firearm fatalities (Center for Disease Control and Prevention, 2010). For this project, homicides and homicide/suicides were included. By 2005, 16 states had begun the surveillance and these include: Alaska, Colorado, Georgia, Kentucky, Maryland, Massachusetts, New Jersey, New Mexico, North Carolina, Oklahoma, Oregon, Rhode Island, South Carolina, Utah, Virginia, and Wisconsin. Ohio also started collecting data in 2011. The records include for the purposes of this project, incident variables, victim variables, suspect variables, death certificate variables, coroner/ medical examiner/ hospital variables, police and law enforcement variables, victim-suspect relationship variables, weapon type variables, and circumstances for homicide. Descriptive information from the NVDRS is available through the Web-based Injury Statistics Query and Reporting System (WISQARS; http://www.cdc.gov/injury/wisqars/); however, a restricted access version of the data was used for the current study to allow for imputation of missing data, examination of variables by racial/ethnic group and victim-offender relationship, and inclusion of additional variables.

Race and ethnicity information was gathered through death certificates, coroner/medical examiner reports, and police reports. We examined Whites, Latinos, African-Americans and all others races (including biracial). Immigrant status was determined by classifying all persons who were born outside of the US as immigrants. Place of birth was determined through the death certificates and coroner/medical examiner reports. History of abuse was marked if any record (coroner/medical examiner reports, police reports) indicated a documented history of abuse by the suspect.

DATA ANALYSIS

Missing Data. Missing data is an important concern in data analysis as missing data can produced biased coefficients and deflated standard errors leading to questionable results if not

handled appropriately (see Allison, 2002). The most common strategy for handling missing data is to assume that the data are Missing Completely at Random (MCAR); that the probability that a data element is missing is independent from the value of that data element and the value of all other variables. As discussed in Fox and Swatt (2008), this assumption that underlies common techniques such as listwise deletion is problematic for the Supplementary Homicide Reports and homicide data generally due to missing data resulting from unsolved cases. A more tenable assumption is that the data are Missing at Random (MAR), where the data can be treated as MCAR after adjusting for covariates that affect the probability of missingness. Following the strategy used by Fox and Swatt (2008), we used multiple imputation (MI) to adjust for missing data in the NVDRS dataset.

For the current study, 27 variables were imputed using the chained equations method developed by van Buuren, Boshuizen, & Knook (1999), and implemented by Royston and colleagues (2004; 2009; White et al. 2011) and implemented in Stata 13.0 (see StataCorp, 2014). Since nearly all of these variables were categorical, dichotomous and multinomial logit models were used for the prediction equations for all variables but the number of wounds (negative binomial). Because a large number of categorical variables appears in the models, it was necessary to augment the data with pseudo observations to avoid situations of quasi-complete separation or "perfect prediction" (see StataCorp, 2014 for discussion). Initial diagnostics suggested that iterations converged to a stable distribution after approximately 15 burn-in iterations. Based considerations relating to the fraction of missing information for key variables and the amount of computation time required (36 hours), 40 imputed data sets were created.

Data Analysis. In order to examine whether there were differences between race and ethnic groups for the covariates under Goals 1 and 2, we examined the proportion of IPHs out of the

total number of homicides. While this does not capture the differential risk of homicide (or IPH) for each group, this ratio can be used to discern whether patterns of IPH differ between groups with different rates of victimization. Because these data are multiply imputed, it is necessary to combine estimates using Rubin's rules (see Rubin, 1987; StataCorp, 2014). When examining the impact of these covariates simultaneously in Goal 3**,** we estimated separate logit models predicting whether a case would be an IPH compared to other homicide types, which is analogous to examining the proportion of IPH compared to total homicides examined previously. Again, the results were combined using Rubin's rules and the impact of the covariates were compared between race/ethnicity groups.

