



# STDs Among Transgender College Students in the United States: The Role of Experienced Discrimination

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## Abstract

Based upon prior research, there is a high prevalence of HIV and sexual risk behaviors among transgender women particularly transgender women of color. While HIV prevalence among transgender men is relatively low, transgender men who have sex with men are at substantial risk for HIV, and many have had a sexually transmitted disease in the past. Individual behaviors along of these individuals do not account for disparate HIV diagnoses among transgender people. Numerous factors, including compromised mental health, incarceration, homelessness, limited access to health care and negative health care encounters impact such disparities. One of the most incriminating factors is the role that discrimination, in a variety of settings, may play. To date, no research has been conducted among transgender college students which examines their risk for sexually transmitted diseases, or the role that discrimination plays in that risk.

## Purpose

There is insufficient research on the relationship between experienced discrimination and the risk of sexually transmitted diseases among transgender college students. To that end, the purpose of this research was to 1) to determine sexually transmitted disease risk (past year) among self-identified transgender college students in the United States, and 2) explore the relationship between experienced discrimination and sexually transmitted disease risk among transgender college students.

## Methodology

A secondary analysis of American College Health Association National College Health Assessment version 2, Spring 2010 survey data was conducted. The sample was restricted to those of traditional college age (18-24 years) attending a four year institution in the United States, who also reported their gender (male, female, or transgender). The final sample consisted of 61,548 students, 106 of whom identified as transgender. Because the instrument does not distinguish between transgender males and transgender females, self-identified males and females were combined to for a cisgender category, to compare to transgender students. The following data was utilized as part of the statistical treatment.

### Past Year Diagnosis of a Sexually Transmitted Disease

### Risk Behaviors

- Lifetime engagement in vaginal intercourse
- Lifetime engagement in anal intercourse
- Number of sexual partners in the prior year
- Engagement in unprotected sex as a consequence of drinking in the past year
- Quantity of alcohol consumed during last bout of partying
- Poly-drug use in the past 30 days

