Are lifetime and recent incidence of domestic violence associated with increased incidence of STIs and increased risky sexual behaviors among women in Ukraine?

Introduction:

Ukraine already features one of the highest prevalence levels of HIV in the formerly Soviet nations, with prevalence among adults at 1.4% at the end of 2003.[1] The rate of new HIV infections increased by a factor of 1.5 between 2001 and 2003, and is still accelerating.[2] Although the epidemic is still somewhat concentrated in intravenous drug users (IDUs), drug dependency among those infected has decreased from 83.4% to 52.4% in recent years, indicating that sexual transmission is playing an increasing role.[3] The HIV epidemic is largely concentrated in young people, perhaps largely because IDUs themselves are young, with an estimated 20% under 20 years old.[4] Although the epidemic was initially concentrated among males, women represent an increasing percentage of infections. From 1987 to 1996, women represented 20% of infections, whereas by 2001 they represented one-third of those living with HIV or AIDS.[5] The increase in HIV infections in Ukraine has been matched by increased incidence of other sexually transmitted infections (STIs). Official syphilis cases, for instance, increased from 5,229 in 1991 to 77,345 in 1996, an average annual increase of 83%.[6]

Domestic Violence and Risky Sexual Behavior in Ukraine

Violence from an intimate partner has been linked to higher levels of HIV and other STI infections, especially among younger women. HIV-positive young women in an African study were ten times as likely as HIV-negative women to report recent domestic abuse.[7] Individuals who report domestic violence also report higher levels of STI infections.[8] The increased STI and HIV risk for women who have been abused is purported to come from three main sources. Firstly, women are at increased risk of HIV and other STIs as a direct result of forced sexual abuse.

Secondly, women who are sexually or physically abused, either in childhood or later in life, are more likely to exhibit risky sexual behaviors following abuse. Moore[9] describes how victims of abuse often later go on to exhibit several risk behaviors at once, such as increased drug use, initiating sex at younger ages, consuming alcohol, engaging

in sex work, and having sex with multiple partners. Others have shown that those who are abused are more likely to go on to have other abusive partners, furthering the cycle of abuse and risky behavior.[10]

Thirdly, women who experience abuse, or even the threat of abuse, are less likely to believe they are capable of effectively negotiating safe sexual behaviors. Researchers have found that domestic violence undermines women's feelings of control,[11] leading them to be less assertive in their sexual negotiations with partners. Hulton et. al., for instance, find that women feel they are powerless to implement safe sex strategies in the face of potential male violence, even if their male partners have not been abusive in the past.[12] Wingood and Diclemente[13] find that women are threatened with abuse and abandonment when trying to negotiate safe sexual practices with their partners, such as using condoms.

Domestic violence, or the threat of domestic violence, also dissuades women from asking their partners about their risky behaviors, such as extramarital affairs, because they fear violent retribution for being suspicious.[14] This reluctance to ask questions is especially detrimental as men who abuse their partners are also 'riskier' in that they are more likely to be infected with an STI and are more likely to engage in behavior that puts them at risk of contracting a STI. Martin et. al.,[15] for instance, find that men who abuse their wives are more likely to have extramarital sex, and are more likely to be infected with a STI. Gielen et. al.[16] find that men that abuse their wives are more likely to be HIV-positive, were more likely to use drugs, and were less likely to use condoms. Van der Straten et. al.[17] also found that husbands who abused their wives were more likely to be HIV-positive, and more likely to coerce their partners into having sex.

Tolerance of domestic violence among individuals and within a society is also a proxy measure of the state of gender relations in that country. Men and women who are more tolerant of domestic violence are more likely to believe that women do not have control over their own bodies, that the sexual needs of men predominate over those women, and that women should not question a man's sexual behavior.[18] Dunkle et. al.[19] found that relationships that featured substantial male dominance and control, even without violence, women were more likely to avoid using condoms and increased the likelihood of HIV infection.

