevalence of sex reassignment surgery is 1:100,000 population, or approximately 3000–9000 in the U.S.[4,8] In 2001, 866 male-to-female (MTF) primary surgeries (bottom surgery) and 336 female-to-male (FTM) primary surgeries (top surgery) were documented in the U.S., and the prevalence has likely increased since then, despite considerable under-reporting.[4,8,11] These procedures are costly to uninsured patients. In addition, many costs for gender-specific preventive care (i.e., prostate screening, mammograms) are not covered by insurance if a patient legally changes their sex on their birth certificate.[11,12] According to Gorton et al., providing insurance coverage would appear cost-effective,[2] whereas negative outcomes associated with denial of coverage could be costly to payers because of increased morbidity.[13] For instance, studies by Lundstrom and by Kuiper and Cohen-Kettenis estimated that suicidality in transmen dropped from 20 % to 1 % after treatment.[14,15] No studies, however, have measured the economic benefit of health insurance coverage to transgender enrollees for medically necessary and preventive services.

Our objective was to analyze the cost-effectiveness of health insurance coverage for medically necessary and preventive services compared to no coverage in the U.S. adult transgender population. This study was designed from a U.S. societal perspective and evaluated outcomes over 5- and 10-year periods.[16] We hypothesized that provider coverage is cost-effective.

METHODS

Study Design

Using a Markov model, we compared the cost-effectiveness of health insurance for provider coverage (i.e., access to primary, secondary, and tertiary services provided by a physician and/or advanced practitioner) of medically necessary services in the U.S. adult transgender population.[17,18] Model parameters were extracted from the National Transgender Discrimination Survey (NTDS) of adults,[1] and provider costs for transition-related care were extracted from the Healthcare Bluebook.[19] Costs were adjusted to 2013 U.S. dollar values and discounted at 3 % along with utilities, and analyzed over 5 and 10 years.[16]

The analysis was conducted from a U.S. societal perspective. Effectiveness was measured as quality-adjusted life years (QALYs) derived from EuroQol Group EQ-5D index scores.[20] Patient costs in the provider coverage arm were considered along with probabilities for negative outcomes and any associated costs for psychiatric rehabilitation. Patients in the provider coverage arm were assumed to receive individualized transition therapy.[7] With no health benefit, patients were assumed to have lower upfront costs, but higher risks for negative outcomes, long-term costs, and lower life expectancy.

Model

The Markov model (Fig. 1) was built using TreeAge (TreeAge Software, Inc., Williamstown, MA, USA; 2009). With provider coverage, 100 % of patients were modeled to have authorized transitional therapy care in accordance with the World Professional Association for Transgender Health (WPATH) standards of care.[3]

Patients could experience a continuous progression of outcomes in escalating stages over 1-year cycles for up to 10 years. Patients in escalated states required costly rehabilitation to cycle through job loss/depression in order to return to a preferable baseline state. Patients who cycled into escalated states had increased risk of drug abuse, suicidality, and HIV.[21] The risk of death included all-cause mortality[22] and specific mortality rates from suicide and drug overdose.[23 25] Following transitional therapy, the model included costs for provider coverage to reduce negative outcomes.

No Health Benefit

The structure of the no health benefit arm accounted for denial of coverage to transgender patients for medically necessary and preventive care, as well as adverse implications. Patients began either at baseline or a job loss/depression state according to the unemployment rate associated with anti-transgender bias.[1] Patients at baseline and in the job loss/depression state were modeled as having high rates of escalating issues, including death.[1] Alternatively, patients at baseline accrued no cost.

Provider Coverage

Patients with health insurance with provider coverage could navigate through transitional therapy or denial. Patients denied coverage following a mental health evaluation transitioned to baseline or escalated states. This sub-tree accounted for variations in policy and practice, including barriers raised through insurance claims and coding processes. For example, if a female-to-male (FTM) patient changed his legal gender marker and then submitted billing for a Pap smear, coverage was modeled as denied based on his gender marker despite the provider's adherence to WPATH guidelines.