FINDINGS

Goal 1. Goal 1 (see Table 1) involved understanding the distribution of IPH for race and ethnic groups across all years and sites. One of the first questions was whether there were substantial differences in the proportion of IPH victimization when comparing Latino ancestry to non-Latino ancestry for each racial group and whether there were any differences between racial groups among Latino ethnicities. Results from these tests suggest that there were significant differences in the proportion of IPHs between Latinos and non-Latinos for each racial group (White, Black, and other), but that the differences were only substantial for Whites (diff = .117) and Other Race (diff = .088). When comparing IPH proportions across racial groups for Latinos, the observed differences in the proportions are not statistically significant. These results suggest that it is sensible to combine race/ethnicity into a single variable (White non-Latino, Black non-Latino, Latino, and Other non-Latino), which was done for the remainder of the comparisons. When examining the difference between the proportions of IPHs between the combined race/ethnicity groups, a very clear statistically significant difference was seen. Specifically, 22% of White

With regard to prevention, the most malleable variable examined was abuse history. In order to prevent IPH, options are needed for both partners to mitigate the levels of violence. In about 60% of homicides of women by intimates, there was a **documented** history of abuse. Thus, these cases largely came into contact with police and could have been potentially thwarted, if appropriate interventions were in place. From these data, it appears that improved police interventions, along with adequate, effective, and available services for women who are abused and services for men who abuse, are the best approaches to reaching abusive couples. It is also important to consider that culturally-responsive services may be especially pertinent here, as there are unique trends among this group with regard to IPH and police interventions.

Overall, this project demonstrates the utility of the NVDRS and the examination of ethnicity. The level of detail and precision in the dataset allows for nuanced inspection of homicide cases. Surely future work should continue to monitor and disentangle trends of Latino IPH.

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Table 1. Comparisons between Race/Ethnic Groups for Goal 1.

Variable	Race/Ethnic Group White	Black	Latino	Other	F-test df	F-value
Victim Latino Ethnicity						
Latino						
Ave Count of IPH	340.625	17.175	--	33.525		
Ave Proportion of IPH	0.102	0.090	--	0.172	2, 1917	0.61
Non-Latino						
Ave Count of IPH	2431.325	1715.325	--	217.850	x	x
Ave Proportion of IPH	0.219	0.097	--	0.085		
Difference NH v H	0.117	0.007	--	0.088	3, 3447	96.31***
Intimate Partner Homicide						
Ave Count of IPH	2431.325	1715.325	391.325	217.850		
Ave Proportion of IPH	0.219	0.097	0.099	0.172	3, 4595	221.63***
Victim Age						
15 to 24						
Ave Count of IPH	278.300	325.750	80.575	32.550		
Ave Proportion of IPH	0.157	0.052	0.066	0.115	3, 4469	40.37***
25 to 34						
Ave Count of IPH	488.200	537.375	141.450	59.950		
Ave Proportion of IPH	0.257	0.103	0.116	0.201	3, 6430	62.78***
35 to 64						
Ave Count of IPH	1424.075	811.800	163.650	116.975		
Ave Proportion of IPH	0.265	0.167	0.148	0.222	3, 4771	50.77***
65+						
Ave Count of IPH	240.225	37.975	4.400	8.300		
Ave Proportion of IPH	0.207	0.101	0.081	0.135	3, 2578	9.27***
Victim Sex						
Male						
Ave Count of IPH	460.600	494.225	70.375	41.775		
Ave Proportion of IPH	0.065	0.033	0.022	0.046	3, 2089	34.42***
Female						
Ave Count of IPH	1970.725	1221.100	320.950	176.075		
Ave Proportion of IPH	0.495	0.434	0.454	0.489	3, 3530	7.15***
Victim Immigrant Status						
Non-Immigrant						
Ave Count of IPH	2342.700	1664.000	206.350	141.900		
Ave Proportion of IPH	0.221	0.097	0.099	0.161	x	x

Immigrant						
Ave Count of IPH	88.625	51.325	184.975	75.950		
Ave Proportion of IPH	0.182	0.100	0.099	0.198	3, 4209	10.62***
Difference NI v I	0.039	-0.002	0.000	-0.037	4, 4899	1.50

x = Not tested

* $p < .05$; ** $p < .01$; *** $p < .001$

Table 2. Comparisons between Race/Ethnic Groups for Goal 2.

