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Smoking Behaviors Among Pregnant Women: A Romanian Case Study

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SIT Study Abroad

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Abstract

Smoking behavior during pregnancy is one of few preventable factors associated with poor health outcomes for both women and children. The post-communist countries in Central and Eastern Europe face many challenges in this realm, as tobacco control efforts have not adequately addressed this behavioral health issue that has arisen since 1989. To better inform these efforts in Romania, this study categorizes the determinants of pregnant women's prior smoking, current smoking, and current smoke exposure by using both quantitative and qualitative analysis. We find that those living with other smokers, exposed to smoke on a daily basis, and experiencing stress during pregnancy are most at risk for harmful smoking behaviors. We suggest that future efforts involve both structural and service-based changes that are catered towards pregnant women. Structural changes include multi-sector integration for tobacco control, health system coordination and implementation of smoking cessation counseling, and improved monitoring of existing programs. Service-based changes include education programs, community-based efforts, and involving women's partners in the smoking cessation process.

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Acronyms

ARPS: Romanian Association for Health Promotion

CEE: Central and Eastern Europe

COPS: Conferences of Parties

CSO: Civil Society Organization

EPDS-R: Edinburgh Postnatal Depression Scale adjusted for Romania

EU: European Union

FCA: Framework Convention Alliance

FCTC: Framework Convention on Tobacco Control

GATS: Global Adult Tobacco Survey

GP: General Practitioner

IPPF: International Planned Parenthood Federation

LSNS-6: Lubben Social Network Scale

MCH: Maternal and Child Health

MOF: Ministry of Finance

MAIA: An Integrated Assessment of the Determinants of Pregnancy Outcomes Initiative

MOH: Ministry of Health

NGO: Non-Governmental Organization

OR: Odds Ratio

PPP: Public Private Partnership

PRISM: Proactive Sustainable Preventive Intervention

PSS: Perceived Stress Scale

RHS: Reproductive Health Survey

SDC: Swiss Agency for Development and Cooperation

SES: Socioeconomic Status

SHS: Secondhand Smoke

SPRO: Smoking During Pregnancy in Romania

SRH: Sexual and Reproductive Health

STAI: State Trait Anxiety Inventory

UNDP: United Nations Development Program

UNFPA: United Nations Population Fund

WHO: World Health Organization

Preface

This project was conducted in collaboration with the Babes-Bolyai University Center for Health Policy and Public Health in Cluj, Romania in the department of Community and Behavioral Health. Through their partnership, this study worked with the Integrated Assessment of the Determinants of Pregnancy Outcomes Initiative (MAIA) for advancing maternal and child health in Romania and made use of the MAIA questionnaire. Dr. Anne Wallis at James Madison University serves as the Principal Investigator and primary liaison between Romanian and American colleagues for the MAIA research project. While this Independent Study Project for SIT Study Abroad is a product of on-site research in Romania and Switzerland, it is not the final deliverable for this study. Our project will likely be expanded upon at Washington and Lee University throughout 2014 and 2015 to produce an Economics Honors Thesis by May 2015.

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I. Introduction

Comprehensive health measures enhance a country's human capital by improving population health.[1] In the former communist countries of Central and Eastern Europe (CEE), the population health concerns often focus on Maternal and Child Health (MCH). Here, infant and maternal health outcomes are relatively worse than in Western Europe.[2] Smoking and exposure to secondhand smoke (SHS) during pregnancy are two of few preventable factors associated with poor MCH outcomes, including low birth weight, preterm birth, and long-term health implications for mothers and children.[3,4,5,6,7,1] Pregnancy is also an opportune time to initiate smoking cessation because pregnant women's perceptions of health risks are heightened during this time and expecting women have higher quit rates than the general population.[3,5] Focusing on smoking cessation, lowering SHS exposure, and preventing postpartum relapse for pregnant women in CEE is thus of critical importance.