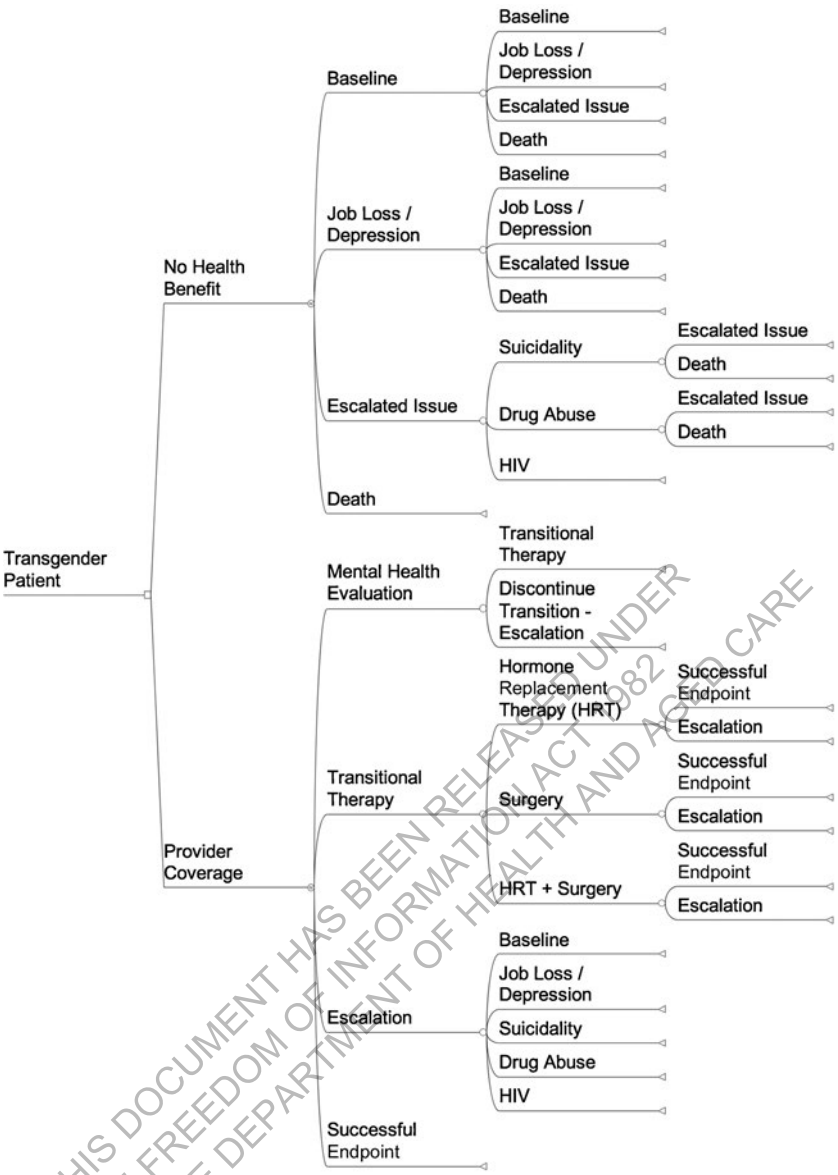

Figure 1 A simplified Markov diagram comparing no health benefit to provider coverage of medically necessary services for the U.S. transgender population.

Provider coverage was modeled as having higher costs and improved quality of life. The model also incorporated probabilities for negative health outcomes. Most patients were assumed to receive a full range of services indicated by WPATH, including reconstructive procedures.[3,7]

Assumptions

The model included several assumptions. First, provider coverage paid for the following procedural combinations: surgery, HRT, surgery and HRT, discontinued transition, and costs associated with baseline prevalence of job loss/depression. Second, costs for provider coverage were equivalent to reimbursed rates for procedural diagnosis-related groups (DRGs). Third, transitional therapy would maintain its baseline utility.

