

## Supplementary Online Content

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**eAppendix 1.** Calculation of Model Parameters

**eAppendix 2.** Description of NSDUH 2020 Methodological Changes and Their Consequences for Analyses

**eTable 1.** Size of Each Social Strata and Observed Prevalence of Suicide Ideation, Plan, and Attempt, Excluding 2020 Data

**eTable 2.** Size of the Social Strata That Were Excluded From Analyses due to Small Sample Sizes, Excluding 2020 Data

**eTable 3.** Size of Each Social Strata and Observed Prevalence of Suicide Ideation, Plan, and Attempt, Including 2020 Data

**eTable 4.** Predicted Prevalence of Suicide Ideation, Suicide Plan, and Suicide Attempt, Including 2020 Data

**eAppendix 3.** Code Used for Analyses

**eReferences**

This supplementary material has been provided by the authors to give readers additional information about their work.

## **eAppendix 1. Calculation of model parameters**

The variance partition coefficient (VPC) is calculated by dividing the strata-level variance by the strata-level variance + 3.29. 3.29 is a non-estimated parameter and is equal to the variance of the standard logistic distribution (Beccia et al., 2021). This value is then multiplied by 100, to put it on a percentage scale. See Beccia et al. (2021) Supplemental Material for a detailed description of these parameter calculations.

## **eAppendix 2. Description of NSDUH 2020 methodological changes and their consequences for analyses**

NSDUH 2020 data included two methodological changes compared to prior years: different skip rules for assessing suicide plans and suicide attempts and different interview administration procedures. NSDUH states that because of these methodological changes, 2020 data should not be combined with prior years' data. However, MAIHDA's model estimation is enhanced with larger sample sizes, so we performed supplemental analyses that included NSDUH 2020 data in addition to NSUDH 2015–2019 data. As we describe below, we believe that the two methodological changes NSDUH implemented would have little impact on the models we estimated and interpreted.

Regarding skip rules, in NSDUH 2020 Quarter 1 and all quarters of all prior years, participants were asked about suicide plans and attempts only if they reported suicide ideation. However, in NSDUH 2020 Quarter 4, all participants were asked about suicide plans and attempts, regardless of whether they reported suicide ideation (see pp. 110–111 of the NSDUH 2020 methodology report). However, p. 111 of the NSDUH 2020 methodology report further states that fewer than 15 people reported plans or attempts in the absence of ideation. Given this very small number, those people who in NSDUH 2020 Quarter 4 reported suicide plans or attempts in the absence of suicide ideation were treated “as not making suicide plans or attempting suicide in that period.” In other words, although the administration of the questions about suicide plans and attempts differed in NSDUH 2020 Quarter 4, the actual data were coded in the exact same way as they were in all prior years. Thus, we do not believe the skip rules that were not applied in the NSDUH 2020 Quarter 4 methodology (but that were applied in the data) prevent us from interpreting the 2020 data along with the prior years' data.

Per the NSDUH 2020 methodology report (p. 1), NSDSUH 2020 Quarter 1 and data from all prior years were collected via face-to-face interviews. NSDUH 2020 Quarter 4 data were collected via web-based interviewing. This means that data were collected using face-to-face interviews for 21 of the 22 quarters represented in the combined 2015–2020 NSDUH data. (NSDUH 2020 data were only collected during Quarter 1 and Quarter 4 due to the Covid-19 pandemic). Although it is conservative to not compare any 2020 data to those of prior years (which is why we present only the 2015–2019 data in the main text), it seems unlikely that the change from face-to-face interviews to web-based interviews would drastically impact suicide-related outcomes, given that there is consistency between self-report and clinician-administered suicide-related outcomes (e.g., Fox et al., 2020).

We describe in **Supplemental Table 3** the observed prevalence for suicide ideation, plan, and attempt for the 2015–2020 combined data, and the predicted prevalence for all outcomes for the 2015–2020 combined data in **Supplemental Table 4**. The pattern of results presented here is highly similar to the results presented in the main text, though some 95% credible intervals are slightly more narrow, likely on account of larger sample sizes.

**eTable 1.** Size of each social strata and observed prevalence of suicide ideation, plan, and attempt excluding 2020 data