Although accurate information about the incidence of domestic violence is almost nonexistent, a 1996 survey estimated that 12% of women under age 28 had experienced violence at the hands of their husbands in the previous year.[20] In the UNICEF Ukraine Health Report,[21] 70% of women reported 'humiliation' in the home, which encompassed both physical and verbal abuse. Alcohol abuse has been increasing,[22] a factor long associated with increased domestic violence.[23] Increasing economic stress has led to increases in domestic violence reports, particularly in formerly-industrialized areas that have suffered severe decline.[24] Crowded housing conditions, due to chronic housing shortages during the Soviet period and beyond, strain personal relationships through lack of space and the presence of multigenerational families, also increasing the likelihood of domestic violence.[25]

Research Questions: Sexual Behavior

Given the prevalence of domestic violence in the Ukraine, and in light of the HIV and other STI epidemics, it is important to determine the relationship between domestic violence and risky sexual behaviors that could lead to infection with HIV or another STI. In particular, I will examine how any abusive behavior in the past affects lifetime condom use, recent condom use, likelihood of multiple partners, frequency of intercourse, and lifetime and recent STI prevalence. For women who have been abused in the past, I will determine whether the type and timing of abuse affects current condom use and recent STI prevalence.

Condom Usage

Condoms are a primary means of protecting against STIs, with condoms reducing the probability of HIV transmission by 87%,[26] and are also highly effective in preventing the spread of chlamydia and gonorrhea when used consistently and correctly.[27] In Ukraine, recent condom use is low, as only 19.9% of sexually active women report using condoms in the last three months. Women in this age group might not be using condoms consistently because they want to become pregnant, or are using other forms of contraception. Indeed, 24.7% of sexually active women report using the IUD. Young women may lack accurate information about reproductive and sexual health, as 26.5% of

currently sexually active women report they are using withdrawal as a means of avoiding pregnancy. 54.4% of sexually active women, however, report using a condom at some point in their lives, indicating that condom use is inconsistent rather than nonexistent. Rather than avoiding condoms altogether, young women in Ukraine seem to be using them inconsistently, a practice that leads to suboptimal protection from HIV and other STIs.

As Campbell[28] notes, just because women are informed about the importance of condom use in protecting against HIV, they will not or cannot necessarily use them consistently, because they may not have control over the decision to use a condom, or even believe that they have the right to ask. Previous work has determined that once women's actual or perceived autonomy within a relationship is reduced, she is more unwilling even to purchase contraceptive pills or devices (including condoms),[29] much less use them.[30] From a male perspective, men who are more likely to approve of domestic violence are also more likely to perceive themselves as in sole control of sexual interactions, and are less likely to use condoms with their partners, or even to discuss their use.[31] The threat of domestic violence may be a prime determinant of whether women report using condoms with their partners, both currently and in the past, with women reporting abuse being less likely to negotiate condom use.

Multiple Partners

Having multiple partners has been widely cited as a risk factor for STIs, both in terms of total lifetime partnerships[32] and multiple concurrent or serial partnerships.[33] Multiple partnerships increase the likelihood that one of these partners may be infected with a STI, especially as many of these partners might themselves currently have or have had many other partners. Women who have multiple partners are less likely to use condoms consistently, and are less likely to have influence over contraceptive choice, including condoms, further increasing their risk of STIs.[34] Furthermore, men who abuse their partners report more partners than men who do not,[35] indicating that women who have suffered intimate partner violence also choose riskier partners.

2.5% of married and 21.6% of formerly married Ukrainian women report more than one sexual partner in the last year. The relationship between domestic violence and

multiple partners is not always clear. Several researchers report that women who have experienced violence are more likely to report multiple partners, especially those who have been abused physically or sexually at a young age, as they have diminished self-esteem, which leads to greater risk taking.[36] Others indicate that an extramarital affair might trigger abuse in the first place.[37] Yet, women who are under the threat of abuse seem less likely to provoke further abuse by having an affair or another partner. Therefore, I tentatively expect that women who report abuse will have more partners, but the opposite result would not be surprising either.

Sexual Frequency

Increased sexual frequency increases the opportunities for STI transmission if a woman is engaging in sexual intercourse with an infected partner.[38]

The relationship between sexual frequency and domestic violence is not well-documented in the literature, but it seems plausible that women who feel they do not have control over their own bodies are less likely to refuse unwanted sexual interactions, increasing the frequency of sex. Wingood and Diclemente,[39] describe how women who are abused sexually and physically are more likely to report frequent unprotected sex, putting themselves at increased risk of a STI both because they are having sex without condoms and because they are having sex more often. Yet, women who are happy with their partners and their relationships could be willing to engage in, or even initiate, intercourse more often. Therefore, I do not have a strong prior hypothesis about how the threat of abuse will affect frequency of intercourse, but since this factor is important to STI transmission, it deserves attention.