Data Collection

Data were collected from a systematic review of over 30 randomized controlled trials, observational data, and case series detailing types of gender-confirming care, whether transphobic-related events triggered negative outcomes, and the existence of a defined outcome for each related state. Many probabilities were from the NTDS (Table 1).[1]

Costs

Transition costs were gathered from the GIC public record and the literature (Table 2).[11] Existing DRGs weighted by procedural prevalence were used for initial and incremental costs of services. Thus, costs were reflective of the most common procedures (e.g. mastectomy) compared to rare procedures

Table 1 Probabilities for the cost effectiveness analysis

Probabilities	Base Case	Range for Sensitivity Analyses	Source
No Health Benefits			
Baseline	0.74	0.629 0.851	1
Baseline	0.7	0 595 0.805	1
Job Loss/Depression*	0.199	0.169 0.229	1
Escalation	0.1	0.085 0.115	1
Suicidality*	0.82	0.697 0.943	1
HIV	0.048	0.039 0.053	1
Drug Abuse	0.13	0.1105 0.1495	1
Death	0.00012	0.000102 0.000138	22
Active	0.26	0 221 0.299	1
Baseline	0.58	0.493 0.667	1
Active	0.26	0 221 0.299	1
Escalation	0.13	0.1105 0.1495	1
Suicidality*	0.739	0.628 0.849	1
HIV	0.101	0.086105 0.116495	1
Drug Abuse	0.16	0.136 0.184	1
Death*	0.00012	0.000102 0.000138	22
Death	0.00012	0.000102 0.000138	22
Suicidality			
Job	0.47	0 399 0.541	1
Loss/Depression*			
Suicidality	0.33	0 281 0.380	24
Drug Abuse	0.08	0.068 0.092	1
Death	0.12	0.102 0.138	24
Drug Abuse			
Job	0.383	0 326 0.441	1
Loss/Depression*			
Drug Abuse	0.448	0 381 0.515	1
HIV	0.026	0.022 0.030	1
Suicidality	0.14	0.119 0.161	23 25
Death	0.0017	0.0014 0.0019	23 25
Provider Coverage			
Mental Health Evaluation			
Denied Coverage	0.07	0.059 0.081	1
HRT	0.62	0 527 0.713	1
Escalation	0.66	0.412 0.841	1
Surgery*	0.31	0 264 0.357	1
Escalation	0.0895	0.076 0.103	23
MTF	0.5		Assumed
w/HRT	0.8	0.68 0.92	1
w/no HRT*	0.2	0.17 0.23	1
FTM	0.5		Assumed
w/HRT	0.69	0 586 0.793	1
w/no HRT*	0.03	0.025 0.034	1

** Represents a remainder so that all probabilities add up to 1.0; FTM female to male transition, HRT hormone replacement therapy, MTF male to female transition*

(e.g. phalloplasty).[11,17] There were no costs attributed to baseline state or death. Depression, suicidality, and drug abuse states resulted in rehabilitative costs.[26 28] The U.S. cost of illness for HIV was extracted from Walensky et al.[29]

Cost of provider coverage was dependent on combinations of surgery and HRT. HRT was a fixed cost. The MTF group represented combinations of penectomy, breast augmentation, labiaplasty, and vaginoplasty. The FTM represented combinations of mastectomy, hysterectomy, abdominoplasty, and genital augmentation. Under provider coverage, there was an annual cost of $2175 associated with medically necessary services and preventive care.

Other treatment costs were based on DRGs. Escalated states following baseline were based on employment status. The NTDS found that 78 % of respondents who successfully transitioned reported improved job performance.[1] Conversely, respondents who experienced job loss were 70 % more likely to abuse substances than employed respondents. HIV rates among the transgender population were 400 % higher than in the general population, and doubled with unemployment.