Romania specifically has undergone many changes in both the maternal health and tobacco sectors since the 1990's, including emergence of the tobacco culture and high instances of smoking and SHS exposure during pregnancy. However, many pregnancy risk factors, including smoking, are largely undocumented and under-addressed.[8] Additionally, Romania is undergoing a large transition in the tobacco epidemic, and tobacco usage is becoming a marker of social and health inequalities rather than social sophistication.[6,9,2] Yet, there is a scarcity of current studies comprehensively characterizing pregnant women and their smoking behaviors

[1] When referring to pregnancy, we are addressing the time period between conception and childbirth. However, when referring to the healthcare system's involvement, the pregnancy period is defined as 'from the first antenatal care contact up to six weeks postpartum'.[3]

[2] The tobacco epidemic maps the substantial health hazards of tobacco use that usually lag three to four decades behind the peak in smoking prevalence.[9] There is now a four-stage model of cigarette consumption and subsequent mortality for men and women.[9]

and exposure.[8,9,10,11] It is critical to develop an understanding of these current pregnancy risk factors to begin improving MCH outcomes in this region.

The purpose of this study is to assess the determinants of smoking prior to pregnancy, and continued smoking and smoke exposure during pregnancy in Romania. Doing so will inform potential and current efforts aimed at improving MCH and smoking cessation among this population. Our study will also contribute to the larger literature as to how to improve MCH in the former communist countries of CEE undergoing many health-related transitions.

II. Methodology

To best assess the determinants of tobacco use and exposure among pregnant women, this research synthesizes three primary methods: information from both scholarly articles and international and Romanian health reports, formal and informal interviews with experts, and primary data analysis from the MAIA questionnaire. These categories are not mutually exclusive, as interviewees suggested additional articles and referred other experts, data analysis prompted further research and interview questions, and articles and reports provided contact information for authors and informed data analysis. Initial discussions of this project began in January 2014 and the project serves as a baseline for future analysis and research.

A. Articles & Reports

Reports produced by international bodies were first accessed, including the 2010 European Perinatal Health Report, the World Health Organization's (WHO) Framework Convention on Tobacco Control (FCTC), the WHO's Equity, Social determinants, and Public Health Programs, and the WHO's Recommendations for the Prevention and Management of Tobacco Use and Second-Hand Smoke Exposure in Pregnancy.[1,3,6,12] Romanian national reports were then accessed including the 2011 Global Adult Tobacco Survey (GATS), 2008 Health

Systems in Transition, and 2004 Reproductive Health Survey (RHS).[13,14,15,3] These reports served to provide context for both current tobacco and maternal health issues faced in Romania and the issues' formation over the past twenty-five years. After initial background was established, scholarly articles provided more specific insights on sociodemographic, environmental, behavioral, and mental health determinants of smoking during pregnancy. Additionally, further articles published by staff members at the Center for Health Policy and Public Health at Babes-Bolyai University established necessary health knowledge specific to the Romanian context.

B. Interviews

Interviews were conducted both in Romania and in Switzerland throughout April and May 2014. Staff members at Babes-Bolyai University organized formal and informal in-person interviews with MAIA project staff, the Center for Health Policy and Public Health's Executive Director and local coordinator of the MAIA study, a MAIA data collector, and the Center's primary gynecology contact. All MAIA project affiliates were interviewed on-site in Cluj, Romania while the gynecologist was interviewed in Targu-Mures, Romania at the University of Medicine and Pharmacy. While in Targu-Mures, the former data collector for Mures County was contacted and interviewed. Interviews in Bucharest, Romania were conducted with a MOH correspondent and pulmonologist, gynecologist, and neonatologist. In Switzerland, interviews were conducted with tobacco control specialists at the United Nations Development Program (UNDP) and WHO in order to complement knowledge from Romanian specialists with those

[3] The GATS was implemented by a mutual agreement between Romania's Ministry of Health (MOH) and the WHO. The WHO conducts the GATS in low and middle-income countries with high prevalence of tobacco use and underdeveloped tobacco control policies.[7] This was a critical project for Romania's tobacco database, as Romania had not collected large-scale tobacco data previously and now has the capacity for continued monitoring.

working in the international sector. Additionally, Skype and phone interviews were conducted with academics, the Framework Convention Alliance (FCA), the WHO, and the Swiss Agency for Development and Cooperation (SDC). Guidelines were created for all interviews but they were conducted in a semi-structured manner, so not all questions were fully addressed while further insights were gained. MAIA research staff reviewed guidelines for interviews in Romania prior to the interviews and all guidelines are listed in the appendix.