Research Questions: Lifetime and Recent STI Prevalence

It is important to identify risk factors, such as domestic violence, that increase the likelihood of STIs besides HIV, not only because these infections can cause serious morbidity and mortality on their own, but also because concurrent infection with an ulcerative STI, such as gonorrhea, can enhance HIV transmission.[40] In Ukraine, 46.0% of sexually active women aged 15-49 report ever having a STI, while 14.8% report having genital ulcers in the last 12 months, a likely symptom of a STI. Because of increased

risky behavior due to abuse, women who experience domestic violence, or the threat of domestic violence, all else being equal, should report higher levels of lifetime STIs. Furthermore, because recent abuse might directly lead to recent risky behavior, those who have recently experienced abuse should be more likely to report a recent STI.

Data and Methods:

The data come from the 1999 Ukraine Reproductive Health Survey,[41] which is a nationally-representative population-based survey of women aged 15-49. The data include information on demographic characteristics, recent and lifetime incidence of domestic violence, information about certain STIs, and information on sexual behavior and contraception. Because I am interested in sexual behavior, I limit my analyses to individuals who have already debuted sexually and because domestic violence incidence questions were only asked of women who have been married or lived with a man, I further limit my analyses to these women. Furthermore, because HIV and other STIs are concentrated in young people, I use analysis samples both of women of all ages and of women aged 30 and under.

Model: Condom Usage

Condom usage is measured in the DHS in a few different ways. Firstly, respondents are asked if they have ever used a condom, then whether they used a condom within the last three months and at last intercourse, indicating both lifetime and recent use. Furthermore, respondents are also asked whether they are currently using other contraceptive methods. To gain an understanding of characteristics, including domestic violence tolerance, that predict any willingness to use condoms, I will use basic logistic regression to model the probability that a respondent has ever used a condom:

Eq. 2(1): $\text{log-odds}\{\text{Ever used condom} = 1 \mid dv, X\} = \beta_0 + \beta dv + \beta X + \varepsilon$

where 'dv' represents whether an individual has ever been threatened by an intimate partner and X represents a vector of control variables.

When modeling more recent condom use, it is important to consider other sexual goals in addition to disease avoidance, such as the desire to get pregnant, as well as other contraceptive behavior, as these competing goals and behaviors can directly affect the decision to use a condom. In particular, women who are trying to get pregnant are highly unlikely to use a condom as this impedes pregnancy. Furthermore, Cushman et. al.[42] find that women who choose long-term hormonal contraception, such as birth control pills or an IUD, are much less likely to use condoms as they are no longer worried about contraception, even when they are aware that hormonal methods do not protect against HIV and other STIs. Macaluso et. al.,[43] however, found that women who use hormonal contraception are more likely to use condoms to prevent STIs, perhaps because these women had more knowledge about STI risk, and were willing to take more control of their reproductive health.

In order to account for multiple, competing goals of contraception (or the lack of contraception), I will use multinomial logistic regression to model more recent condom use. In particular, I will examine whether a woman used a condom at last intercourse while also using another form of contraception (indicating that the condom use was likely to protect against STIs, option 1), whether a woman did not use a condom at last intercourse, but is currently using another form of contraception (indicating that the woman does not currently want to get pregnant, option 2), or whether a woman used neither a condom nor another form of contraception (option 3).

Eq. 2(2a): $\{\Pr.\ y = 1|\ dv, X\} = \exp(\beta_1 X) / 1 + \exp(\beta_2 X) + \exp(\beta_3 X)$

Eq. 2(2b): $\{\Pr.\ y = 2|\ dv, X\} = \exp(\beta_2 X) / 1 + \exp(\beta_1 X) + \exp(\beta_3 X)$

Eq. 2(2c): $\{\Pr.\ y = 3|\ dv, X\} = 1 / 1 + \exp(\beta_1 X) + \exp(\beta_2 X)$

NB: Option 3 is the reference group.

Model: Multiple Partners

In the RHS, respondents are asked about current partnerships and number of partners in the last twelve months, but not total lifetime partners. I will use logistic regression to predict whether ever having a violent episode influences the likelihood of the binary outcome of having more than one partner in the past year.

Eq. 2(3a): log-odds {multiple partners = 1 | dv, X} = $\beta_0 + \beta dv + \beta X + \varepsilon$

where 'dv' measures whether a respondent has ever been threatened by an intimate partner and X is a vector of control variables.