Gender	Sexual orientation	Rurality	Race and ethnicity	Social stratum <i>n</i>	Suicide ideation <i>n</i> (%)	Suicide plan <i>n</i> (%)	Suicide attempt <i>n</i> (%)
Men	Heterosexual	Metro (large)	Black, Non-Hispanic	6636	275 (4.2)	83 (1.3)	49 (0.7)
			Hispanic	9286	371 (4)	101 (1.1)	64 (0.7)
			White, Non-Hispanic	21161	1093 (5.2)	270 (1.3)	103 (0.5)
		Metro (small)	Black, Non-Hispanic	3222	136 (4.3)	51 (1.6)	34 (1.1)
			Hispanic	4980	239 (4.8)	72 (1.5)	37 (0.7)
			White, Non-Hispanic	21798	1166 (5.4)	340 (1.6)	143 (0.7)
		Nonmetro	Black, Non-Hispanic	1268	50 (4)	15 (1.2)	10 (0.8)
			Hispanic	1454	59 (4.1)	17 (1.2)	13 (0.9)
			White, Non-Hispanic	14342	746 (5.2)	234 (1.6)	96 (0.7)
	Gay/Lesbian	Metro (large)	Black, Non-Hispanic	200	20 (10.1)	<10	<10
			Hispanic	307	39 (12.7)	12 (3.9)	<10
			White, Non-Hispanic	718	87 (12.2)	34 (4.8)	14 (2)
		Metro (small)	Black, Non-Hispanic	65	<10	<10	<10
			Hispanic	124	20 (16.1)	10 (8.1)	<10
			White, Non-Hispanic	431	64 (14.9)	17 (4)	<10
		Nonmetro	Black, Non-Hispanic	24	<10	<10	<10
			Hispanic	32	6 (18.8)	<10	<10
			White, Non-Hispanic	202	27 (13.4)	10 (5)	11 (5.5)
Bisexual	Metro (large)	Black, Non-Hispanic	148	28 (18.9)	12 (8.1)	<10	
		Hispanic	257	54 (21.2)	22 (8.6)	<10	
		White, Non-Hispanic	566	111 (19.7)	42 (7.5)	15 (2.7)	
	Metro (small)	Black, Non-Hispanic	63	<10	4 (6.3)	<10	
		Hispanic	131	33 (25.4)	11 (8.5)	<10	
		White, Non-Hispanic	546	129 (23.6)	47 (8.6)	17 (3.1)	
	Nonmetro	Black, Non-Hispanic	15	<10	<10	<10	
		Hispanic	32	<10	<10	<10	
		White, Non-Hispanic	290	56 (19.4)	22 (7.6)	<10	
Women	Heterosexual	Metro (large)	Black, Non-Hispanic	7920	335 (4.2)	99 (1.3)	58 (0.7)
			Hispanic	10504	454 (4.3)	127 (1.2)	72 (0.7)
			White, Non-Hispanic	22643	1197 (5.3)	313 (1.4)	133 (0.6)
		Metro (small)	Black, Non-Hispanic	3842	196 (5.1)	51 (1.3)	36 (0.9)
			Hispanic	5422	279 (5.2)	90 (1.7)	49 (0.9)
			White, Non-Hispanic	23425	1322 (5.7)	376 (1.6)	173 (0.7)
		Nonmetro	Black, Non-Hispanic	1563	64 (4.1)	20 (1.3)	14 (0.9)
			Hispanic	1522	86 (5.7)	24 (1.6)	13 (0.9)
			White, Non-Hispanic	15507	887 (5.7)	282 (1.8)	101 (0.7)
	Gay/Lesbian	Metro (large)	Black, Non-Hispanic	269	26 (9.7)	<10	<10
			Hispanic	256	39 (15.4)	14 (5.5)	<10
			White, Non-Hispanic	507	75 (14.9)	27 (5.4)	12 (2.4)
		Metro (small)	Black, Non-Hispanic	108	<10	<10	<10
			Hispanic	120	22 (18.5)	10 (8.4)	8 (6.7)
			White, Non-Hispanic	504	80 (15.9)	35 (7)	13 (2.6)
		Nonmetro	Black, Non-Hispanic	27	<10	<10	<10
			Hispanic	31	<10	<10	<10
			White, Non-Hispanic	240	52 (21.7)	21 (8.8)	10 (4.2)
Bisexual	Metro (large)	Black, Non-Hispanic	720	130 (18.3)	59 (8.3)	36 (5.1)	
		Hispanic	730	150 (20.6)	55 (7.6)	26 (3.6)	
		White, Non-Hispanic	1746	385 (22.2)	152 (8.8)	72 (4.2)	
	Metro (small)	Black, Non-Hispanic	304	57 (18.9)	23 (7.6)	<10	
		Hispanic	443	101 (22.9)	45 (10.2)	23 (5.2)	
		White, Non-Hispanic	1872	463 (24.9)	184 (9.9)	84 (4.5)	
	Nonmetro	Black, Non-Hispanic	83	19 (22.9)	13 (15.7)	<10	
		Hispanic	136	40 (29.6)	17 (12.6)	10 (7.4)	
		White, Non-Hispanic	1058	261 (24.9)	105 (10)	52 (5)	

*Note.* Metro = metropolitan, 95% CI = 95% credible interval. This table shows all of the social strata, stratum-specific sample sizes, and stratum-specific observed prevalence for all outcomes. The table can be interpreted from left to right, hierarchically. For example, the cell including “Men” has three nested cells for the three sexual orientations included in the study. Each sexual orientation has three nested cells for the levels of rurality. Each level of rurality includes three nested cells for race and ethnicity. To maintain de-identifiability, we do not report the *n* or % for cells that included fewer than 10 people reporting suicide ideation, plans, or attempts.