### Experienced Discrimination

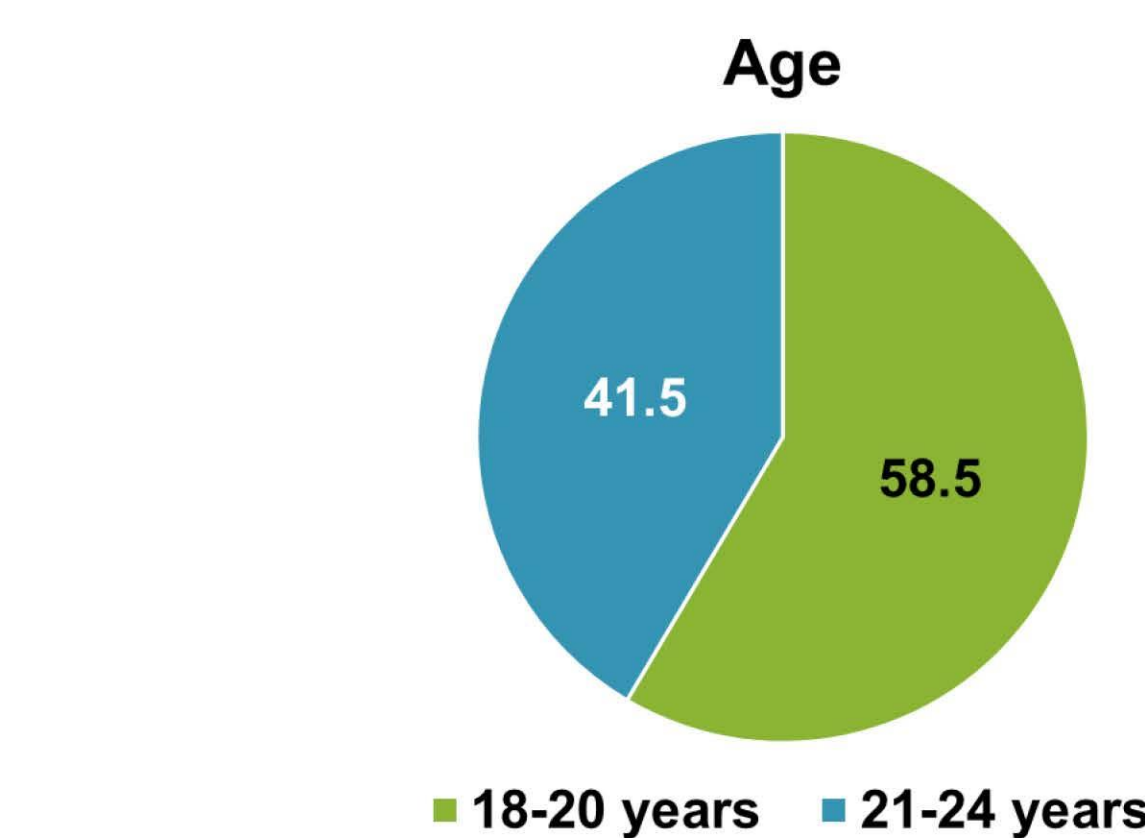
- Racism, sexism, and homophobia

## Statistical Treatment

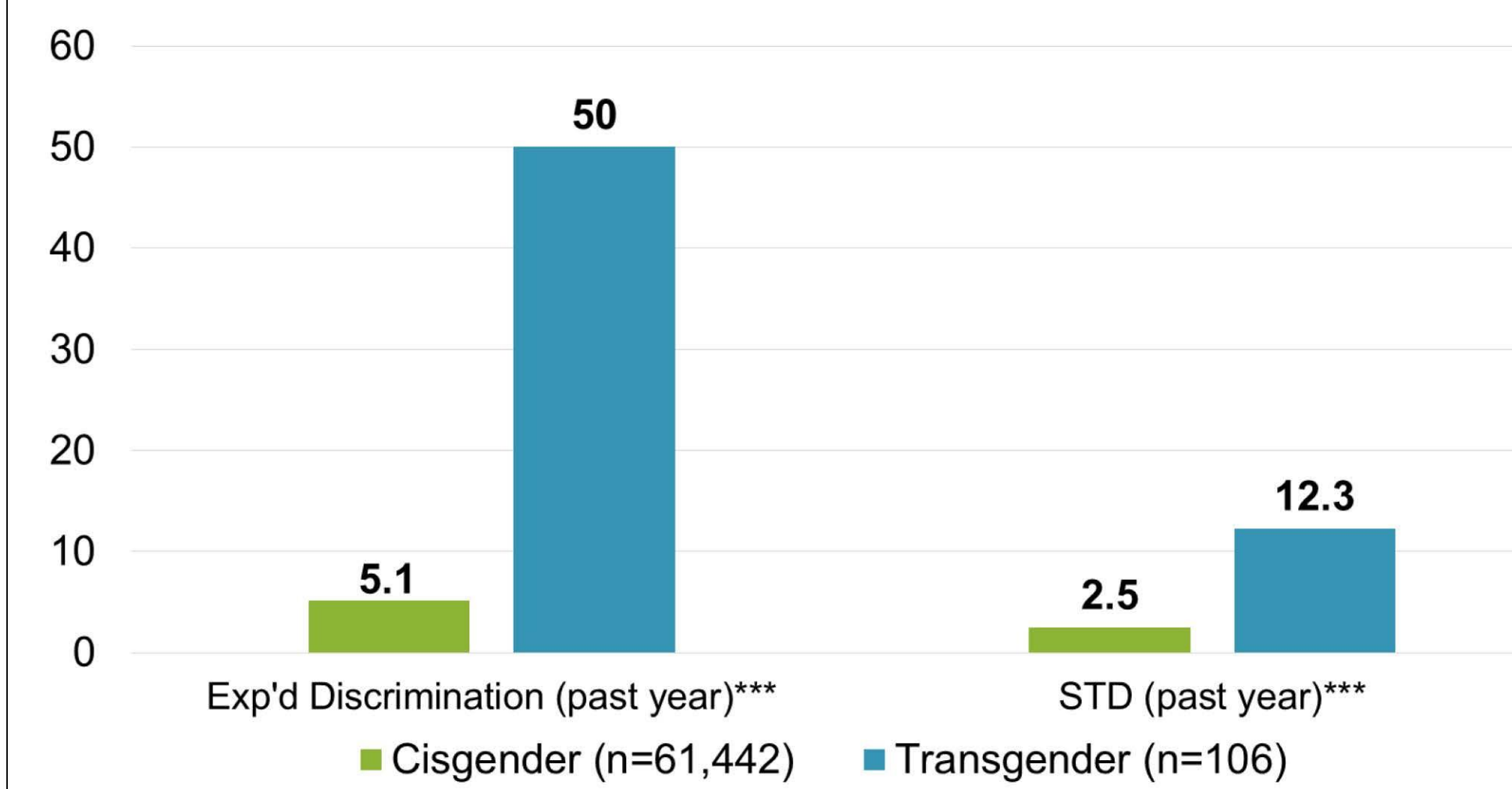
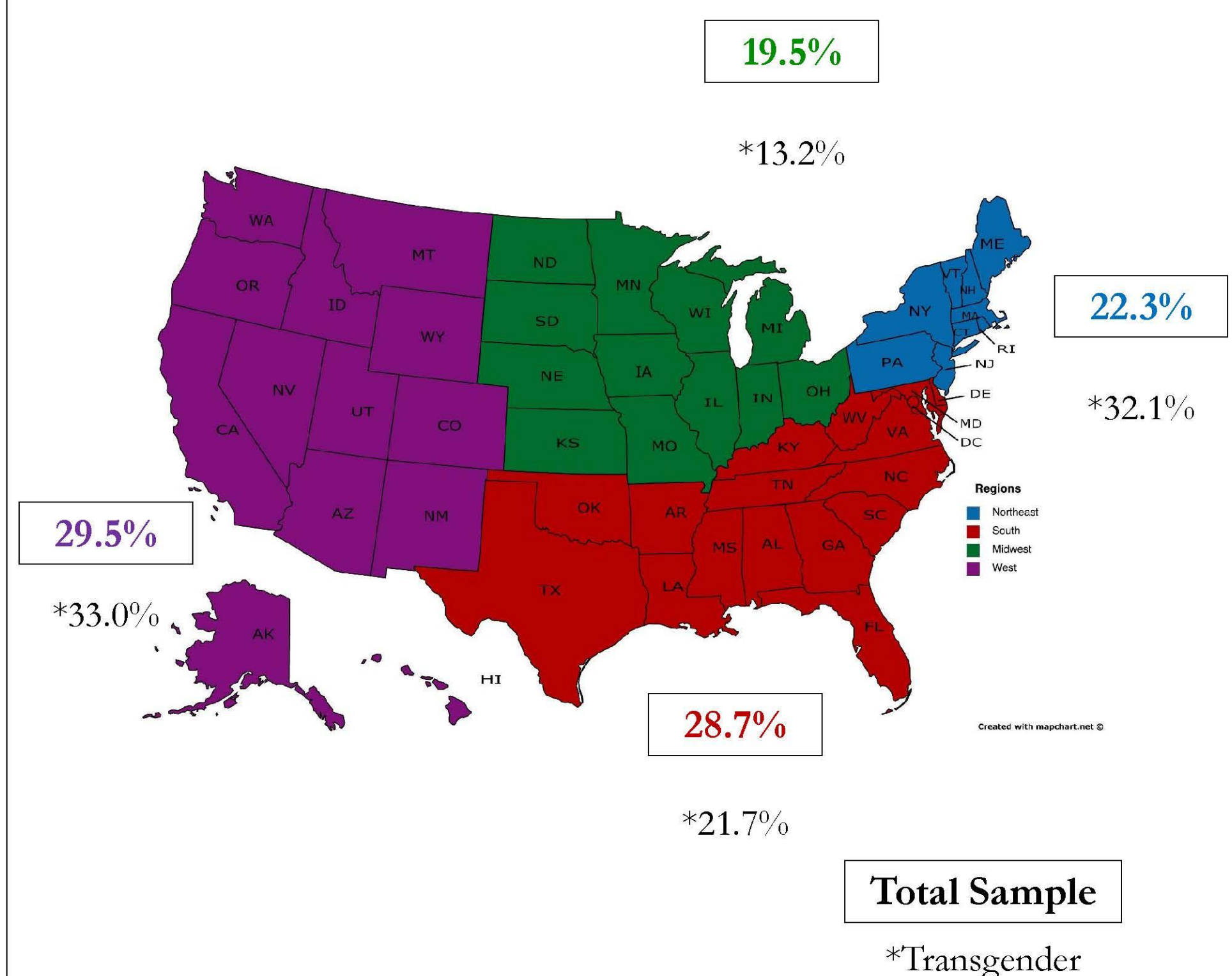
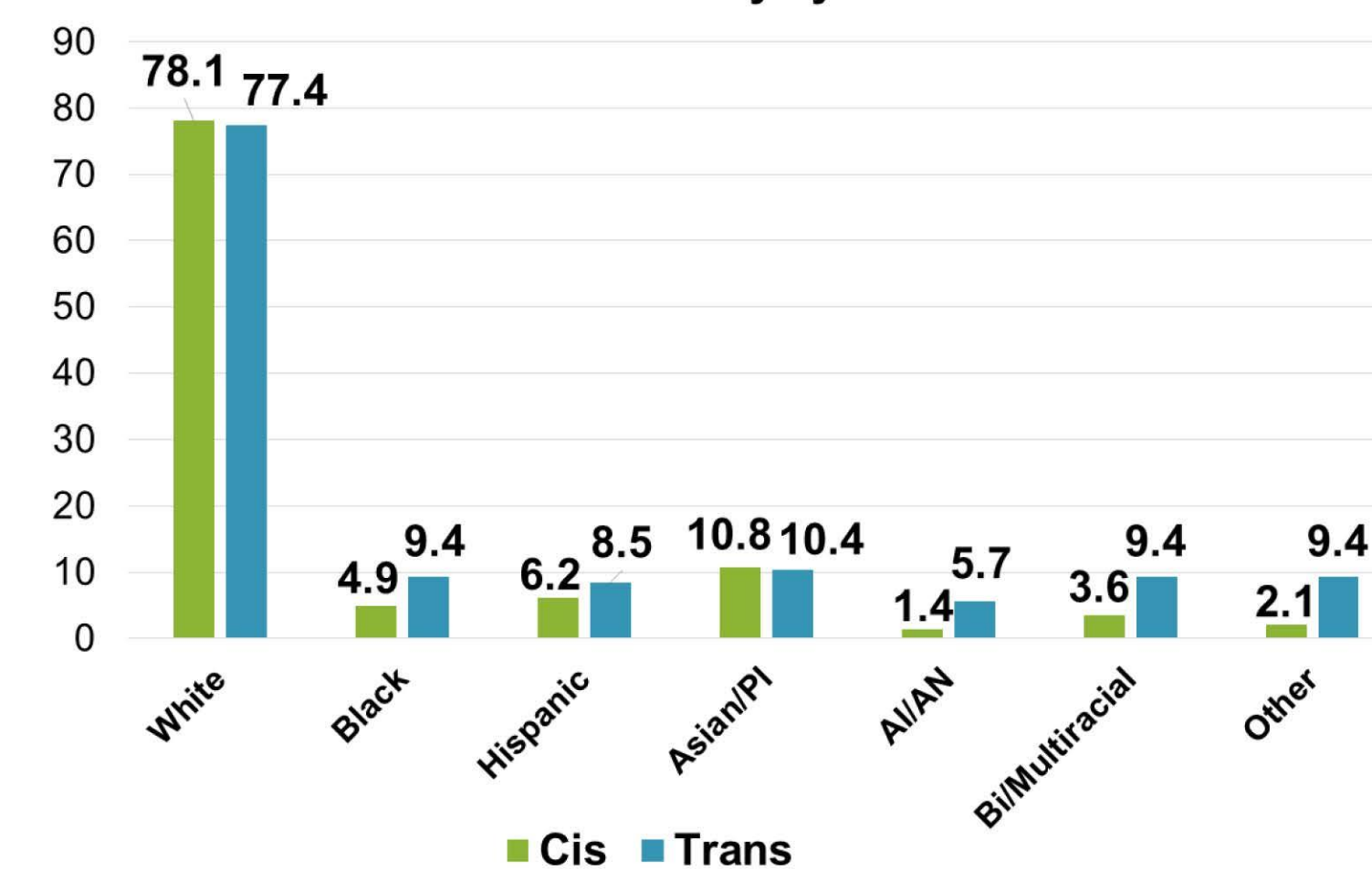
IBM SPSS Statistics was used for all analyses. Multivariate logistic regression analyses were conducted to identify factors associated with past year sexually transmitted disease diagnosis based on gender (cisgender versus transgender), demographic characteristics (age, race/ethnicity, international status, region of the United States), behavioral risk factors (sexual, alcohol and poly-drug use) and experienced discrimination (racism, sexism, and homophobia) in the prior year.