Furthermore, to try to achieve a sense of how the timing of violent events affects more recent behavior, for the subset of women that report a violent event, I can determine whether it is recent abuse that is relevant to recent multiple partnerships, abuse in the past, or both:

Eq. 2(3b): log-odds {multiple partners in last 12 months = 1 | dv, X} =
$\beta_0 + \beta dv_1 + \beta dv_2 + \beta X + \varepsilon$

where 'dv_1' indicates whether a woman last experienced a threatening event within the last 12 months, 'dv_2' indicates whether a woman reports a threatening event prior to the last 12 months, and X is a vector of control variables.

Since I know total numbers of partners, I can also look at how domestic violence tolerance influences the total number of partners utilizing linear regression.

Eq. 2(4): # partners = $\beta_0 + \beta dv + \beta X + \varepsilon$

where 'dv' measures whether a respondent has ever been threatened by an intimate partner and X is a vector of control variables.

Model: Sexual Frequency

The RHS does report how many times a woman has had sex in the past month, and also reports how long ago a woman last had sexual intercourse, giving some indication of recent sexual activity while avoiding recall bias associated with asking about frequency of intercourse during a period longer than one month ago. Therefore, I will use logistic regression to predict whether a woman has had sex at all within the last month, as well as using linear regression to determine how often she had sex. In order to determine the impact of domestic violence on both sexual frequency and safe sexual practices, I will use logistic regression to estimate whether domestic violence influences the likelihood of having had unprotected sex within the last week and the last month.

Eq. 2(5): log-odds {sex last month = 1 | dv, X} = $\beta_0 + \beta dv + \beta X + \varepsilon$

Eq. 2(6): # times had sex last month = $\beta_0 + \beta dv + \beta X + \varepsilon$

Eq. 2(7): log-odds {unprotected sex last month = 1 | dv, X} = $\beta_0 + \beta dv + \beta X + \varepsilon$

where 'dv' indicates whether an individual has ever been threatened by a partner and X is a vector of control variables.

Model: STI Prevalence

The RHS asks a series of questions about whether a woman has ever been diagnosed with a number of STIs, including gonorrhea, syphilis, herpes, chlamydia, and HPV. I have created a single binary variable indicating whether a woman reports ever having had one of these STIs. Furthermore, the RHS asks whether a woman has had a genital ulcer in the last 12 months, without asking more specifically which disease it might be a symptom of. I will use logistic regression to determine the effect of lifetime prevalence of domestic violence on lifetime STI and recent STI prevalence for all women. Additionally, because I know when the violent incident took place for women who report them, I can look at the temporal relationship between STIs and domestic violence for this subset of women.

For all women:

Eq. 2(8): log-odds {ever had STI = 1 | dv, X} = $\beta_0 + \beta dv + \beta X + \varepsilon$

Eq. 2(9a): log-odds {had genital ulcer in past 12 months = 1 | dv, X} = $\beta_0 + \beta dv + \beta X + \varepsilon$

where 'dv' indicates whether a woman has ever been threatened and X is a vector of control variables.

For the subset of women who report domestic violence:

Eq. 2(9b): log-odds {genital ulcer in last 12 months = 1 | dv, X} =

$$\beta_0 + \beta dv_1 + \beta dv_2 + \beta X + \varepsilon$$

where 'dv_1' indicates whether a woman last experienced a threatening event within the last 12 months, 'dv_2' indicates whether a woman reports a threatening event prior to the last 12 months, and X is a vector of control variables. With this last equation, I hope to determine whether it is past domestic violence that affects current STI infections, recent domestic violence, or both.

Lifetime and Recent Domestic Violence Prevalence

Lifetime domestic violence prevalence is measured in the RHS by asking married or formerly married women a single binary question, 'Did a partner or ex-partner ever threaten to hit you, shove, or slap you, threaten you with a knife or other weapon, or actually hit you?" Women who report 'yes' are then asked further, more specific, questions regarding lifetime and more recent threats and physical abuse, including whether she has ever been threatened with fists, pushed, kicked or hit, or threatened with a knife or other weapon. Women are also asked when these events last occurred, so I can look at whether it is past or more recent domestic violence that has a more relevant effect on current behavior and STI prevalence, or whether they both do.