**eTable 2.** Size of the social strata that were excluded from analyses due to small sample sizes, and numbers of people with suicide ideation, plan, and attempt, excluding 2020 data

Gender	Sexual orientation	County	Race and ethnicity	Social stratum <i>n</i>	Ideation <i>n</i>	Plan <i>n</i>	Attempt <i>n</i>
Men	Heterosexual	Metro (large)	American Indian, Non-Hispanic	224	12	<10	<10
			Asian, Non-Hispanic	3007	94	28	15
			Multiracial, Non-Hispanic	1169	111	42	23
			Native Hawaiian, Non-Hispanic	186	<10	<10	<10
		Metro (small)	American Indian, Non-Hispanic	402	35	<10	<10
			Asian, Non-Hispanic	1288	51	16	<10
			Multiracial, Non-Hispanic	1261	103	41	20
			Native Hawaiian, Non-Hispanic	217	<10	<10	<10
		Nonmetro	American Indian, Non-Hispanic	711	37	23	15
			Asian, Non-Hispanic	220	<10	<10	<10
			Multiracial, Non-Hispanic	606	51	13	<10
			Native Hawaiian, Non-Hispanic	68	<10	<10	<10
	Gay/Lesbian	Metro (large)	American Indian, Non-Hispanic	<10	<10	<10	<10
			Asian, Non-Hispanic	64	11	<10	<10
			Multiracial, Non-Hispanic	45	<10	<10	<10
			Native Hawaiian, Non-Hispanic	12	<10	<10	<10
		Metro (small)	American Indian, Non-Hispanic	14	<10	<10	<10
			Asian, Non-Hispanic	29	<10	<10	<10
			Multiracial, Non-Hispanic	35	<10	<10	<10
			Native Hawaiian, Non-Hispanic	<10	<10	<10	<10
Nonmetro		American Indian, Non-Hispanic	13	<10	<10	<10	
		Asian, Non-Hispanic	<10	<10	<10	<10	
		Multiracial, Non-Hispanic	13	<10	<10	<10	
		Native Hawaiian, Non-Hispanic	<10	<10	<10	<10	
Bisexual	Metro (large)	American Indian, Non-Hispanic	<10	<10	<10	<10	
		Asian, Non-Hispanic	79	<10	<10	<10	
		Multiracial, Non-Hispanic	53	14	<10	<10	
		Native Hawaiian, Non-Hispanic	<10	<10	<10	<10	
	Metro (small)	American Indian, Non-Hispanic	17	<10	<10	<10	
		Asian, Non-Hispanic	35	<10	<10	<10	
		Multiracial, Non-Hispanic	40	14	<10	<10	
		Native Hawaiian, Non-Hispanic	11	<10	<10	<10	
	Nonmetro	American Indian, Non-Hispanic	24	<10	<10	<10	
		Asian, Non-Hispanic	<10	<10	<10	<10	
		Multiracial, Non-Hispanic	24	<10	<10	<10	
		Native Hawaiian, Non-Hispanic	<10	<10	<10	<10	
Women	Heterosexual	Metro (large)	American Indian, Non-Hispanic	214	19	<10	<10
			Asian, Non-Hispanic	3016	121	29	21
			Multiracial, Non-Hispanic	1158	96	35	<10
			Native Hawaiian, Non-Hispanic	167	12	<10	<10
		Metro (small)	American Indian, Non-Hispanic	444	33	12	<10
			Asian, Non-Hispanic	1331	50	16	<10
			Multiracial, Non-Hispanic	1300	111	34	16
			Native Hawaiian, Non-Hispanic	233	<10	<10	<10
		Nonmetro	American Indian, Non-Hispanic	753	53	23	13
			Asian, Non-Hispanic	266	<10	<10	<10
			Multiracial, Non-Hispanic	578	50	18	10
			Native Hawaiian, Non-Hispanic	71	<10	<10	<10
	Gay/Lesbian	Metro (large)	American Indian, Non-Hispanic	<10	<10	<10	<10
			Asian, Non-Hispanic	30	<10	<10	<10
			Multiracial, Non-Hispanic	56	<10	<10	<10
			Native Hawaiian, Non-Hispanic	<10	<10	<10	<10
		Metro (small)	American Indian, Non-Hispanic	12	<10	<10	<10

Gender	Sexual orientation	County	Race and ethnicity	Social stratum <i>n</i>	Ideation <i>n</i>	Plan <i>n</i>	Attempt <i>n</i>
			Asian, Non-Hispanic	22	<10	<10	<10
			Multiracial, Non-Hispanic	49	15	<10	<10
			Native Hawaiian, Non-Hispanic	<10	<10	<10	<10
		Nonmetro	American Indian, Non-Hispanic	15	<10	<10	<10
			Asian, Non-Hispanic	<10	<10	<10	<10
			Multiracial, Non-Hispanic	25	<10	<10	<10
			Native Hawaiian, Non-Hispanic	<10	<10	<10	<10
	Bisexual	Metro (large)	American Indian, Non-Hispanic	23	<10	<10	<10
			Asian, Non-Hispanic	155	25	<10	<10
			Multiracial, Non-Hispanic	214	67	25	20
			Native Hawaiian, Non-Hispanic	<10	<10	<10	<10
		Metro (small)	American Indian, Non-Hispanic	57	16	<10	<10
			Asian, Non-Hispanic	74	22	<10	<10
			Multiracial, Non-Hispanic	217	66	34	16
			Native Hawaiian, Non-Hispanic	18	<10	<10	<10
		Nonmetro	American Indian, Non-Hispanic	52	14	<10	<10
			Asian, Non-Hispanic	<10	<10	<10	<10
			Multiracial, Non-Hispanic	94	23	<10	<10
			Native Hawaiian, Non-Hispanic	<10	<10	<10	<10

*Note.* Metro = metropolitan, 95% CI = 95% credible interval. This table shows all of the social strata, stratum-specific sample sizes, and stratum-specific prevalence for all outcomes. The table can be interpreted from left to right, hierarchically. For example, the cell including “Men” has three nested cells for the three sexual orientations included in the study. Each sexual orientation has three nested cells for the levels of rurality. Each level of rurality includes four nested cells for race and ethnicity. Some cells had fewer than 10 individuals, and to avoid compromising de-identifiability, we do not report the actual *ns* for these cells.