C. Data Analysis

While in Romania, primary data analysis was performed utilizing the MAIA questionnaire through SPSS (SPSS Inc., Chicago, Illinois) software. This included descriptive statistics, cross-tabulations, correlations, and binary logistic regressions. Three models were run to best assess the determinants of smoking before pregnancy and continued smoking and SHS exposure during pregnancy. The dependent variables are as follows: smoking six months prior to pregnancy, continued smoking during pregnancy, and exposure to SHS during pregnancy. Data analysis was conducted in collaboration with MAIA research staff and the Principal Investigator of the MAIA project.

III. Historical Development

To begin to understand the multidimensional issues surrounding smoking and pregnancy in Romania, we must first assess Romania's historical development since 1989, as post-communist countries in CEE have unique national identities that have shaped their current health situation.

A. Government Restructuring

Prior to December 1989, the communist Ceausescu regime tightly controlled Romania's governmental, economic, and health systems by vast centralization and designating all property

as publicly owned.[14,16] Many public spheres lacked competition, were of poor quality, underfunded, inefficient and inflexible, and had inadequate facilities.[14] Non-governmental organizations (NGO) were illegal, so there was no presence of civil society organizations (CSO) or a private sector to counterbalance the large presence of the state.[16,17] The 1989 revolution overthrew the communist government and transformed the country into a republic led by a democratically elected president and two-chambered parliament.[14] This political liberalization allowed for health sector reform and the development of a market-based economy.[18] Our subsequent focus will thus be on how the health system was remodeled, how the new economy permitted the multinational tobacco industry to enter, and how these two systems have interacted.

B. Health System Restructuring

Prior to 1989, the health system primarily existed on an isolated, central level. It focused on curing physical illness and terminated all psychology and psychiatry programs in the 1980's, removing all services for mental illness.[19,4] The health system also intruded in women's sexual and reproductive health (SRH) and maternal health, which resulted in women distrusting and disregarding the formal system.[16] Women became unresponsive to healthcare workers' advice and services and institutions became underused.[13,16] In 1989, underused health services, a lack of prevention, and unavailable mental health services led to many pregnant women having health-related burdens. Romania had the highest maternal mortality in Europe, 159 deaths per 100,000 live births.[20]

[4] Psychiatry wards remained in use only for those that fought back against the communist regime.[19] So, the regime misused mental health services and made mental issues a highly stigmatized topic, as it remains today.[19]

After the revolution, the isolated national system fell and became much more integrated and decentralized. Internationally, The WHO, United National Population Fund (UNFPA), the World Bank, and the International Planned Parenthood Federation (IPPF) all collaborated with the National Health Program in the Romanian Ministry of Public Health.[16,21,22] Regional and local levels gained control as well, as all forty-one counties now have a public health department that receives advice from the MOH.[19] When Romania joined the European Union (EU) in 2007, other country's national agencies, such as the SDC, began collaborating with the Romanian MOH to help Romania meet EU guidelines and regulations.[23] This increased coordination among international, national, and regional levels has created a decentralized and pluralistic system. Additionally, in this new system, pregnant women have free access to medical care in state-owned institutions without paying into the mandatory health insurance scheme.[24,14] As a result of this coordination and free antenatal care, by 2004 74% of pregnant women attended their first prenatal visit in the first trimester, 97% claimed to be on the list for a general practitioner (GP), and fertility rates declined.[15] The early antenatal consultations allow doctors to provide necessary behavioral guidance and diagnose health-related disorders and the drop in fertility rates created the potential for women to have higher quality interactions with healthcare providers at these visits and for facilities to invest more in each woman's pregnancy.[7,12] Romania saw a 64% drop in maternal mortality between 1989 and 1994 alone.[18,5]

However, the healthcare system has not reached its potential. While the health system has undergone drastic reform, it remains highly institutionalized and curative.[7,16,21,22] Romania still lacks the necessary infrastructure for a modern health system; it provides curative, physical