## Results

### Sample Characteristics



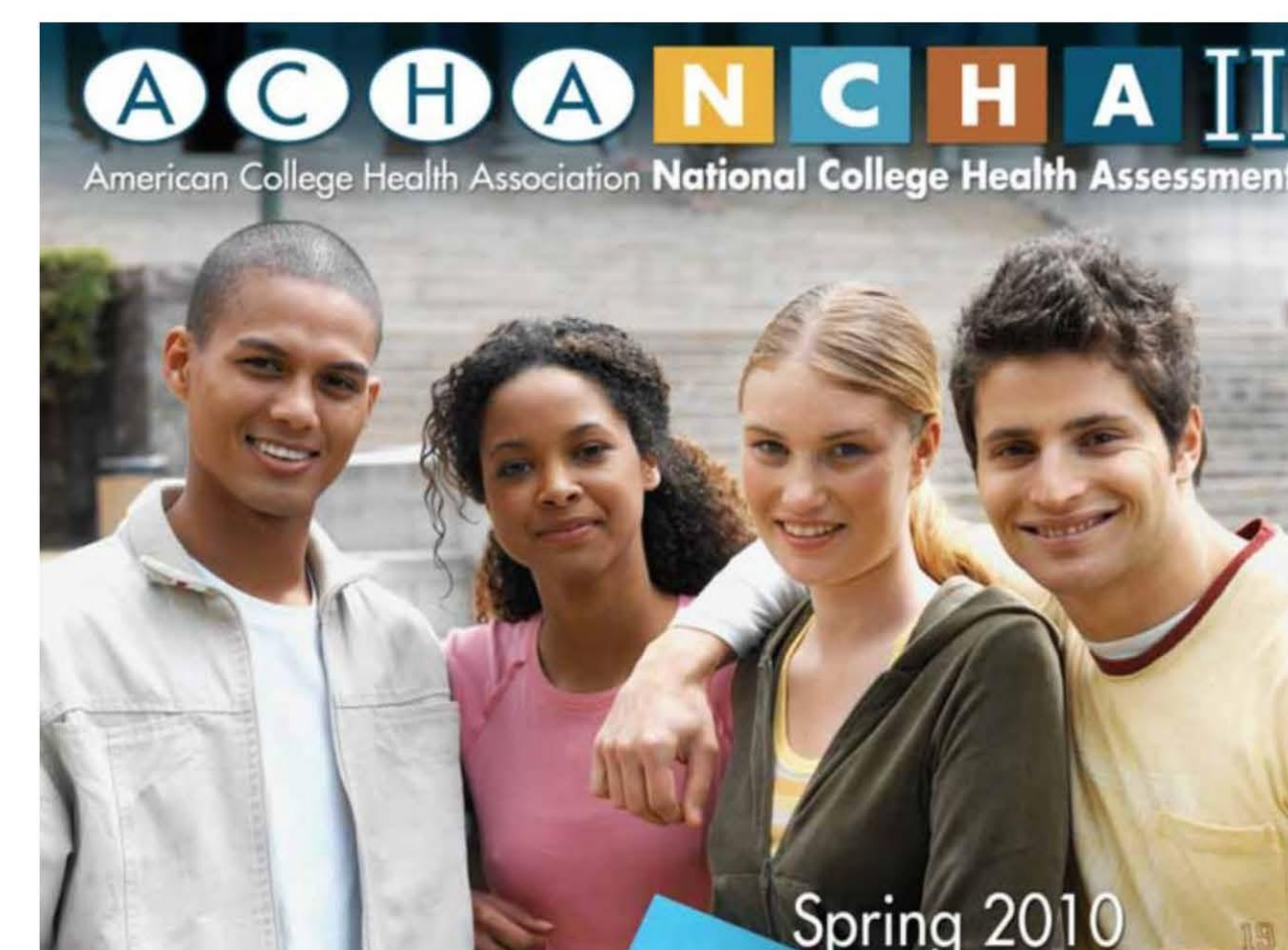
### Race/Ethnicity by Gender



**Experienced Discrimination and Sexually Transmitted Infections.** Overall, 2.5% of college students reported having been diagnosed with a sexually transmitted disease within the past year. Similarly, 5.1% of students experienced discrimination. Transgender students were significantly more likely ( $p < .001$ ) than cisgender students to have had a sexually transmitted disease (12.3% v. 2.5%, respectively) and to have experienced discrimination (50.0% v. 5.1%, respectively).

	Total n (%)	Cisgender n (%)	Transgender n (%)
# Alcoholic Drinks (last time partied)			
0 - 4 Drinks	39929 (64.9)	39853 (64.9)	76 (71.7)
5+ Drinks	21596 (35.1)	21566 (35.1)	30 (28.3)
Poly Drug Use (last 30 days)***			
No (0 or 1 drug used)	59265 (96.3)	59171 (96.3)	94 (88.7)
Yes (2+ drugs used)	2283 (3.7)	2271 (3.7)	12 (11.3)
UPS as Consequence of Drinking (past year)			
No	53491 (86.9)	53399 (86.9)	92 (86.8)
Yes	8057 (13.1)	8043 (13.1)	14 (13.2)
Vaginal Intercourse (ever)			
No	21246 (34.5)	21206 (34.5)	40 (37.7)
Yes	40302 (65.5)	40236 (65.5)	66 (62.3)
Anal Intercourse (ever)***			
No	49287 (80.1)	49218 (80.1)	69 (65.1)
Yes	12261 (19.9)	12224 (19.9)	37 (34.9)
# Sex Partners (past year)***			
0,1 or 2 partners	51620 (83.9)	51540 (83.9)	80 (75.5)
3+ partners	9928 (16.1)	9902 (16.1)	26 (24.5)

Bivariate analyses indicated significant differences between cisgender and transgender students. Self-identified transgender students were significantly more likely to have engaged in poly-drug use during the prior 30 days. Similarly, transgender students were significantly more likely to have ever engaged in anal intercourse (34.9% v. 19.9%,  $p < .001$ ). Nearly one in four transgender students reported having three or more sexual partners during the past year. Without knowing whether respondents were transgender men or women, it is difficult to fully ascertain levels of risk for infection.



	Model 1 OR (95% CI)	Model 2 OR (95% CI)	Model 3 OR (95% CI)	Model 4 OR (95% CI)
Gender (Ref: Cisgender)				
Transgender	5.55 (3.10, 9.94)***	5.36 (2.96, 9.67)***	4.29 (2.23, 8.27)***	1.46 (0.74, 2.86)
Age (Ref: 18-20 years)				
21-24 years	1.79 (1.01, 1.98)***	1.48 (1.33, 1.64)***	1.48 (1.33, 1.65)***	
Race/Ethnicity				
White, non-Hispanic	0.93 (0.77, 1.21)	0.81 (0.67, 0.97)*	0.91 (0.74, 1.10)	
Black, non-Hispanic	1.69 (1.34, 2.13)***	1.65 (1.30, 2.09)***	1.26 (0.88, 1.81)	
Hispanic/Latino	1.29 (1.03, 1.61)*	1.16 (0.83, 1.64)	1.01 (0.80, 1.28)	
Asian/Pi	0.65 (0.51, 0.83)***	0.88 (0.70, 1.11)	0.77 (0.60, 0.98)*	
AI/AN	1.57 (1.13, 2.18)***	1.32 (0.94, 1.84)	1.07 (0.82, 1.39)	
Bi/Multiracial	1.32 (1.04, 1.68)*	1.17 (0.92, 1.50)	1.00 (0.76, 1.30)	
Other	1.00 (0.71, 1.40)	1.01 (0.71, 1.44)	0.81 (0.58, 1.17)	
International Student (Ref: No)				
Yes		0.82 (0.66, 1.02)	0.86 (0.69, 1.06)	0.86 (0.69, 1.07)
Region (Ref: Northeast)				
Midwest	1.08 (0.91, 1.28)	1.17 (0.98, 1.39)	1.17 (0.98, 1.40)	
South	1.39 (1.20, 1.62)***	1.34 (1.15, 1.56)***	1.33 (1.14, 1.56)***	
West	1.25 (1.08, 1.46)***	1.25 (1.07, 1.46)***	1.22 (1.04, 1.43)*	
Vaginal Intercourse (ever) (Ref: No)				
Yes		2.89 (2.39, 3.50)***	3.48 (2.86, 4.22)***	
Anal Intercourse (ever) (Ref: No)				
Yes		1.68 (1.50, 1.87)***	1.53 (1.37, 1.71)***	
# Sex Partners (past year) (Ref: 0-2 partners)				
3+ partners		2.21 (1.96, 2.49)***	2.10 (1.86, 2.37)***	
UPS Consequence Alc. (past year) (Ref: No)				
Yes		1.91 (1.69, 2.16)***	1.86 (1.64, 2.10)***	
# Drinks (last time partied) (Ref: 0-4 drinks)				
5+ drinks		1.11 (0.98, 1.25)	1.15 (1.02, 1.29)*	
PolyDrug Use (past 30 days) (Ref: No)				
Yes		1.88 (1.59, 2.22)***	1.76 (1.48, 2.09)***	
Exp'd Discrimination (past year) (Ref: No)				
Yes				7.76 (6.60, 8.84)***