Utilities

QALYs were extracted from U.S.-based sources (Table 3). Baseline utility was taken as the U.S. average according to Sullivan et al.[20] This index also provided utilities for depression (ICD-9 311) and suicidality (assumed as ICD-9 296). Utility for HIV was referenced from Wu et al., and Coffin et al. provided utility data for drug abuse.[30,31] Surgery had a disutility.[32] Benefit coverage for transition and successful endpoints were weighted as 0.867 QALYs, given primary preferences for these outcomes aligned with the U.S. population average.[30,31]

Sensitivity Analyses

Univariate and multivariate sensitivity analyses were used to test model uncertainty. These sensitivity analyses were performed by varying all base case estimates by reported distributions (e.g., confidence intervals, standard deviations) or by varying estimates ±15 % of the mean when distributions were not reported.

In one particular univariate analysis, the probability of patients starting in job loss/depression ranged from 0–29.9 % in the provider coverage arm, since the model assumed some baseline prevalence of depression or unemployment not negated by transition therapy, leading to downstream escalations.

A Bayesian multivariate probabilistic sensitivity analysis applied distributions for each variable to characterize uncertainty on all parameters simultaneously using 10,000 Monte Carlo simulations. Beta distributions were used for probabilities and utilities (i.e., values of 0.0–1.0), and gamma distributions were used for costs (i.e., positive values).

Budget Impact Analysis

The budget impact of transgender coverage was measured relative to the total U.S. population, thereby gauging equity of absorbing costs of coverage in a small population.[33] Budget impact was calculated on a per-member-per-month basis for an approximate 2014 U.S. population of 320 million (U.S. Census Bureau, 2014). The calculation assumed that following implementation of blanket provider coverage, there would be an influx of about 30,000 transgender persons seeking transitional care in the first 5 years (i.e., 6000/year taken as the midpoint of 3000–9000 procedures per year according to

Table 2 Costs for the cost effectiveness analysis

State	Cost Type	ICD 9 Code	Base Case Costs ($)	Range for Sensitivity Analyses	Source
Baseline		n/a	n/a		Anchor
Job Loss Depression	Annual	311	565.06	63.00 3781.10	28
Attempted Suicide	Annual	296	21,671.00	18420.35 24921.65	27
HIV (generic therapy)	Annual	042	11,600.00	9860.00 13340.00	29
Drug & Substance Abuse	Annual	304	11,448.00	9730.80 13165.20	26
Cost for Mental Health Evaluation	Fixed	n/a	2175.00	1848.75 2501 25	19
HRT	Fixed	n/a	4350.00	3697.50 5002 50	19
Surgery					
MTF w/HRT	Fixed	n/a	22,025.00	18721.25 25328.75	19
MTF w/o HRT	Fixed	n/a	17,675.00	15023.75 20326.25	19
FTM w/HRT	Fixed	n/a	14,658.00	12459.30 16856.70	19
FTM w/o HRT	Fixed	n/a	10,308.00	8761.80 11854.20	19
Cost for Continuous Coverage	Annual	n/a	2175.00	1848.75 2501 25	19
Death		n/a	n/a		Anchor

FTM female to male transition, HRT hormone replacement therapy, MTF male to female transition

Walsham).[32] The additional cost would be the difference in cost of benefit coverage from the model.

RESULTS

Expected Cost and Effectiveness

Provider coverage resulted in higher cost and greater effectiveness, and was cost-effective relative to no health benefits at 5 and 10 years from a willingness-to-pay (WTP) threshold of $100,000/QALY (Table 4). These results were driven by the cohort without health benefits, which had less favorable outcomes, including depression, HIV, and death. The 5-year incremental cost effectiveness ratio (ICER) was greater than that at 10 years, since upfront costs for transitional therapy were not yet offset by costly long-term endpoints of excluded coverage (e.g., HIV, drug abuse).

The 5-year budget impact analysis determined a cost of $0.016 per member per month, meaning that if U.S. society assumed the role of paying an additional $10,614 for each person seeking benefit coverage, the U.S. population could absorb these costs for just cents per month.