Variable	Race/Ethnic Group White	Black	Latino	Other	F-test df	F-value
Primary Suspect Sex						
Male						
Ave Count of IPH	1988.675	1273.000	340.950	181.425		
Ave Proportion of IPH	0.200	0.078	0.092	0.159	3, 4239	213.73***
Female						
Ave Count of IPH	442.650	442.325	50.375	36.425		
Ave Proportion of IPH	0.383	0.327	0.223	0.302	3, 2731	7.65***
Primary Suspect Race						
White						
Ave Count of IPH	1750.375	67.075	64.325	57.075		
Ave Proportion of IPH	0.720	0.039	0.164	0.262	x	x
Black						
Ave Count of IPH	200.500	1335.600	32.550	15.000		
Ave Proportion of IPH	0.082	0.779	0.083	0.069	x	x
Latino						
Ave Count of IPH	183.075	98.950	277.900	19.200		
Ave Proportion of IPH	0.075	0.058	0.710	0.088	x	x
Other						
Ave Count of IPH	297.375	213.700	16.550	126.575		
Ave Proportion of IPH	0.122	0.125	0.042	0.581	x	x
Proportion VO Same Race	0.720	0.779	0.710	0.581	3, 1112	10.59***
Primary Suspect Age						
Under 15 (omitted)					x	x
15 to 24						
Ave Count of IPH	213.075	263.425	56.600	32.725		
Ave Proportion of IPH	0.066	0.031	0.030	0.067	3, 1614	15.78***
24 to 34						
Ave Count of IPH	477.875	525.550	141.800	50.525		
Ave Proportion of IPH	0.177	0.105	0.116	0.136	3, 1992	18.85***
35 to 59						
Ave Count of IPH	1398.975	833.900	175.225	121.700		
Ave Proportion of IPH	0.321	0.239	0.246	0.340	3, 2183	20.02***
60 + (omitted)					x	x

Primary Suspect Committed Suicide						
Male Victim						
Ave Count of IPH	34.550	10.200	1.025	4.175		
Ave Proportion of IPH	0.113	0.155	0.029	0.191	3, 26364	3.01*
Female Victim						
Ave Count of IPH	602.050	189.500	82.900	45.350		
Ave Proportion of IPH	0.770	0.784	0.793	0.775	3, 14675	0.14
Difference Male Vic - Female Vic	-0.656	-0.629	-0.764	-0.584	4, 22926	284.81***
Alcohol in Victim Toxicology Report						
Male Victim						
Ave Count of IPH	200.100	258.725	42.100	29.250		
Ave Proportion of IPH	0.074	0.050	0.028	0.069	3, 2163	13.23***
Female Victim						
Ave Count of IPH	555.025	315.300	79.950	54.750		
Ave Proportion of IPH	0.594	0.484	0.527	0.539	3, 1385	4.56**
Drugs in Victim Toxicology Report						
Male Victim						
Ave Count of IPH	130.400	180.825	28.050	11.725		
Ave Proportion of IPH	0.051	0.033	0.024	0.045	3, 1230	4.81**
Female Victim						
Ave Count of IPH	470.200	327.050	63.375	25.900		
Ave Proportion of IPH	0.470	0.403	0.453	0.455	3, 1149	1.91
Primary Susp History of Abuse of Victim						
Male Victim (omitted)					x	x
Female Victim						
Ave Count of IPH	1795.075	1166.300	311.600	170.650		
Ave Proportion of IPH	0.630	0.580	0.597	0.612	3, 572	2.43
Weapon Type						
Male Victims						
Firearm						
Ave Count of IPH	272.575	201.850	26.850	15.450		
Ave Proportion of IPH	0.069	0.017	0.013	0.031	3, 1779	41.59***
Knife						
Ave Count of IPH	105.575	254.575	33.325	18.275		
Ave Proportion of IPH	0.094	0.173	0.054	0.114	3, 3341	22.28***
Personal Weapon (omitted)						

Other Weapon						
	Ave Count of IPH	71.625	35.275	9.975	7.825	
	Ave Proportion of IPH	0.052	0.039	0.026	0.053	3, 2080	1.78
Female Victims						
Firearm						
	Ave Count of IPH	1120.225	654.825	145.250	67.800	
	Ave Proportion of IPH	0.593	0.452	0.523	0.541	3, 2977	18.78***
Knife						
	Ave Count of IPH	338.550	294.750	97.100	45.575	
	Ave Proportion of IPH	0.517	0.537	0.643	0.526	3, 2746	2.37
Personal Weapon						
	Ave Count of IPH	70.250	33.600	10.200	15.950	
	Ave Proportion of IPH	0.223	0.209	0.126	0.408	3, 4999	3.52*
Other Weapon						
	Ave Count of IPH	441.700	237.925	68.400	46.750	
	Ave Proportion of IPH	0.394	0.364	0.348	0.427	3, 1712	0.9
Number of Wounds						
	Average for IPH	3.292	3.697	4.528	3.592	3, 5004	2.64*
Victim Killed at Home						
	Ave Count of IPH	1776.275	1081.275	257.675	141.550	
	Ave Proportion of IPH	0.311	0.228	0.189	0.297	3, 3906	40.59***
Precipitate by Another Crime						
	Ave Count of IPH	211.975	136.350	33.550	21.550	
	Ave Proportion of IPH	0.066	0.028	0.031	0.053	3, 2174	16.58***