Control Variables

In addition to other reproductive health behaviors and goals, there are a number of other demographic factors that are likely correlated with both a woman's experience of domestic violence and outcome variables. Lower income, for instance, has long been associated with increased domestic violence, especially for those who are unemployed, face higher stress from financial pressures, and those living in more crowded housing conditions.[44]

In Ukraine, households and wage earners have seen their income fluctuate and, ultimately, decline in the past fifteen years, with over 63% of individuals having incomes below the poverty line in 1999.[45] Women face higher levels of unemployment, those who are employed face delays in receiving wages, incomes are becoming more polarized, and economic stress has increased, especially for the working-age population.[46] Economic stress has led some women, in particular, directly into industries that will make them more susceptible to HIV and other STIs. Barnett et. al,[47] for instance, indicate that young women are traveling to more affluent European and Middle Eastern countries to work in the sex industry, as well as encouraging female smugglers to trade sexual favors for reduced custom duties. Furthermore, unemployment and impoverishment among young women who stay in the Ukraine has fuelled the growth of both formal and informal sex work at home, where women may trade sex for informal support or gifts.[48]

Income is likely associated with STIs, not only because of the likelihood that lower income status will entice women into formal or informal economically-based sexual relations, but also because, as public health expenditures have declined, those who seek diagnosis and treatment are more likely to have to pay for a previously-free service.[49] Therefore, those with higher incomes might be more likely to report a STI because they are more likely to be diagnosed in the first place, but those of lower economic status might be at more actual risk of contracting an STI. In either case, economic status should be controlled for, which I will do using a household wealth index (see below). Although partner unemployment would be an important control variable, it is not included in the RHS.

As unemployment among men has been shown to be a risk factor for domestic violence, the employment status of women can also be associated with domestic violence prevalence, especially if the female half of a couple is employed when her male partner is

not.[50] In order to control for employment status, I have created an indicator variable indicating whether the respondent is currently employed.

Not just a woman's educational level, but also that of her partner, is an important correlate of domestic violence incidence. Lower educational levels of both a woman and her partner are associated with increased domestic violence, not only because lower educational attainment corresponds to reduced earning opportunities in many cases,[51] but also because those with lower education may be less able to access and use information about safe sexual practices. Condom use to avoid STIs, in particular, is associated with higher educational levels.[52] I have created a categorical variable for education, divided into four groups: incomplete secondary education, complete secondary education, technical training, and higher education.

A woman's age, and that of her partner, is also an important predictor of domestic violence incidence. A study in Tanzania found that women whose partners were more than 6 years older than them were significantly more likely to report recent violence than those whose partners were either younger than or closer in age to themselves.[53] Furthermore, researchers such as Egley[54] have explained that younger men are more likely to perpetrate domestic violence, and younger women more likely to be victims, because norms of behavior and negotiation are set earlier on in the relationship life cycle. Furthermore, a respondent's sexual behavior is likely correlated with current age, as sexual mores and behaviors have changed over time, and younger women are likely better educated about modern family planning methods and the importance of using condoms to protect against STIs. Especially in terms of lifetime prevalence, current age is an important predictor of STI acquisition as well, as older women have been exposed to sexual risk for a longer period of time. Therefore, both the current age of the respondent and her partner should be controlled for. Unfortunately, the RHS does not include partner age, only partner education, so I am only able to control for a respondent's current age.

Marital status is likely highly correlated with domestic violence. Wilson and Daly[55] find that, in Western countries, nearly two-thirds of spousal homicides occur during a separation, estrangement or following divorce. A study in Thailand found that men in unstable marriages, perhaps leading towards a divorce, are more likely to batter their wives.[56] Furthermore, although not all those who divorce have been abused, divorce

may indicate a move away from an abusive husband. Therefore, lifetime incidence of domestic violence will likely be higher among formerly married women.

In addition to increasing the risk of domestic violence, alcohol consumption has also been shown to increase the likelihood of a STI, as well as risky sexual behavior, particularly among adolescents.[57] I will include as a control variable whether a respondent reports frequently drinking any one of several alcoholic beverages: wine, beer, vodka, cognac, or champagne [NB: I am still working on modeling alcohol consumption, so this variable is not included in the preliminary results].

Other authors have determined that urban residence is associated with domestic violence.[58] The 'private family' theory espoused by Martin et. al.[59] explains that increased incidence of domestic violence is encouraged by the anonymity of city living, apart from traditional networks of kin that observed each other's daily behavior. Urban residence may also influence condom use, as urban dwellers may have increased access to condoms and information about how to use them. They may also have more anonymous access to other partners, or be more likely to access a clinic to have a STI diagnosed. Therefore, urban residence should be controlled for.