Table 3 Utilities for the cost effectiveness analysis

Utilities	ICD 9 Code	Base Case Utility	Range for Sensitivity Analyses	Source
Baseline*	n/a	0.867	0.737 0.997	20
Job Loss Depression	311	0.732	0.622 0.842	20
Attempted Suicide	296	0.693	0.589 0.797	20
HIV	042	0.800	0.680 0.920	31
Drug & Substance Abuse	304	0.800	0.730 0.900	30
Hormone Replacement Therapy (HRT)	n/a	0.867	0.737 0.997	Assumed
Surgery (transition utility from baseline)	n/a	0.155	0.178 to 0.132	32
End State	n/a	0.867	0.737 0.997	Assumed
Death	n/a	0.0	0.0 0.0	Anchor

**The benefit of having transitional therapy is no disutility from baseline status*

Sensitivity and Threshold Analyses

Variations in expected values of all cost, probability, and utility estimates did not change expected results. Univariate sensitivity analyses indicated that the model was most sensitive to (1) probability of suicidal death, (2) probability of drug abuse, and (3) utilities of baseline, depression, and drug abuse. However, univariate and two- and three-way sensitivity analyses did not alter results.

The results did not change in sensitivity analysis of patients with provider coverage starting at a baseline with job loss or depression. The maximum probability of 29.9 % job loss/depression produced a 10-year ICER of only $20,942/QALY.

The probabilistic sensitivity analysis showed that provider coverage was cost-effective compared to no health benefit in 8477 of 10,000 Monte Carlo simulations at a mean ICER of $8655/QALY (median ICER of $8593/QALY). In 389 of these simulations, provider coverage dominated the alternative (Fig. 2).

DISCUSSION

These findings suggest that the removal of transgender exclusions is affordable and efficient with respect to the U.S. population. Provider coverage is a cost-effective policy at a willingness-to-pay threshold of $100,000/QALY. The ICER of provider coverage for medically necessary services and preventive care at 10 years is about $9300/QALY, which suggests that this policy would be comparatively efficient on a per-patient basis. Even at 5 years, this type of program still holds good value. These findings appear robust to model uncertainty according to sensitivity analyses. In addition, the results of the budget impact analysis imply that this policy is affordable, with a cost of only about $0.016 per member per month.

Table 4 Expected results of the base case cost effectiveness analysis

	Cost (USD 2013)	Δ Cost	Health Utility (QALYs)	Δ Utility	ICER ($/QALY)
5 Year Time Horizon					
No Health Benefit	10,712.00		3.71		
Provider Coverage	21,326.00	10,614.00	3.98	0.27	39,311.11
Male to Female (MTF)*	22,545.00	11,833.00	3.98	0.27	43,825.93
Female to Male (FTM)*	20,107.00	9395.00	3.98	0.27	34,796.30
10 Year Time Horizon					
No Health Benefit	23,619.00		6.49		
Provider Coverage	31,816.00	8197.00	7.37	0.88	9314.77
Male to Female (MTF)*	33,034.00	9415.00	7.37	0.88	10,698.86
Female to Male (FTM)*	30,597.00	6978.00	7.37	0.88	7929.55

(*) Compared to no health benefit; QALY quality adjusted life year

This case presents an economical coverage policy that can be likened to patients in the U.S. facing similar challenges of access to necessary care, such as those with rare diseases who have access to necessary health technology as a result of the Orphan Drug Act of 1983.[34] For instance, cystic fibrosis (CF) affects a population of only 30,000 individuals in the U.S., but has evolved into a successfully treatable chronic disease with the availability of new pharmaceuticals.[35] While the cost of ivacaftor for CF ($300,000/year) is neither affordable nor efficient (ICER>$ 1million/QALY), this act makes it available to CF patients.[36] By the absorption of the cost of ivacaftor across the U.S. population for people who are uninsured or have annual incomes less than $150,000, the budget impact is only about $0.05 per member per month.[37]