x = Not tested

* $p < .05$; ** $p < .01$; *** $p < .001$

Table 3. Results from Logit Models for White, Black, and Hispanic

Variable	White b		SE	OR	Black b		SE	OR	Latino b		SE	OR
Victim Sex												
Male[1]												
Female	3.296	***	(.113)	27.009	3.488	***	(.136)	32.731	4.255	***	(.267)	70.461
Vicim Age												
15 to 24 yr[1]												
25 to 34 yr	0.404		(.212)	1.497	0.636	**	(.222)	1.888	0.431		(.319)	1.539
35 to 64 yr	-0.117		(.179)	0.889	0.380	*	(.186)	1.462	0.094		(.315)	1.098
65+ yr	-0.273		(.236)	0.761	-0.450		(.38)	0.638	-1.191		(.981)	0.304
Victim Marital Status												
Single[1]												
Married	1.028	***	(.141)	2.795	0.771	***	(.152)	2.161	0.626	*	(.259)	1.870
Divorced	0.298		(.193)	1.347	0.044		(.229)	1.045	0.301		(.359)	1.351
Victim Education												
Less than HS Degree[1]												
HS Degree or More	0.256		(.143)	1.292	0.210		(.163)	1.234	0.216		(.265)	1.241
Victim Immigrant Status												
Not Immigrant[1]												
Immigrant	-0.576	*	(.234)	0.562	-0.526	*	(.259)	0.591	0.040		(.259)	1.040
Alcohol in Victim Toxicology												
No[1]												
Yes	0.203		(.136)	1.225	0.055		(.136)	1.057	0.018		(.24)	1.018
Drugs in Victim Toxicology												
No[1]												
Yes	-0.299	*	(.132)	0.741	-0.315	*	(.145)	0.730	0.049		(.283)	1.050
Primary Suspect Sex												
Male[1]												
Female	2.869	***	(.139)	17.626	2.810	***	(.163)	16.616	3.020	***	(.348)	20.501

Primary Suspect Race											
White[1]											
Black	-0.436	**	(.143)	0.647	-0.193		(.279)	0.824	-0.756		(.459)	0.470
Hispanic	-0.086		(.193)	0.917	-0.377		(.34)	0.686	-0.181		(.329)	0.834
Other	-0.532	***	(.131)	0.587	-0.421		(.299)	0.656	-0.834		(.615)	0.434
Weapon Type											
Firearm[1]											
Knife	-0.182		(.146)	0.833	0.670	***	(.169)	1.953	0.485		(.279)	1.625
Personal Weapon	-0.982	***	(.204)	0.374	-0.124		(.318)	0.883	-0.218		(.559)	0.804
Other	-0.254		(.13)	0.775	0.260		(.165)	1.297	-0.085		(.325)	0.918
Number of Wounds	-0.006		(.009)	0.994	-0.011		(.01)	0.989	0.002		(.016)	1.002
Suspect Committed Suicide											
No[1]											
Yes	1.369	***	(.138)	3.933	2.071	***	(.237)	7.931	1.975	***	(.386)	7.210
Victim Killed at Home											
No[1]											
Yes	0.799	***	(.095)	2.224	0.849	***	(.119)	2.338	0.875	***	(.22)	2.399
Precipitated by Another Crime											
No[1]											
Yes	-1.801	***	(.138)	0.165	-1.773	***	(.167)	0.170	-1.558	***	(.297)	0.211
Primary Suspect Abuse History											
No[1]											
Yes	2.419	***	(.336)	11.238	3.034	***	(.412)	20.771	3.220	***	(.853)	25.039
Constant	-5.692	***	(.304)	0.003	-6.891	***	(.474)	0.001	-7.702	***	(.921)	0.000

[1] Reference group

* $p < .05$; ** $p < .01$; *** $p < .001$