[5] While this large drop in fertility rates is likely related to prenatal care quality, it is highly correlated with Romania legalizing abortion in 1989. This made abortions much safer and easier to access, so abortion-related mortality greatly decreased.[22] In fact, between 1990 and 1992, Romania had three abortions for every live birth.[22]

health services rather than preventative mental and physical services.[14,16] Some even argue that most of the improvements in MCH have been due to overall economic growth rather than specific interventions.[25] Many services are not properly implemented and enforced, mental health services remain highly stigmatized, and there is a large lack of guidance and counseling on health behaviors.[1,13,15,26] Thus, public health in Romania does not consist as a preventative, holistic system, but as the epidemiology of infectious disease.[25] There is still a systemic and institutional problem twenty-five years after the revolution.

C. Tobacco Industry Restructuring

As previously mentioned, the government heavily controlled the economy prior to 1989, which included the tobacco industry. As a result of the revolution and liberalized economy, Romania saw a surge of multinational tobacco companies in 1989.[13] The companies quickly built themselves into the government and social structure of Romania, removing the political will for tobacco control and becoming symbols for the Western way of life.[1,19] Additionally, much of the companies' advertising was catered to young women as a sign of feminism and emancipation, increasing the social pressure for women specifically to smoke.[1,19]

Early national and international efforts to decrease smoking lacked conviction, as no actors had a vested interest in lowering smoking rates. When nicotine gum was introduced in 1996, pharmaceutical companies improperly gave directions, and people quickly reverted back to smoking after misusing the gum.[19] International regulations banned the explicit advertisement of tobacco in 1998 and the Tobacco Control Program was introduced in 2002, but neither effort was convincing, involved the health system, nor worked to raise the price of tobacco.[19] In 2002, smoking was also outlawed in public places, but, similarly to other changes, there was no enforcement present and the social dominance of tobacco usage took precedence over legality.[27]

2005 saw the first successful tobacco efforts with the implementation of WHO's FCTC and the Romanian MOH's National Program for Tobacco Control, 'Stop Smoking'.[6,13,17,19,6,7] 'Stop Smoking' installed regional offices throughout the country, a quit phone line, smoking cessation group therapy, and educational programs.[19] The combination of FCTC and 'Stop Smoking' decreased tobacco advertising, increased cigarette prices, initiated negative media portrayal of smoking, and increased services to quit smoking.[19,30] While the tone towards smoking became negative, programs remained geared towards the general population and had no focus on pregnant women.[19,8]

Romania still did not see a decrease in smoking rates. The MOH implemented an excise tax on tobacco in 2006, which only increased revenues to the state without decreasing smoking rates.[14] This tax also made the Ministry of Finance (MOF) more acceptant of the tobacco companies due to the revenue they brought in and less supportive of anti-smoking legislation.[17] Additionally, the ban on smoking in public places was amended in 2007 to allow all areas less than 100 m^2 to be smoke-friendly, making virtually all restaurants, bars, and club smoking areas.[27] 2010 finally saw a decrease in affordability of cigarettes due to an increase in the exchange rate with the Euro, an increase on the 2006 excise tax, and the economic crisis, all

[6] The FCTC is the first internationalization of tobacco control efforts and it aims to protect the human rights of all affected by smoking, particularly women and children.[28] It attempts to integrate national programs for smoking cessation into national development planning processes, so their efforts are indirectly related to our focus.[6,17] They hold conferences of parties (COPS) every two years for all governments to meet and discuss the FCTC.[29]

[7] With establishment of the FCTC, many adjacent initiatives were created. The WHO created the Tobacco Free Initiative to serve as the technical implementer of the FCTC and the FCA was created to provide a voice for civil society and review the implementation of FCTC policies on the ground.[28,29]