While justice, legality, and a desire to avoid discrimination should drive decisions about benefit coverage, this case for the transgender population also appears economically attractive. The budget impact analysis calculates the expected value of costs for a state with an average population of 700 instances of transition therapy each year. Thus, if state governments require

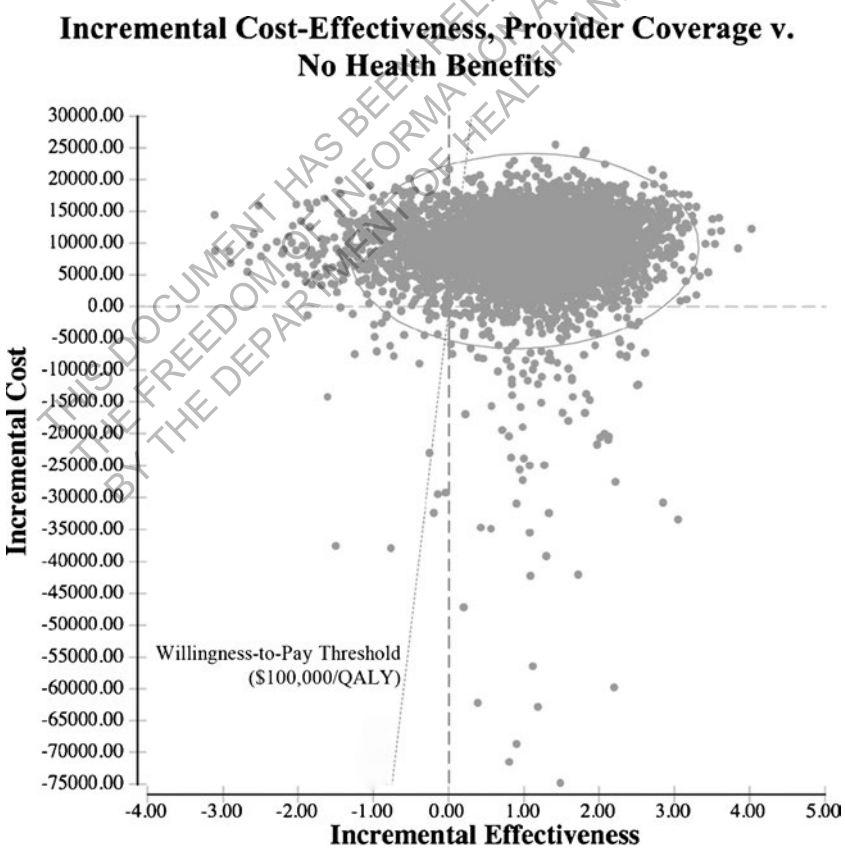

Figure 2 A scatter plot of a Bayesian multivariate probabilistic sensitivity analysis measuring the incremental cost effectiveness ratios (ICERs) of 10,000 Monte Carlo simulations. Under no health benefit, people who are transgender navigate issues such as employment discrimination and depression, which can escalate to more severe health states such as suicidality, drug abuse, and HIV, according to the 2011 National Transgender Discrimination Survey. A lack of provider coverage under this arm increases the risk of these issues. In the other arm, provider coverage improves access to primary and preventive care, as well as medically necessary services that in most cases lead to transitional therapy such as hormone replacement therapy and surgery. The majority of people with provider coverage achieve preferred health states with greater utility, at an increased cost per year of about $2175. The risks of escalated issues such as depression and suicidality still exist for the provider coverage arm, since not all people qualify for all benefits, and transitional therapy does not completely insulate against these issues.

that payers offer coverage, insurance companies need to account for approximately $7.5 million per state. While cost-effective on a societal level, there is some upfront investment required of payers. A return-on-investment (ROI) calculation for this figure shows that it would take a payer approximately 63 years to break even on an investment in this type of benefit program.