An unadjusted model (Model 1) indicated that transgender students were over five and a half times more likely to have had a sexually transmitted disease in the past year than their cisgender colleagues. When adjusted for ethnicity, race, international status, and region, transgender students remained over five times as likely to have had an infection (Model 2). In accounting for other behaviors, that relationship remained significant among transgender students (Model 3). However, when accounting for experienced discrimination, transgender students were no longer significantly at risk (Model 4). Students who reported experienced discrimination were 7.8 times more likely to have had an infection in the past year. This fully accounted for the risk among transgender students.

## Key Findings

- Transgender college students had **5.6x** greater odds of an STD (past year) than cisgender college students (OR: 5.55; 95% CI: 3.10, 9.94).
- Demographic characteristics and behaviors (sexual and substance use) partially mediated STD risk (past year) among transgender students.
- Students who experienced discrimination in the past year (i.e., racism, sexism, homophobia) had **7.8x** greater odds of an STD (past year) than students who did not experience discrimination (OR 7.76; 95% CI: 6.80, 8.84).
- Experienced discrimination fully accounted for elevated STD risk (past year) among transgender college students.

## Conclusion

Preventing discrimination against transgender students on college campuses and surrounding communities is an important strategy for sexually transmitted infection prevention. A comprehensive approach, including education about infection and safer sex, but also one which utilizes non-discrimination policies inclusive of gender identity and expression on campuses, gender inclusive housing, restrooms, and other facilities is requisite. Similarly, assuring that all necessary forms provide an opportunity for students to use their preferred or chosen name will assist in minimizing perceived discrimination. Lastly, approaches to education should not solely include transgender students, but rather all faculty, students, and staff about transgender issues.



# The Importance of Yoga in the Treatment of Asthma

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## INTRODUCTION

- Asthma affects over **334 million** people globally and is a major public health problem.
- In the United States, approximately **one in 12** persons suffered from asthma in 2009 and accounted for **\$56 billion** in costs.
- Yoga as an integrative therapy with its emphasis on breathing techniques (**pranayama**) and low physical impact postures (**asanas**) helps in improving the airflow to the lungs.
- Regular practice of yogic *asanas* and *pranayama* **reduces the constriction of bronchial tubes.**

## OBJECTIVES

The primary objective of the study was to review the efficacy of yoga as an **integrative therapy** in asthmatics.

## METHODS

A thorough review was conducted following the PRISMA guidelines, searching for the topic in databases.

**Inclusion Criteria:** Studies were included if they

- (1) Included adult(>18 years) asthma patients;
- (2) were published between **1975 and January 2017**;
- (3) were written in the English language;
- (4) were published in a peer-reviewed journals indexed in MEDLINE (PubMed), CINAHL, Health Watch and PsycINFO
- (5) utilized any type of intervention (educational or practice-based); and
- (6) had a quantitative evaluation.

**Exclusion Criteria:** Studies were excluded if

- (1) they were incomplete or ongoing;
- (2) used qualitative methodology;
- (3) they were just protocols for interventional programs
- (4) Studies which did not meet any of the aforementioned inclusion criteria were excluded.