Ukraine's population is comprised of many ethnic subgroups, a relic of internal migrations throughout the Soviet period, as well as historical ethnic groups that resided in Ukraine prior to the 1920s. Approximately 71% of the country is ethnically Ukrainian, 24% are Russian, and the remaining 5% other ethnicities, such as Tatars, Jews, and Crimeans. Although these ethnic groups do not differ from one another in terms of behavior and mores as much as different ethnic groups do in other formerly Soviet countries, such as those of Central Asia (especially because both ethnic Ukrainians and ethnic Russians follow a Christian Orthodox religion), different ethnic groups may have different customs, tolerance of domestic violence, or different historical economic or social advantages. Therefore, I will control for ethnicity, although I will put all non-Russian, non-Ukrainian ethnicities into a single 'other' category.

In order to control for pregnancy intentions, I have used a question in the RHS that asks whether a woman wants to have more children, and when. I have created a variable indicating whether a woman is seeking pregnancy, defined as wanting to have more children within the next two years.

Finally, condom use itself should be considered when predicting STI acquisition, as condom use is a means to protect against STIs. In predicting lifetime STI prevalence, I will use whether a subject has ever used a condom as a control variable. When examining more recent STI prevalence, I will use more recent condom use as a control variable.

Wealth Index

The RHS does not include income and expenditure data, but does include information on asset ownership, housing quality, and sanitary conditions. In order to estimate the effect of household economic status on sexual behavior and STI incidence, I have created an index using this information as an estimate of household wealth. I derived the wealth index using the methods of Filmer and Pritchett.[60] As argued by Filmer and Pritchett, although this method provides questionable data on current wealth, it is a good long-term approximation of household economic status, and relative differences between households. The specific variables included in my wealth index are a series of dummy variables indicating whether a household owns a computer, television, car, VCR, telephone, wash machine, and has an indoor bathroom. Filmer and Pritchett's index calculation method utilizes principle component analysis, which reduces a number of variables into a single index, detects structure in the relationship between variables, and utilizes this structure in determining household wealth. My Cronbach alpha value is .59.

Data Problems and Potential Biases:

Missing Data

Of the 5,411 sexually active, married or formerly married women in the RHS dataset, 29 of them are missing information about domestic violence threats, 64 are missing information about lifetime condom use, and 595 are missing information about recent condom use. An additional 424 are missing information about multiple partnerships, and 585 are missing information about recent STI prevalence [NB: some women are missing multiple outcome variables]. I will use t-tests to determine whether the women with missing outcome data vary significantly on key variables, such as domestic violence prevalence, from those with outcome data. [NB: I would love some

advice on whether I should create a single analysis sample for women who have no missing outcome data, or whether I should have different-sized samples for different outcomes].

Simultaneous Causality

For at least some outcomes, it is hard to know whether domestic violence is a cause of risky behavior, or a consequence of it. Wingood and Diclemente,[61] for instance, noted that women who suggested condom use are often threatened with abuse, and Verma and Collumbien[62] noted that multiple partners, in the form of extramarital affairs, are often a trigger of abuse. Also, with the exception of recent behavior and STI prevalence, it is hard to know which came first: the risky behavior or the abuse. Yet, I believe it is still important to determine whether a relationship exists between domestic violence and risky behavior, as both of these phenomena are not necessarily one-time incidents, but ongoing events. For instance, even if an extramarital affair initially triggered abuse, that abuse might discourage a woman from suggesting condom use in the future. When interpreting the results, it will be important to note that these are associations, rather than necessarily causal relationships, but important associations nonetheless.

Under-reporting of Domestic Violence: Recall Bias

Recall bias refers to reporting bias that may arise when respondents recall more recent events better than events further in the past. Encouragingly, women do report incidents of domestic abuse that occurred over five years ago, indicating that they remember more than just recent events. Recall bias is likely to be worse for older women who were abused long ago, and/or were diagnosed with a STI long ago. This bias may make it appear as if domestic abuse is a more important determinant of behavior in younger women, relative to older ones. It is impossible to know whether women are differentially remembering sexual experiences, domestic abuse incidents, and STIs based on other characteristics, but there is no reason to believe they are doing so.

Under-reporting of Domestic Violence: Other

In addition to recall bias, domestic violence incidents are often under-reported because individuals feel ashamed, want to forget the event, or psychologically repress the memory of a traumatic experience.[63] If women under-report domestic violence incidents differentially, this could lead to biased conclusions. For instance, if women who report violent incidents, as opposed to suppressing them, are also less likely to have multiple partners, this could over-state the importance of domestic violence as a predictor of this outcome. Although there is no way to know how many women are under-reporting violent incidents, almost no women actually refuse to answer the questions regarding intimate partner violence, indicating that bias from this source is hopefully minimal.