**Comparison and summary of Supplemental Table 1 and Supplementary Table 2.** Per the guidelines in Astivia et al. (2019), Evans et al. (2018), and Mahendran et al. (2022), a stratum sample size is too small to be interpreted when either the total stratum sample size is < 110 or when < 10 individuals within the stratum report the outcome. Of the 54 strata shown in **Supplemental Table 1** (i.e., strata that were included in the analyses), 18.5% (*n* = 10) have a total stratum sample size < 110, 16.7% (*n* = 9) have fewer than 10 individuals with suicide ideation, 20.4% (*n* = 11) have fewer than 10 individuals with suicide plans, and 40.7% (*n* = 22) have fewer than 10 individuals with suicide attempts.

Of the 72 strata shown in **Supplemental Table 2** (i.e., strata that were not included in the analyses), 65% (*n* = 47) have a total stratum sample size < 110, 61.1% (*n* = 44) have fewer than 10 individuals with suicide ideation, 79.2% (*n* = 57) have fewer than 10 individuals with suicide plans, and 86.1% (*n* = 62) have fewer than 10 individuals with suicide attempts. Given these small stratum-specific sample sizes, we excluded individuals who were Non-Hispanic Native American, Non-Hispanic Asian, Non-Hispanic multiracial, and non-Hispanic American Indian and Alaska Native from analyses.

**eTable 3.** Size of each social strata and observed prevalence of suicide ideation, plan, and attempt including 2020 data

Gender	Sexual orientation	Rurality	Race and ethnicity	Social stratum <i>n</i>	Suicide ideation <i>n</i> (%)	Suicide plan <i>n</i> (%)	Suicide attempt <i>n</i> (%)
Men	Heterosexual	Metro (large)	Black, Non-Hispanic	7191	293 (4.1)	91 (1.3)	91 (1.3)
			Hispanic	10096	401 (4)	110 (1.1)	110 (1.1)
			White, Non-Hispanic	24074	1222 (5.1)	303 (1.3)	303 (1.3)
		Metro (small)	Black, Non-Hispanic	3477	144 (4.2)	53 (1.5)	53 (1.5)
			Hispanic	5424	268 (5)	80 (1.5)	80 (1.5)
			White, Non-Hispanic	24659	1325 (5.4)	371 (1.5)	371 (1.5)
		Nonmetro	Black, Non-Hispanic	1354	52 (3.9)	16 (1.2)	16 (1.2)
			Hispanic	1602	65 (4.1)	18 (1.1)	18 (1.1)
			White, Non-Hispanic	15978	836 (5.2)	258 (1.6)	258 (1.6)
	Gay/Lesbian	Metro (large)	Black, Non-Hispanic	225	25 (11.2)	11 (4.9)	11 (4.9)
			Hispanic	348	45 (12.9)	13 (3.7)	13 (3.7)
			White, Non-Hispanic	846	105 (12.5)	37 (4.4)	37 (4.4)
		Metro (small)	Black, Non-Hispanic	75	<10	<10	<10
			Hispanic	141	22 (15.6)	11 (7.8)	11 (7.8)
			White, Non-Hispanic	522	79 (15.2)	20 (3.9)	20 (3.9)
		Nonmetro	Black, Non-Hispanic	25	<10	<10	<10
			Hispanic	40	<10	<10	<10
			White, Non-Hispanic	226	31 (13.8)	11 (4.9)	11 (4.9)
Bisexual	Metro (large)	Black, Non-Hispanic	166	31 (18.7)	13 (7.8)	13 (7.8)	
		Hispanic	283	63 (22.4)	23 (8.2)	23 (8.2)	
		White, Non-Hispanic	668	136 (20.5)	49 (7.4)	49 (7.4)	
	Metro (small)	Black, Non-Hispanic	70	<10	<10	<10	
		Hispanic	149	37 (25)	11 (7.4)	11 (7.4)	
		White, Non-Hispanic	675	148 (22)	56 (8.3)	56 (8.3)	
	Nonmetro	Black, Non-Hispanic	15	<10	<10	<10	
		Hispanic	37	<10	<10	<10	
		White, Non-Hispanic	346	69 (20.1)	26 (7.6)	26 (7.6)	
Women	Heterosexual	Metro (large)	Black, Non-Hispanic	8576	362 (4.2)	108 (1.3)	108 (1.3)
			Hispanic	11428	506 (4.4)	150 (1.3)	150 (1.3)
			White, Non-Hispanic	25825	1340 (5.2)	343 (1.3)	343 (1.3)
		Metro (small)	Black, Non-Hispanic	4222	210 (5)	56 (1.3)	56 (1.3)
			Hispanic	6019	305 (5.1)	99 (1.7)	99 (1.7)
			White, Non-Hispanic	26664	1518 (5.7)	430 (1.6)	430 (1.6)
		Nonmetro	Black, Non-Hispanic	1668	71 (4.3)	24 (1.4)	24 (1.4)
			Hispanic	1677	98 (5.9)	26 (1.6)	26 (1.6)
			White, Non-Hispanic	17313	992 (5.7)	309 (1.8)	309 (1.8)
	Gay/Lesbian	Metro (large)	Black, Non-Hispanic	290	29 (10.1)	<10	<10
			Hispanic	272	40 (14.8)	15 (5.6)	15 (5.6)
			White, Non-Hispanic	596	92 (15.5)	30 (5.1)	30 (5.1)
		Metro (small)	Black, Non-Hispanic	125	12 (9.7)	<10	4 (3.2)
			Hispanic	132	27 (20.6)	12 (9.2)	12 (9.2)
			White, Non-Hispanic	597	96 (16.1)	40 (6.7)	40 (6.7)
		Nonmetro	Black, Non-Hispanic	29	<10	<10	<10
			Hispanic	35	<10	<10	<10
			White, Non-Hispanic	274	60 (21.9)	24 (8.8)	24 (8.8)
Bisexual	Metro (large)	Black, Non-Hispanic	781	136 (17.7)	62 (8.1)	62 (8.1)	
		Hispanic	855	175 (20.6)	67 (7.9)	67 (7.9)	
		White, Non-Hispanic	2142	483 (22.7)	180 (8.5)	180 (8.5)	
	Metro (small)	Black, Non-Hispanic	344	61 (17.8)	24 (7)	24 (7)	
		Hispanic	525	119 (22.7)	51 (9.7)	51 (9.7)	
		White, Non-Hispanic	2302	569 (24.9)	220 (9.6)	220 (9.6)	
	Nonmetro	Black, Non-Hispanic	91	20 (22)	13 (14.3)	13 (14.3)	
		Hispanic	154	43 (28.1)	18 (11.8)	18 (11.8)	
		White, Non-Hispanic	1244	306 (24.8)	125 (10.1)	125 (10.1)	