## PARTIAL RESULTS OF RECENT STUDIES

Authors	Design and Sample	Intervention	Sailent Findings
Bidwell et al., 2012, USA	<b>RCT</b> , N= 19; control group n=8, experimental group n=12. All participants were females and non smokers	Two, 1-hour supervised yoga sessions/week under the observation of a yoga instructor and 30mins per week at home for 10 weeks ( <b>25 hrs. in 10 weeks</b> )	SGRQ scores indicated 45% improvement in QOL in experimental group ( <b>p&lt;0.05</b> ). Yoga group also demonstrated 29% reduction in parasympathetic modulation. Tidal volume increased in yoga group ( <b>p&lt;0.05</b> ) post intervention
Biju et al., 2012, India	<b>Quasi-experimental</b> study, N=70; Control group n=35 and yoga group n=35. All participants were non smokers	1hr per day for 15 days with yoga instructor and 1hr per day every day at home for 3 months. ( <b>90 hrs. in 3months</b> )	After 3 months, FVC and FEV2 showed <b>no</b> significant difference between the two groups while FEV1, FEV% and PEFR showed significant difference between the two groups ( <b>p&lt;0.05</b> )
Chandrasekhar et al., 2012, India	<b>Quasi experimental</b> study, N=60; Control group n=30 and yoga group n=30. All were male and non smokers	20-30 mins <i>shava asana</i> every day for three weeks (21 days) ( <b>7 hrs-10.5 hrs. in 3 weeks</b> )	Spirometry parameters FEV1, FVC, FEV1/VC, MVV were <b>not</b> statistically significant 3 weeks post intervention (p>0.05) compared to baseline
Singh et al., 2012, India	<b>RCT</b> N=60; Control group n=30 and yoga training group n=30. All participants were non smokers	40-50 mins every day for 2 months ( <b>40 hrs-50 hrs. in 2 months</b> )	The pulmonary parameters like TLCO, FVC, FEV1, MVV, PEFR and SVC have significantly improved ( <b>p&lt;0.001</b> ) after yoga. FEV1/FVC also showed significant improvement ( <b>p&lt;0.05</b> )
Pandit et al., 2013, India	Pre test and post test intervention N=30. All participants were male and non smokers	1hr per day for 6 months ( <b>180 hrs.</b> )	Pulmonary tests FVC, FEV1, FEV1/FVC%, PEFR and MVV were all <b>not</b> statistically significant months post intervention (p>0.05) but were statistically significant 6months post intervention ( <b>p&lt;0.05</b> )
Pokldnikova et al.,2013, Czech republic	<b>RCT</b> , N=29; Control group n=14 and intervention group n=15. Participants were non nicotine users	4 of 1.5hrs sessions of yoga and 4, 1hr sessions of psychotherapy ( <b>6 hrs.</b> )	Pulmonary parametric tests, FVC, FEV1 and PEFR were significantly different post intervention at 8 weeks ( <b>p&lt;0.05</b> ) and however statistically insignificant (p>0.05) at 4 month follow up except for PEFR ( <b>p&lt;0.05</b> )
Ruprai et al., 2013, India	<b>Pre test and post test</b> intervention, N=40. All participants were male and non smokers	Yoga session lasted for 1hr per day for 12 weeks ( <b>84 hrs.</b> ) led by a yoga instructor	Breath holding time, FEC, FEV1 and PEFR significantly improved post intervention ( <b>p&lt;0.001</b> ). Respiratory rate significantly reduced in post test results ( <b>p&lt;0.001</b> )
Sodhi et al.,2014, India	<b>RCT</b> N=120; control group n=60 and yoga group n=60. All participants were non smokers	45 mins per week with yoga instructor + 1.5hrs every day continued for a total of 8 weeks ( <b>90 hrs. in 8 weeks</b> )	Symptoms, activities and environment domain significantly improved 8 weeks post intervention ( <b>p&lt;0.01</b> ). Number and severity of asthma attacks also significantly reduced at both 4 and 8 weeks post intervention ( <b>p&lt;0.05</b> ) compared to baseline.
Agnihotri et al., 2017, India	<b>RCT</b> N=241; Control group n=120and Yoga group n=121. Participants were non or ex smokers (have not smoked in more than 6 months)	Yoga group performed yoga for 30mins a day, 5 days a week for 6 months ( <b>60 hrs. in 6 months</b> )	Compared to controls, yoga group showed significant improvement in pulmonary parameters like FVC, FEV1, and PEFR at 3 months post intervention ( <b>p&lt;0.05</b> ) and 6months post intervention ( <b>p&lt;0.0001</b> ). FEV1/FVC significantly reduced at 3months and 6 months post intervention ( <b>p=0.02</b> and <b>p&lt;0.0001</b> respectively)

## RESULTS

- Thirty-four studies** were included in the review.
- Twenty-two (64.7%)** of the studies were **randomized controlled trials (RCTs)**, **six** were **pre and post-test design**, **two** were **self-controlled match**, and **one each of case control, prospective cohort, cross-sectional, and retrospective**
- Most of the studies in the review indicated that yoga does improve the **spirometry measures** and breathing
- Statistically significant improvement** of the breathing among asthmatics (p<0.05) was found.

## DISCUSSION

- Most of the studies in the review indicated that **yoga does improve the spirometric measures and reduce the respiratory rate.**
- This indicates that yoga seems to be promising approach and can be used as an integrative therapy for bronchial asthma.

## LIMITATIONS

- Not many of the studies conducted a power analysis and hence the **sample sizes were generally small.**
- Most of the studies focused on **immediate and short term measurement** of pulmonary parameters or QOL.
- Studies **did not use behavioral theories** in helping participants undergo behavior change.



# Hidden Deficits: Developmental Outcomes of Children Born Prematurely

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**Abstract:** Research demonstrates that children born preterm are at increased risk for a range of neurobehavioral impairments, although substantial individual variability exists with regards to the profile and severity of deficits. In addition to scoring lower on measures of general intelligence, preterm children tend to perform more poorly on tests of motor functioning, visual-perceptual skills, as well as attention and executive functioning. Language is also particularly vulnerable, with specific deficits being reported in all simple and complex tasks. Preterm survivors have been reported to be at increased risk for behaviours consistent with ADD/ADHD and ASD. Consequently, preterm children are more likely to underperform at school and exhibit emotional and behavioural problems. Ninety-six infants born prematurely in Ontario, Canada, were assessed by registered health professionals using standardized and non-standardized assessment tools measuring the development of gross motor, fine motor, expressive and receptive language. The objective of this study was to determine the overall presence and severity of delays in all domains assessed, as well as to determine the influence of gestational age and birth weight. Overall, the results demonstrated that the majority of children assessed fell within the average range. However, a significant proportion showed a mild delay in at least one developmental domain. Of the participants referred for therapy, the largest proportion were those born moderately preterm, followed closely by those born extremely preterm. Finally, the results also demonstrated that these delays could be identified as early as the child's preschool years.

## Background

Recently, more subtle deficits are being reported in all categories of premature children: learning disabilities, executive functioning, visual-motor integration, motor coordination disorders, selective language impairment, attention deficit hyperactivity disorder (ADHD) and reduced educational achievement. Interestingly, more authors are reporting similar, though milder issues in the moderate (32-33 weeks' gestation) and late preterm infants (34-36 weeks' gestation).

## Research objectives

The goal of this study was to provide preliminary data on the neurodevelopmental outcomes of preschool children born prematurely. A retrospective chart review was conducted on all children monitored by an interdisciplinary Follow-Up Program between 2009 and 2014 in Canada. Each child was assessed by a registered health care professional. Of the 107 cases identified, 96 individuals were retained for statistical analyses (86.4% of the initial cohort).

## Participants

This study reviewed the development of preterm infants who were born before 35 weeks' gestation at a hospital covering a large geographical region in Ontario, Canada. These infants were then assigned to the hospital's Neonatal Follow-up Program and were evaluated over time, by the same individuals, using a battery of tests that measure gross motor, fine motor, expressive and receptive language development. The sample included all children born between 2009 and 2014 ( $n = 107$ ). Exclusion criteria included infants with a specific disorder or condition (e.g. genetic syndrome, cerebral palsy etc.;  $n = 10$ ). The final sample consisted of 96 children, with an equal distribution of males ( $n = 46$ ) and females ( $n = 51$ ). The largest proportion of the sample was born moderately preterm (MPT) ( $n = 47$ ), followed closely by those born very preterm (VPT) ( $n = 34$ ) and extremely preterm (EPT) ( $n = 15$ ) preterm. Regarding birth weight, the highest proportion of children were born with very low birth weight (VLBW) ( $n = 59$ ), followed by extremely low birth weight (ELBW) ( $n = 49$ ) and low birth weight (LBW) ( $n = 15$ ).