[8] The Romanian Association for Health Promotion (ARPS) split women into focus groups and asked their opinion on smoking cessation to make leaflets to help them quit.[19] However, no women found pregnancy to be a critical time to quit, so the subsequent leaflets provide no guidance for smoking cessation before or during pregnancy.[19]

which made smoking much more expensive and brought a decrease in smoking across socioeconomic groups.[10,19,31] More recently, the 2014 European directive on tobacco control is the first regional attempt to counter the tobacco industry by working together with the industry rather than against it.[19] As previously mentioned, the industry has been a high contributor to the state budget and has greatly influenced members of parliament by funding specific projects and bringing in much revenue to the MOF.[19,25] So, this directive's new approach has a unique opportunity. However, smoking rates remain as high as those of the West three decades ago, around 30%, and Romania was one of four countries that voted against the Tobacco Products Directive negotiations.[32,33] Tobacco control is a prerequisite good for a country's development, so Romania remains underdeveloped by this measure.[1,9]

D. Health Sector Involvement with Tobacco

Prior to 1989, Romania took no interest in the nexus between heath and smoking.[25] While hospitals are now required to be 'baby-friendly,' meaning no smoking is allowed inside, there are often smoking rooms for both doctors and patients.[31] 'Baby-friendly' only remains on paper, as does much tobacco legislation. Additionally, there are no official recommendations or protocols for gynecologists or GP to follow with smoking patients.[25] Often, this lack of guidance is heightened for pregnant women, as gynecologists only see their role as temporary; they will see the woman for a maximum of nine months.[25] The doctor's mindset remains highly medical and does not focus on patient education or women's health-related behaviors at home.[25] The doctors' lack of involvement is indicative of a curative, health systems approach rather than a

[9] While the specific initiatives against tobacco usage are increasing, it is important to note that country-wide initiatives often take many years to become ratified, planned, and enacted, so many policies do not include current tobacco indicators. For instance, the SDC developed countrywide priorities with Romania in 2009 that ignored tobacco control.[23] Because of this long process, there is no way for project priorities to be modified until 2019, so this topic will go largely unaddressed.[23]

preventative, health services approach.[25] The health system's high institutionalization and lack of prevention does not separate out tobacco control from infectious disease control, two very separate tasks.[25,30]

In addition to the health system's incomplete view of tobacco control, there is no collaboration within the medical field for patients.[23,31,10] The hospital, GP, gynecologist, and mental health specialists do not communicate. For example, doctors in hospitals must write a code for smoking in a patient's file, but this information is not shared with the GP or other health providers.[34] Again, the focus on curative care prevents doctors from seeing the harmful side effects of this incomplete procedure; they only see the patients for a short period of time.[25,11]

The MOH trained both GP and gynecologists to refer smoking patients to cessation centers through the 'Stop Smoking' program, but doctors are highly reluctant to participate.[19] Before the revolution, smoking prevention was not covered in medical school, so many doctors have not adopted modern practices and most still advise women to reduce smoking but to continue smoking in small amounts during pregnancy because of the stress and agitation that quitting will cause.[19,25] As a result, many doctors do not refer women to cessation centers, and, if they do, they are often not convincing or credible, and most women do not go if advised.[19,12]

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[10] There is also no collaboration between the medical and social service sectors, which further prohibits women from receiving comprehensive health services.[23] This separation also encourages the mindset that health and social issues are unrelated, further discouraging doctors from addressing social determinants of health.

[11] Hospital doctors have a vested interest in documenting patient's smoking status, as it a cause of co-morbidity and they are differentially paid for all co-morbidity diagnoses.[34] However, GP are not given additional reimbursements for documenting smoking status, so they often do not do so.[34] Thus, patient's files only indicate that they are smokers if they have been hospitalized.

[12] Gynecologists and nurses, whom pregnant women have the most contact with, also have the highest rates of smoking in the medical sphere.[19] Their smoking behavior drastically lowers their credibility to pregnant women when they counsel against smoking, as they often smell like smoke.