*Note.* Metro = metropolitan, 95% CI = 95% credible interval. This table shows all of the social strata, stratum-specific sample sizes, and stratum-specific observed prevalence for all outcomes. The table can be interpreted from left to right, hierarchically. For example, the cell including “Men” has three nested cells for the three sexual orientations included in the study. Each sexual orientation has three nested cells for the levels of rurality. Each level of rurality includes three nested cells for race and ethnicity. To maintain de-identifiability, we do not report the *n* or % for cells that included fewer than 10 people reporting suicide ideation, plans, or attempts.

**eTable 4.** Predicted prevalence of suicide ideation, plan, and attempt including 2020 data

Gender	Sexual orientation	Rurality	Race and ethnicity	Suicide ideation	Suicide plan	Suicide attempt
				Predicted prevalence (95% CI)	Predicted prevalence (95% CI)	Predicted prevalence (95% CI)
Men	Heterosexual	Metro (large)	Black, Non-Hispanic	3.3 (2.9, 3.6)	1 (0.8, 1.1)	0.5 (0.4, 0.7)
			Hispanic	3 (2.7, 3.4)	0.8 (0.7, 0.9)	0.4 (0.3, 0.6)
			White, Non-Hispanic	4.6 (4.3, 4.8)	1.1 (1, 1.3)	0.4 (0.3, 0.5)
		Metro (small)	Black, Non-Hispanic	3.3 (2.8, 3.8)	1.2 (0.9, 1.5)	0.7 (0.5, 1)
			Hispanic	3.7 (3.2, 4.1)	1.1 (0.8, 1.3)	0.5 (0.4, 0.6)
			White, Non-Hispanic	4.7 (4.5, 5)	1.3 (1.2, 1.4)	0.5 (0.4, 0.6)
		Nonmetro	Black, Non-Hispanic	3.1 (2.3, 3.9)	1 (0.6, 1.4)	0.6 (0.2, 0.9)
			Hispanic	3.1 (2.5, 3.8)	0.9 (0.5, 1.2)	0.6 (0.4, 0.9)
			White, Non-Hispanic	4.6 (4.3, 4.9)	1.4 (1.2, 1.6)	0.5 (0.4, 0.6)
	Gay/Lesbian	Metro (large)	Black, Non-Hispanic	8.4 (5.9, 11.4)	3.4 (1.9, 5.3)	1.8 (0.8, 3.3)
			Hispanic	9.4 (7.2, 11.5)	2.6 (1.2, 4)	1.6 (0.7, 2.4)
			White, Non-Hispanic	10.7 (8.9, 12.6)	3.7 (2.6, 4.5)	1.3 (0.7, 1.9)
		Metro (small)	Black, Non-Hispanic	7.1 (3.2, 10.8)	2 (0.7, 4.8)	1.4 (0.4, 3.3)
			Hispanic	10.7 (7.5, 15.6)	4.7 (2.1, 7.1)	1.3 (0.4, 2.3)
			White, Non-Hispanic	11.7 (8.9, 13.6)	2.8 (1.8, 4)	1.4 (0.7, 2.5)
		Nonmetro	Black, Non-Hispanic	7.3 (2.8, 14.8)	1.9 (0.2, 4.5)	1 (0.2, 2.8)
			Hispanic	10.9 (4.5, 17.8)	4.6 (1.1, 8.2)	1.7 (0.4, 3.9)
			White, Non-Hispanic	10.7 (7.7, 13.9)	3.3 (1.3, 5.4)	3.1 (1.5, 5.1)
Bisexual	Metro (large)	Black, Non-Hispanic	13.1 (8.5, 17.9)	4.8 (2.7, 7.1)	2.1 (1, 3.5)	
		Hispanic	14.8 (11.7, 18.4)	5 (3.3, 7)	1.8 (1, 3.1)	