## Methodology

The children were assessed by a multidisciplinary team consisting of a developmental paediatrician, a physiotherapist, an occupational therapist and a speech-language pathologist. At the time the study took place, these assessments were conducted by the same therapists at 4 weeks, 2, 6, 9, 12, 18 and 24 months, using the same assessment tools and after correcting for prematurity. The physiotherapist used the *Alberta Infant Motor Scales* (AIMS) with non ambulatory children and the *Early Intervention Developmental Profile* (EIDP), gross motor component, with ambulatory children. The occupational therapist used the EIDP, fine motor component and the speech-language pathologist used the Rossetti Infant-Toddler Scale. In order to determine the average scores obtained on the assessments, the score given at each appointment and for each participant was retained for statistical analysis. For the AIMS, a score below the 5<sup>th</sup> percentile was considered below average. For the EIDP and the Rossetti Infant-Toddler Language Scale, four categories were created: within normal limits, 0 – 6 month delay, 6 – 12 month delay and 12 – 18 month delay. In the context of this presentation, only the score given at the time of the last appointment ( $x = 21.9$  months) will be presented.

## Results

**Table 1 Assessment results for participants at time of last assessment (X = 21.9 months)**

Result	Gross motor		Fine motor		Rec. lang.		Exp. lang.	
	n = 96	%	n = 96	%	n = 96	%	n = 96	%
Within normal limits	62	64.5	59	61.4	50	51.6	50	51.6
0 - 6 month delay	26	26.9	27	28	32	33.3	32	33.3
6 - 12 month delay	4	4.3	3	3.2	11	11.8	11	11.8
12 - 18 month delay	0	0	1	1.1	0	0	0	0
Missing data	4	4.3	6	6.25	3	3.3	3	3.3
Referrals to therapy	12		14		38			
Referrals according to GA:								
Extremely preterm ( $n = 15$ )	4	26.7	4	25	8	53.5	8	53.5
Very premature ( $n = 34$ )	5	14.7	6	17.6	11	32.4	11	32.4
Moderately/late premature ( $n = 47$ )	3	6.4	4	8.5	19	40.4	19	40.4

In total, 42 participants were referred to either physiotherapy, occupational therapy or speech-language therapy, demonstrating that a significant proportion of the children monitored by the follow-up program showed at least a mild delay in one developmental domain. Of the participants referred for therapy, the largest proportion were those born moderately/late preterm ( $n = 22$ ), followed by those very preterm ( $n = 11$ ) and extremely preterm ( $n = 9$ ). Also of note is the fact that approximately half ( $n = 23$ ) were referred for delays in more than one developmental area.

## Conclusion

The results obtained in this study have several implications. First, the follow-up of premature children is essential, should be longitudinal and multidisciplinary, and occur from birth into school years, thus allowing for the identification of prenatal and postnatal risk factors that impact on social and academic success. Although the results presented in the context of this research are preliminary in nature and need to be interpreted with caution, they suggest the presence of mild delays in children who, until recently, were generally considered to be at decreased risk. In many Canadian follow-up programs, these children fall outside the inclusion criterion for monitoring. Although evidence for motor outcomes in MPT and LPT children is emerging, more information is needed in order to make recommendations on their place in neonatal follow-up. Large scale, longitudinal and population-based studies are required in order to provide more data on predictors, risk factors and long-term outcomes of these children. The conclusions drawn from these studies would help determine if these children are at increased risk of delays and should be included in Neonatal Follow Up Programs.

## Selective bibliography

- 1) Vohr BR, Wright LL, Dusick AM et al. Neurodevelopmental and functional outcomes of extremely low birth weight infants in the National Institute of Child Health and Human Development Neonatal Research Network, 1993-94. *Pediatr.* 2000 105(6): 1216-26.
- 2) Bracewell M, Marlow N. Patterns of motor disability in very preterm children. *Ment Retard Dev Disabil Res Rev.* 2002 8:241-8.
- 3) Salt A, Redshaw M. Neurodevelopmental follow-up after preterm birth: follow up after two years. *Early Hum Dev.* 2006 82:185-97.
- 4) Church P, Luther M, Asztalos E. The perfect storm: the high prevalence low severity outcomes of the Preterm Survivors. *Curr Pediatr Rev* 2012 8(1): 1-10.



Health, Wellness, & Society



# Housing and Health in Korea : Focusing on Age Difference

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## Introduction and Research Question

The purpose of this study is to examine how housing (and its related features) affects health of elderly and non-elderly population.

There are many factors that are closely related to one's health – such as age, gender, income, educational level - but housing is particularly important because it is not only a physical space/environment which has a direct impact on one's body, but also a wealth indicator that represents one's socio-economic status . In fact, according to many empirical studies, housing tenure (ownership, rent) and other housing related features (space, satisfaction, number of rooms, lighting etc.) does have strong impact on one's health conditions, chronic illness, psychological distress, as well as depression (Pollack et al., 2004; Bonnefoy, 2007; Macintyre et al., 2003; Gould & Jones, 1996; Evans et al., 2000; Deaton & Paxson, 1998; Kim et al., 2013). This relation of 'health-housing' can be more significant in elderly population. Since elderly tend to have limited income compared to non-elderly, they are more affected by their own wealth (house). Also, since elderly spend average of 80% of their time at home, he/she can be more influenced by the physical environment of a dwelling (Ebner et al. 2007).