Preliminary Results:

Tables 1-5 indicate preliminary results for whether domestic violence threats influence lifetime and recent condom use, multiple partnerships in the last year, and lifetime and recent STI prevalence. In all of these outcomes (except for recent condom use among all women), ever being threatened or abused by a partner is significantly associated with the outcome. For condom use, ever being threatened or abused by a partner is significantly associated with lifetime condom use, although domestic violence actually increases the likelihood a woman has ever used a condom – the opposite of the hypothesized relationship. Young women who have been abused are also more likely to have used condoms recently. These phenomena will need more investigation. Furthermore, as detailed above, I will use a multinomial logit model to investigate condom use relative to other contraceptive behavior.

For multiple partnerships, not only is domestic violence associated with an increase in the propensity of women to engage in multiple partnerships in the last year, but it is also significantly increases the number of partners reported by .098 partners. For STI prevalence, domestic abuse is a strong, consistent, significant predictor of both lifetime and recent STI prevalence. One interesting result from the STI data is that using condoms actually increases an individual's lifetime chances of having a STI; this result is puzzling and warrants more investigation as well.

Table 1: Effect of Domestic Violence on Lifetime Condom Use

	All women[1]		Women 15-30[4]	
variable	odds ratio	sig.[2]	odds ratio	sig.[2]
domestic violence:				
ever threatened by partner	1.25	**	1.51	**
ethnicity:				
Russian	1.21	*	1.20	
other ethnicity	0.94		0.74	
(reference group = Ukrainian)				
education:				
completed secondary	1.23		1.14	
technical education	1.24		0.96	
higher education	1.98	***	1.69	**
(reference group = incomplete secondary)				
others:				
wealth score	1.24	***	1.35	***
current age	0.97	***	1.00	
married now[3]	0.92		0.82	
urban residence	2.01	***	2.20	***
currently employed	0.98		0.99	
seeking pregnancy	0.64	***	0.66	**

1. N = 5247
2. p-values based on t-statistics: + indicates p < .1, * p < .05, ** p < .01, *** p <.001
3. Those not married now are formerly married
4. N = 2192

Table 2: Effect of Domestic Violence on Recent Condom Use

	All women[1]		Women 15-30[4]	
variable	odds ratio	sig.[2]	odds ratio	sig.[2]
domestic violence:				
ever threatened by partner	0.99		1.38	*
ethnicity:				
Russian	1.05		0.97	
other ethnicity	0.98		0.76	
(reference group = Ukrainian)				
education:				
completed secondary	1.47	+	1.45	
technical education	1.20		1.00	
higher education	2.65	***	2.07	**
(reference group = incomplete secondary)				
others:				
wealth score	1.28	***	1.40	***
current age	0.95	***	0.98	
married now[3]	0.77	+	0.87	
urban residence	2.12	***	2.04	***
currently employed	0.96		1.00	
seeking pregnancy	0.79	+	0.86	

1. N = 4728
2. p-values based on t-statistics: + indicates p < .1, * p < .05, ** p < .01, *** p <.001
3. Those not married now are formerly married
4. N = 2062

Table 3a: Effect of Domestic Violence on Likelihood of Multiple Partners in the Past 12 Months

	All women[1]		Women 15-30[4]	
variable	odds ratio	sig.[2]	odds ratio	sig.[2]
domestic violence:				
ever threatened by partner	2.85	***	3.12	***
ethnicity:				
Russian	1.00		1.11	
other ethnicity	0.89		1.70	
(reference group = Ukrainian)				
education:				
completed secondary	1.05		1.07	
technical education	0.90		0.86	
higher education	1.22		1.55	
(reference group = incomplete secondary)				
others:				
wealth score	1.04		0.68	*
current age	0.97	*	0.95	
married now[3]	0.11	***	0.10	***
urban residence	1.52	+	2.43	*
currently employed	0.89		1.23	
seeking pregnancy	1.40		1.81	*

1. N = 4893
2. p-values based on t-statistics: + indicates p < .1, * p < .05, ** p < .01, *** p <.001
3. Those not married now are formerly married
4. N = 2986

Table 3b: Effect of Domestic Violence on Number of Partners in the Past 12 Months