		White, Non-Hispanic	14.5 (12.5, 17)	4.8 (3.3, 6.3)	1.7 (0.9, 2.4)	
	Metro (small)	Black, Non-Hispanic	6.7 (2.5, 11.1)	3.5 (0.9, 6.5)	2.4 (0.7, 5)	
		Hispanic	15.6 (12.2, 20.7)	4.2 (2.1, 7.4)	2 (0.8, 3.7)	
		White, Non-Hispanic	15.4 (12.9, 17.5)	5.3 (4, 6.7)	1.5 (1, 2.3)	
	Nonmetro	Black, Non-Hispanic	13.1 (4, 24.6)	4.3 (1.1, 10.3)	1.7 (0.2, 4.6)	
		Hispanic	13.7 (5.2, 22.3)	7 (2.4, 13.5)	2.4 (0.5, 5.5)	
		White, Non-Hispanic	13.5 (11.2, 16.4)	4.6 (3.2, 6.7)	1.5 (0.8, 2.5)	
Women	Heterosexual	Metro (large)	Black, Non-Hispanic	3.6 (3.3, 4)	1.1 (0.9, 1.3)	0.6 (0.5, 0.7)
			Hispanic	3.5 (3.2, 3.8)	1 (0.8, 1.2)	0.5 (0.4, 0.6)
			White, Non-Hispanic	4.8 (4.6, 5.1)	1.2 (1.1, 1.3)	0.5 (0.4, 0.6)
		Metro (small)	Black, Non-Hispanic	4.1 (3.6, 4.6)	1.1 (0.8, 1.4)	0.7 (0.5, 0.9)
			Hispanic	3.9 (3.6, 4.5)	1.2 (1, 1.5)	0.6 (0.5, 0.8)
			White, Non-Hispanic	5.1 (4.9, 5.4)	1.4 (1.3, 1.5)	0.6 (0.5, 0.7)
		Nonmetro	Black, Non-Hispanic	3.6 (2.9, 4.4)	1.2 (0.8, 1.6)	0.8 (0.5, 1.2)
			Hispanic	4.5 (3.6, 5.2)	1.2 (0.8, 1.6)	0.6 (0.3, 0.9)
			White, Non-Hispanic	5.3 (4.9, 5.5)	1.6 (1.4, 1.8)	0.6 (0.5, 0.7)
	Gay/Lesbian	Metro (large)	Black, Non-Hispanic	7 (5.2, 9.5)	2.1 (1.1, 3.4)	1.5 (0.7, 2.7)
			Hispanic	10.5 (7.3, 13.5)	3.5 (2.1, 5.2)	1.6 (0.7, 2.9)
			White, Non-Hispanic	12.5 (10.1, 14.8)	3.9 (2.9, 5.3)	1.5 (0.8, 2.4)
		Metro (small)	Black, Non-Hispanic	6.7 (4.1, 9.9)	2.1 (0.8, 4)	1.6 (0.6, 3)
			Hispanic	13.6 (9, 18.2)	5.1 (2.4, 8.1)	2.9 (1.4, 5.1)
			White, Non-Hispanic	13 (10.5, 15)	5.1 (3.6, 6.6)	1.9 (1.1, 3.1)
		Nonmetro	Black, Non-Hispanic	6.1 (2.2, 13.5)	3.8 (1.2, 8.5)	1.3 (0.3, 3.8)
			Hispanic	12.4 (5.4, 20.7)	3 (0.5, 6.8)	0.9 (0.3, 2.2)
			White, Non-Hispanic	16.5 (13.1, 20.3)	6.2 (4.2, 8.8)	2.6 (1.3, 4)
Bisexual	Metro (large)	Black, Non-Hispanic	11.5 (9.5, 13.2)	4.9 (3.6, 6.1)	2.6 (1.9, 3.5)	
		Hispanic	13.1 (11.6, 14.9)	4.6 (3.4, 5.5)	2.1 (1.4, 2.8)	
		White, Non-Hispanic	15.7 (14.5, 16.8)	5.4 (4.7, 6.1)	2.2 (1.8, 2.7)	
	Metro (small)	Black, Non-Hispanic	11.4 (8.5, 14.2)	4.1 (2.8, 5.6)	1.5 (0.7, 2.3)	
		Hispanic	14.3 (12.2, 16.5)	5.6 (4.4, 7.3)	2.6 (1.8, 3.5)	
		White, Non-Hispanic	16.8 (15.5, 18)	5.9 (5.3, 6.8)	2.3 (1.8, 2.7)	
	Nonmetro	Black, Non-Hispanic	13.1 (7.8, 18.4)	7.1 (4.2, 11.2)	3.2 (1.4, 6)	
		Hispanic	17.2 (12.8, 21.4)	6.1 (3.7, 9)	2.7 (1, 4.6)	
		White, Non-Hispanic	16.5 (14.6, 18)	6.1 (5, 7.1)	2.5 (1.9, 3.2)	