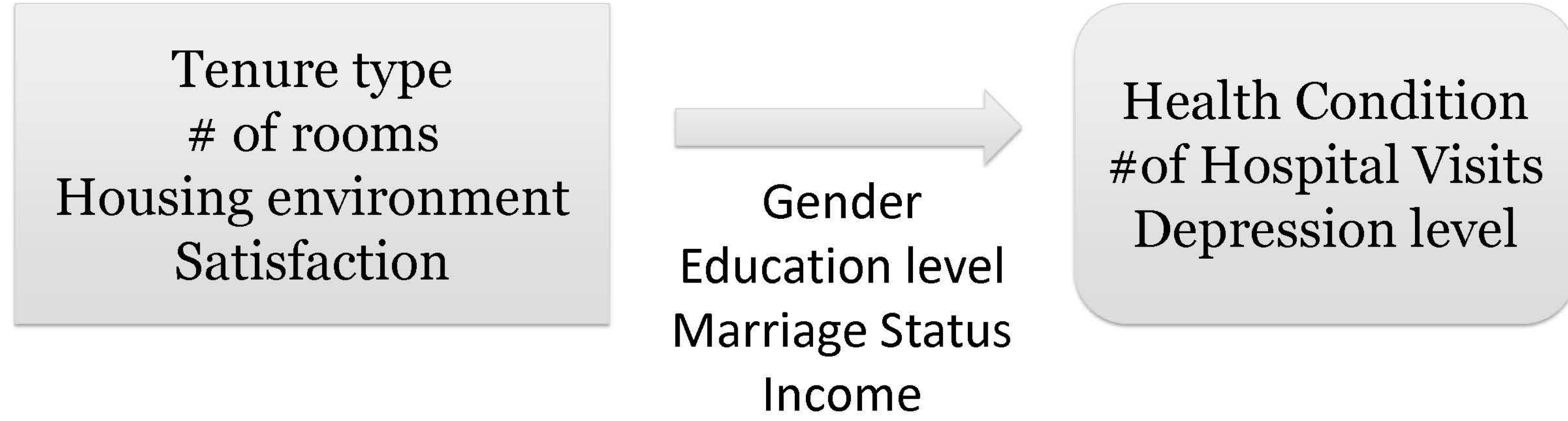
There are previous studies that analyze the relationship between housing and health, but only few of them examine the difference of the relations between elderly and non-elderly. This study aims to analyze how housing-related factors affect health and mental health of Korean elderly and non-elderly respectively, and see if there is any difference between the two.

## Method

- Sample: Korean Welfare Panel Study 11<sup>th</sup> wave (2016) participants (total=13,318; elderly= 4,994; non-elderly= 8,324)
- Analysis: Multiple Regression
- Dependent Variables: Subjective health condition (1-5 scale; 1 very unhealthy and 5 very healthy), Number of hospital visits, and Depression level (1-48; higher score means more depressed)

- Independent Variables: Tenure type (0=non-owner, 1=owner), Number of rooms, Housing Environment (Env1: Sound building with heat and damp proof ; Env2: adequate heating system, sound proof, ventilation, lightening; Env3: adequate environment without noise, odors or tremble , Env4: Safe from natural hazard (flood, land slide etc)), (yes=1 no=0), Housing Satisfaction (1-5 scale, as 1 very unsatisfied and 5 very satisfied)
- CV: Gender (0=female, 1=male), Education level (0=high school, 1=middle or lower, 2=college or above), Marriage status (0=spouse/partner, 1=no spouse/partner) and Income

<Research Model>



## Result

### ❖ Elderly (E)

Elderly (controlled)	Health Condition		Hospital Visits		Depression level	
	B	SE	B	SE	B	SE
Homeownership	.110***	.029	-1.592	1.268	-.504***	.119
Number of rooms	.060***	.018	-1.118	0.810	-.149**	.076
Env1	.033	.044	-1.059	1.955	-.168	.184
Env2	.002	.052	-1.863	2.292	-.558**	.216
Env3	.118*	.070	-5.019	3.100	-.304	.292
Env4	.156**	.075	-2.106	3.338	-.291	.314
Housing satisfaction	.169***	.018	-2.243**	0.813	-.719***	.076
(constant)	3.452***	.186	40.79***	8.24	20.107***	.775
F, R2, N	36.96***, 0.31		15.46***, 0.20		44.20***, 0.33,	

### ❖ Non-Elderly (NE)

Non-elderly (controlled)	Health Condition		Hospital Visits		Depression level	
	B	SE	B	SE	B	SE
Homeownership	.032*	.019	-1.229**	.530	-.176**	.067
Number of rooms	.017	.014	-0.378	.387	.013	.797
Env1	.021	.035	-1.502	.987	-.023	.125
Env2	-.039	.038	1.060	1.083	-.087	.137
Env3	-.138	.051	-5.202***	1.450	-.455**	.183
Env4	-.074	.074	-6.018**	2.095	.347	.264
Housing satisfaction	.111***	.011	-.711*	.315	-.465***	.040
(constant)	4.184***	0.98	-4.586	2.799	19.26***	0.353
F, R2, N	124.91***, 0.42		45.02***, 0.27		52.68***, 0.29	

Homeowners tended to have better health condition(E, NE), less hospital visits (NE only), lower depression (E, NE). More rooms in the house tended to affect elderly to have better health conditions, and lower depression. Env2 (heating, lightening etc.) affect elderly to have lower depression. Env3(noise, odors etc.) affected elderly to have better health condition(E), less hospital visits(NE), and lower depression (NE). Env4 (safety) helped to have better health condition (E), and less hospital visits(NE). Housing satisfaction had significant effect on all three DVs in both groups.

Housing effect on Health for Elderly and Non-elderly had its similarities and differences. Homeownership and Housing satisfaction was important to both groups, but number of rooms were significant only in Elderly. Housing environment also had different effects on two groups.

## Reference

Bonnefoy, X. (2007). Inadequate housing and health: an overview. *International Journal of Environment and Pollution*, 30(3-4), 411-429.

Deaton, A., Paxson, C., 1998. Ageing and inequality in income and health. *American Economic Review, Papers and Proceedings* 88 (2), 248-253.

Ebner, P., Giessler, J., Marx, L., Feddersen, E., & Lüdtkke, I. (2007). Housing for People of All Ages: flexible, unrestricted, senior-friendly. *Walter de Gruyter*.

Evans, G. W., Wells, N. M., Chan, H. Y. E., & Saltzman, H. (2000). Housing quality and mental health. *Journal of consulting and clinical psychology*, 68(3), 526.

Gould, M. I., & Jones, K. (1996). Analyzing perceived limiting long-term illness using UK census microdata. *Social science & medicine*, 42(6), 857-869.

Kim, S., Kim, S., Lee, J. (2013). The effect on Housing on Health. *Health and Social Science*, 34, 109-133.

Macintyre, S., Ellaway, A., Hiscock, R., Kearns, A., Der, G., & McKay, L. (2003). What features of the home and the area might help to explain observed relationships between housing tenure and health? Evidence from the west of Scotland. *Health & place*, 9(3), 207-218.

Pollack, C. E., von dem Knesebeck, O., & Siegrist, J. (2004). Housing and health in Germany. *Journal of Epidemiology & Community Health*, 58(3), 216-222.