	All women[1]		Women 15-30[4]	
variable	OLS coefficient	sig.[2]	OLS coefficient	sig.[2]
domestic violence:				
ever threatened by partner	0.098	***	0.069	***
ethnicity:				
Russian	0.011		0.018	
other ethnicity	0.015		-0.026	
(reference group = Ukrainian)				
education:				
completed secondary	-0.004		0.010	
technical education	-0.023		-0.006	
higher education	-0.004		0.000	
(reference group = incomplete secondary)				
others:				
wealth score	0.011		0.031	**
current age	-0.002	+	-0.003	
married now[3]	-0.188	***	-0.152	***
urban residence	-0.006		-0.046	
currently employed	-0.018		-0.027	
seeking pregnancy	0.022		-0.022	
constant	1.284		1.319	

1. N = 4893
2. p-values based on t-statistics: + indicates p < .1, * p < .05, ** p < .01, *** p <.001
3. Those not married now are formerly married
4. N = 2986

Table 4: Effect of Domestic Violence on Lifetime STI Prevalence

	All women[1]		Women 15-30[4]	
variable	odds ratio	sig.[2]	odds ratio	sig.[2]
domestic violence:				
ever threatened by partner	1.60	***	1.91	***
condom use:				
ever used condom	1.62	***	1.76	***
ethnicity:				
Russian	1.12		1.17	
other	0.86		0.76	
(reference group = Ukrainian)				
education:				
completed secondary	1.39	*	1.40	+
technical education	1.27		1.33	
higher education	1.50	**	1.55	*
(reference group = incomplete secondary)				
others:				
wealth score	0.99		0.92	
current age	1.03	***	1.09	***
married now[3]	1.07		1.09	
urban residence	0.94		0.91	
currently employed	0.91		0.98	
seeking pregnancy	0.86		0.86	

1. N = 5247
2. p-values based on t-statistics: + indicates p < .1, * p < .05, ** p < .01, *** p <.001
3. Those not married now are formerly married
4. N = 2192

Table 5: Effect of Domestic Violence on Genital Sores in Previous 12 Months

	All women[1]		Women 15-30[4]	
variable	odds ratio	sig.[2]	odds ratio	sig.[2]
domestic violence:				
ever threatened by partner	1.80	***	2.14	***
condom use:				
used condom in last 3 months	1.04		0.84	
ethnicity:				
Russian	0.90		0.93	
other ethnicity	1.08		0.81	
(reference group = Ukrainian)				
education:				
completed secondary	0.79		0.86	
technical education	0.76		0.63	
higher education	0.76		0.92	
(reference group = incomplete secondary)				
others:				
wealth score	1.10		1.18	+
current age	1.00		1.03	
married now[3]	0.91		0.75	
urban residence	0.88		0.92	
currently employed	0.82	+	0.12	
seeking pregnancy	1.47	**	1.49	*

2. p-values based on t-statistics: + indicates $p < .1$, * $p < .05$, ** $p < .01$, *** $p < .001$
3. Those not married now are formerly married
4. N = 1998

Appendix A: Sample Summary Statistics

variable	women's sample: 30 and under	women's sample: all
outcomes:		
ever used condom[1]	54.5	50.3
used condom in last 3 months[2]	20.9	16.6
multiple partners[3]	4.8	4.2
unprotected sex last month[4]	73.0	73.6
domestic violence:		
ever been threatened by a partner	18.57	21.63
of those ever threatened:		
threatened	89.2	90.9
kicked or hit	58.6	61.8
pushed	85.9	86.8
attacked with knife or other weapon	14.8	17.2
STIs:		
ever had a STI	45.1	49.5
had genital sores in the last 12 months[5]	15.5	15.2
ethnicity:		
Ukrainian	76.9	74.7
Russian	18.5	20.7
other ethnicity	4.6	4.6
education:		
< secondary education	9.6	6.0
completed secondary	58.4	60.4
technical education	13.5	12.3
higher education	18.5	21.3
others:		
wealth score[6]	-0.105	-0.054
current age	25.1	32.4
married now[7]	89.2	85.9
urban residence	69.4	71.2
seeking pregnancy[8]	20.4	11.4
N	2229	5382

1. Missing: 24 (15-30) 63 (total)
2. Missing: 154 (15-30) 588 (total)
3. Missing: 97 (15-30) 419 (total)
4. Missing: 72 (15-30) 226 (total)
5. Missing: 153 (15-30) 585 (total)
6. Range: -1.59 - 1.901 (both samples)
7. Those not married now are formerly married.
8. Missing: 13 (15-30) 70 (total)

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