*Note.* Metro = metropolitan, 95% CI = 95% credible interval. Estimates are adjusted for age category and survey year. This table shows all of the social strata, stratum-specific sample sizes, and stratum-specific predicted prevalence for all outcomes. The table can be interpreted from left to right, hierarchically. For example, the cell including “Men” has three nested cells for the three sexual orientations included in the study. Each sexual orientation has three nested cells for the levels of rurality. Each level of rurality includes three nested cells for race and ethnicity.

### eAppendix 3. Code used for analyses

```
library(haven) #v2.4.3
library(foreign) #v0.8-81
library(dplyr) #v1.0.7
library(tidyr) #v1.1.4
library(data.table) #v1.14.2
library(brms) #v2.17.0
library(emmeans) #v1.7.3
library(broom.mixed) #v0.2.9.4
library(stringr) #v1.4.0
library(ggplot2) #v3.3.5
library(readxl) #v1.3.1

#install.packages("remotes")
#remotes::install_github("stan-dev/cmdstanr")
install.packages("cmdstanr", repos = c("https://mc-stan.org/r-packages/", getOption("repos")))

library(cmdstanr)
#install_cmdstan(cores = 2)

#----0. data cleaning code available upon request----
#----1. ideation ----
model_ideation_4 <- brm(ideation ~ age + year + (1 | strata_Inf2),
  data = data1, family = bernoulli(link = "logit"),
  seed = 123, # set seed to get reproducible results
  chains = 2, cores = 2, threads = threading(2), # running 2 chains in parallel
  backend = "cmdstanr", # enables parallelization
  iter = 10000, # 50,000 total iterations // adjust as-needed
  warmup = 5000, # 5,000 warm-up iterations // adjust as-needed
  thin = 50, # thinning every 50 iterations // adjust as-needed
  file = "model_ideation_4") # save model object as an Rds file within current
working directory
#refresh = 0, # hides model fit progress (can omit this)
#control = list(adapt_delta = 0.95))
summary(model_ideation_4)

table(data1$strata_Inf2, data1$ideation)

# calculating VPC:
random_effects_ideation_4 <- tidy(model_ideation_4, effects = "ran_pars")
random_effects_ideation_4[1,5]^2
vpc_ideation_4 <- ((random_effects_ideation_4[1,5]^2)/((random_effects_ideation_4[1,5]^2) +
3.29))*100
```

vpc\_ideation\_4

# obtaining predicted probabilities for each strata:

```
model_ideation_4 %>%  
  emmeans(~ strata_Inf2,  
    epred = TRUE,  
    re_formula = NULL,  
    type = "response")
```

#-----2. plan -----

```
model_plan_4 <- brm(plan ~ age + year + (1 | strata_Inf2),  
  data = data1, family = bernoulli(link = "logit"),  
  seed = 123, # set seed to get reproducible results  
  chains = 2, cores = 2, threads = threading(2), # running 2 chains in parallel  
  backend = "cmdstanr", # enables parallelization  
  iter = 10000, # 50,000 total iterations // adjust as-needed  
  warmup = 5000, # 5,000 warm-up iterations // adjust as-needed  
  thin = 50, # thinning every 50 iterations // adjust as-needed  
  file = "model_plan_4") # save model object as an Rds file within current working  
directory
```

```
summary(model_plan_4)
```

# calculating VPC:

```
random_effects_plan_4 <- tidy(model_plan_4, effects = "ran_pars")  
vpc_plan <- ((random_effects_plan_4[1,5]^2)/((random_effects_plan_4[1,5]^2) + 3.29))*100  
vpc_plan
```

# obtaining predicted probabilities for each strata:

```
model_plan_4 %>%  
  emmeans(~ strata_Inf2,  
    epred = TRUE,  
    re_formula = NULL,  
    type = "response")
```