However, legal and administrative barriers can hinder the implementation of new policy informed by these results. First, commercial payers are accustomed to negotiating contracts and benefit packages in ways that may resist change. It may be difficult to instantaneously adopt changes in provider coverage when exclusions are enforced by a third party or if state law defines health services to exclude transgender benefits.[38] Fortunately, transgender exclusions were recently removed by states, commercial payers, and CMS.[4,7]

According to the Human Rights Commission, 57 of the approximately 200 major employers offering at least one transgender-inclusive health care coverage plan were law firms, possibly reflecting the growing legal consensus that transgender exclusions are discriminatory in practice.[7,39] At least 17 major insurance carriers administer or provide coverage for at least one employer or student plan offering transgender benefits (e.g., Aetna, Cigna, Harvard Pilgrim, United Healthcare, and Blue Cross Blue Shield Massachusetts).[40] Additionally, numerous public employers offer provider coverage (e.g., University of California, University of Michigan, City of Minneapolis, City of New York, and City of San Francisco).[15,40] However, most U.S. health insurance policies still contain transgender exclusions, even though treatment of gender identity disorder is neither cosmetic nor experimental.[40,41]

This study has several limitations. First, data were lacking on whether transition-related therapy completely prevents negative endpoints such as depression/suicidality, or whether a baseline prevalence still exists. Second, some data in this analysis were representative not of the transgender population, but of the general population. Third, no empirical evidence exists on the time-dependency of escalated issues, so expert opinion guided transition probabilities. Fourth, no true health utilities were available for outcomes triggered by anti-transgender bias.[11] Fifth, some costs were derived from an ad hoc survey of provider affiliates to the GIC. Although these results should be widely applicable to most institutions, some insurance carriers have third-party payers or self-payers that could change the relevance of these results. Sixth, while depression and job loss are grouped together in the model, there may be some element of exclusivity in these two states that cannot be well-discerned by health utility. Seventh, HIV and drug abuse represent two of many possible negative outcomes; the choice to highlight these in the model was based on reported prevalence in the NTDS.

Finally, this study did not include children or adolescents, and focused on an adult-only population, based on the age of respondents in the NTDS. According to de Vries et al., young adults experience alleviation of gender dysphoria and improvement in psychological functioning following gender reassignment.[42] Given this promise, the field could benefit from additional outcomes research among youth.

Another challenge of this study involves the premise that outcomes research is able to justify transgender benefit coverage. QALYs in this study come from societal preferences for chronic conditions. People are not asked to consider a state of being for a transgender person who is depressed or HIV-positive, for example, nor are transgender individuals represented. According to Lyons et al., there is a stigma attached to the inclusion of transgender-stratified preferences and outcomes in trials and observation,[43] which speaks to the broader issue of gaining consensus within U.S. society in accepting that unique services covered by transgender benefits are as necessary as care for people not seeking a transition.

By removing transgender exclusions, society could change the trajectory of health for all transgender persons. It is worth considering that other costly surgeries (e.g., breast reduction;, spinal fusion for chronic back pain), procedures (e.g., in vitro fertilization), and health technologies (e.g., drugs such as sildenafil citrate for erectile dysfunction) that consensus dictates as not medically necessary are still covered by payers. Overall, payers may provide the motivation for progress in a field when there is the potential of reimbursement for improved performance. This concept could be likened to poor outcomes of phalloplasty in MTF transitions: surgeons might invest in trials that improve outcomes of these complicated procedures if they knew they would be reimbursed.[44] A law protecting transgender benefit coverage is not only medically necessary, but is morally imperative.

Ultimately, removing a clause expressly prohibiting coverage for medically necessary care in the transgender population is economical at a U.S. societal level. State laws that define "health services," thereby dictating benefit exclusions, should be amended to reflect contemporary medical evidence.[4,38,45] Affiliated contracting agencies and bodies should remove their corresponding exclusions given that provider coverage is affordable, efficient, and equitable.

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Compliance with Ethical Standards

Conflict of Interest: *The Authors have no conflicts of interest to declare. Authorship of this manuscript follows ICMJE guidelines; each author is associated with conceptualization, writing, final approval, and accountability for the work.*

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