#-----3. attempt-----

```
model_attempt_4 <- brm(attempt ~ age + year + (1 | strata_Inf2),  
  data = data1, family = bernoulli(link = "logit"),  
  seed = 123, # set seed to get reproducible results  
  chains = 2, cores = 2, threads = threading(2), # running 2 chains in parallel  
  backend = "cmdstanr", # enables parallelization  
  iter = 10000, # 50,000 total iterations // adjust as-needed  
  warmup = 5000, # 5,000 warm-up iterations // adjust as-needed  
  thin = 50, # thinning every 50 iterations // adjust as-needed
```

```

file = "model_attempt_4") # save model object as an Rds file within current
working directory
summary(model_attempt_4)

# calculating VPC:
random_effects_attempt_4 <- tidy(model_attempt_4, effects = "ran_pars")
vpc_attempt_4 <- ((random_effects_attempt_4[1,5]^2)/((random_effects_attempt_4[1,5]^2) +
3.29))*100
vpc_attempt_4

# obtaining predicted probabilities for each strata:
model_attempt_4 %>%
  emmeans(~ strata_Inf2,
    epred = TRUE,
    re_formula = NULL,
    type = "response")

#----- 4. figures -----

pred_prev_ideation_r1.3 <- read_excel("~/Dropbox/Penn State/Papers/NSDUH/NSDUH/pred
prev_ideation.xlsx", sheet = "R1 no combined, no 2020")
p_id_r1.3 <- ggplot(pred_prev_ideation_r1.3, aes(x = label4, y = emmean2, color = sex_orient))
+
  geom_point(aes(shape = race, fill = sex_orient), size = 2.5)+
  geom_errorbar(aes(ymin=lower.HPD2, ymax=upper.HPD2, color = sex_orient), width = .3,
position = "dodge") +
  ggtitle("Suicide ideation") +
  ylab("Predicted prevalence")+
  scale_y_continuous(breaks = c(5, 10, 15, 20, 25))+
  scale_shape_manual(breaks = c("Non-Hispanic White", "Non-Hispanic Black", "Hispanic"),
    values = c(22, 24, 21))+
  scale_color_manual(values = c("#1b9e77", "#d95f02", "#7570b3"), guide =
guide_legend(reverse = TRUE))+
  scale_fill_manual(values = c("#1b9e77", "#d95f02", "#7570b3"))+
  theme_bw() +
  facet_wrap(county~sex, scales = "free_y", ncol = 2, strip.position = "left") +
  coord_flip() +
  theme(axis.title.y = element_blank()) +
  labs(color = "Sexual Orientation", shape = "Race")+
  guides(shape = guide_legend(order = 1),
    color = guide_legend(reverse = TRUE, order = 2),
    fill = "none")
pdf("plot_ideation_r1.3.pdf", w = 12)
print(p_id_r1.3)
dev.off()

```

```

pred_prev_plan_r1.3 <- read_excel("~/Dropbox/Penn State/Papers/NSDUH/NSDUH/pred
prev_plan.xlsx", sheet = "R1 no combined, no 2020")
p_plan_r1.3 <- ggplot(pred_prev_plan_r1.3, aes(x = label4, y = emmean2, color = sex_orient)) +
  geom_point(aes(shape = race, fill = sex_orient), size = 2.5)+
  geom_errorbar(aes(ymin=lower.HPD2, ymax=upper.HPD2, color = sex_orient), width = .3,
position = "dodge") +
  ggtitle("Suicide plan") +
  ylab("Predicted prevalence")+
  scale_y_continuous(breaks = c(2.5, 5, 7.5, 10, 12.5))+
  scale_shape_manual(breaks = c("Non-Hispanic White", "Non-Hispanic Black", "Hispanic"),
  values = c(22, 24, 21))+
  scale_color_manual(values = c("#1b9e77", "#d95f02", "#7570b3"), guide =
guide_legend(reverse = TRUE))+
  scale_fill_manual(values = c("#1b9e77", "#d95f02", "#7570b3"))+
  theme_bw() +
  facet_wrap(county~sex, scales = "free_y", ncol = 2, strip.position = "left") +
  coord_flip() +
  theme(axis.title.y = element_blank()) +
  labs(color = "Sexual Orientation", shape = "Race")+
  guides(shape = guide_legend(order = 1),
  color = guide_legend(reverse = TRUE, order = 2),
  fill = "none")
pdf("plot_plan_r1.3.pdf", w = 12)
print(p_plan_r1.3)
dev.off()

```

```

pred_prev_attempt_r1.3 <- read_excel("~/Dropbox/Penn State/Papers/NSDUH/NSDUH/pred
prev_attempt.xlsx", sheet = "R1 no combined, no 2020")
p_attempt_r1.3 <- ggplot(pred_prev_attempt_r1.3, aes(x = label4, y = emmean2, color =
sex_orient)) +
  geom_point(aes(shape = race, fill = sex_orient), size = 2.5)+
  geom_errorbar(aes(ymin=lower.HPD2, ymax=upper.HPD2, color = sex_orient), width = .3,
position = "dodge") +
  ggtitle("Suicide attempt") +
  ylab("Predicted prevalence")+
  scale_y_continuous(breaks = c(0, 3, 6, 9, 12))+
  scale_shape_manual(breaks = c("Non-Hispanic White", "Non-Hispanic Black", "Hispanic"),
  values = c(22, 24, 21))+
  scale_color_manual(values = c("#1b9e77", "#d95f02", "#7570b3"), guide =
guide_legend(reverse = TRUE))+
  scale_fill_manual(values = c("#1b9e77", "#d95f02", "#7570b3"))+
  theme_bw() +
  facet_wrap(county~sex, scales = "free_y", ncol = 2, strip.position = "left") +
  coord_flip() +
  theme(axis.title.y = element_blank()) +
  labs(color = "Sexual Orientation", shape = "Race")+

```

```
guides(shape = guide_legend(order = 1),
       color = guide_legend(reverse = TRUE, order = 2),
       fill = "none")
pdf("plot_attmept_r1.3.pdf", w = 12)
print(p_attempt_r1.3)
dev.off()
```



## **eReferences**

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