The lack of procedure for healthcare practitioners combines with a lack of conviction against smoking to result in high variability in the advice that pregnant women receive during antenatal visits. In the private MedLife Maternity clinic in Bucharest, Romania, women are advised by their gynecologist to stop smoking during pregnancy, by the neonatologist to refrain from smoking during the postpartum period and throughout breastfeeding, and the mother's smoking status is also transferred to their child's pediatric file.[35] In some public clinics, women receive much advice as well and some gynecologists ask the women to explain the smoking dynamic of the household and advise the spouse to not smoke in the house.[31,35] However, less than 25% of pregnant women in a recent Romanian study reported talking to a doctor about the harmful effects of smoking and it is presumed that the conversations that did take place were primarily patient-initiated rather than provider-based.[24,25] Additionally, other studies have found that of women that initially talked to their doctor about smoking, less than 25% of them were asked about their attempts to stop smoking at subsequent prenatal visits.[36] Due to this inconsistency in medical advice, many women do not see pregnancy as a reason to quit smoking.[19] Of those that do quit, most do not do so because of doctor's advice, formal programs, or counseling.[32] Of all Romanians that quit smoking in 2011, 80.8% say that they did so without formal assistance.[13]

E. Women's Tobacco Use

Due to insufficient health systems, the substantial and powerful presence of the tobacco industry, and a lack of involvement of the health sector in tobacco issues, women's smoking prevalence remains high. Women's tobacco usage increased from 11 to 25% from 1989-2000 and Romania continues to see a closing of the gender-gap in smoking.[6,13,34] Smoking among women of childbearing age reached a high in 2008, with 41% of women smoking before

pregnancy and 15% of all women smoking while pregnant.[24,32,13] 2009 saw the first decrease in female smoking rates in twenty years, and by 2011 smoking rates among females ages 25-44 had decreased to 23.8%.[13] These levels align with the third stage of the tobacco epidemic, as women's smoking rates have begun to decrease after reaching a high of over 40%.[9,32,14]

IV. Social Determinants of Smoking Behaviors[15]

When determining what influences these high smoking rates among Romanian women, we readily see that health policies and the healthcare system's structure influence decisions.[27] However, social environments are shaped by this formal structure and specific environments are becoming increasingly important in determining tobacco usage.[25,27] Now we will turn our attention to these downstream, social determinants. Many poor prenatal health indicators indicate social disadvantages and these disadvantages often interact with one another to create increased vulnerability and exposure to tobacco.[1,12,37] However, Romania is a transitioning country, so the determinants to tobacco use and exposure are changing constantly and the description of a smoker changes yearly.[27] In order to properly characterize those with increased tobacco usage and exposure, we must then explore specific individual and family determinants.

[13] Most women that quit smoking in pregnancy do so in the first trimester, so of women that continue to smoke in pregnancy, most do so throughout the entire pregnancy.[31] However, in Romania, there is not documentation of when in pregnancy women have quit.

[14] The third stage of the tobacco epidemic is classified by a closing gender gap in smoking prevalence, an initial decline in female prevalence following a plateau, increased education on the hazards of smoking, media presence, and smoke-free public places.[9] While Romania does not currently embody all of these characteristics, it is most likely at this stage of the epidemic.

[15] Nicotine addiction is found to make women more likely to continue smoking during pregnancy, and 75% of pregnant smokers say they are addicted to smoking.[1,3,8,35] Related to this is issue is the length of time the woman has smoked, which often determines whether or not she will quit.[31,37] However, as nicotine addiction is a biological predictor of smoking and is unrelated to social determinants, we will not further explore it in this paper.

A. Sociodemographics and Environmental Exposure

Historically, educational attainment has served as an indicator for responding favorably to health promotion and policies, so we expect those with lower education to smoke more before and during pregnancy.[9] Prior studies have found that those with less than a college education are over seven times more likely to continue smoking during pregnancy.[11,38] However, Romania has had an opposite effect. The most educated women smoked before pregnancy as of 2011, representing an earlier stage in the tobacco epidemic in which smoking is seen as sophisticated.[9,38] While highly educated women smoke before pregnancy, prior studies in Romania have found no association between education status and quitting during pregnancy.[24] Additionally, doctors have observed that since 2011, highly educated women are better informed about the risks of smoking during pregnancy and have greater health literacy, so they are now quitting at higher rates than those with less education.[27,31] Our research will help update Romania's data, as there is currently no clear relationship between education and tobacco usage.

Romania has seen an opposite age effect as well. Women of childbearing age have been more likely to smoke than the entire female population, with 23.8% of ages 25-44 smoking and 16.7% of all women smoking in 2011.[13,16] However, this data is not stratified among women of childbearing age. Due to the current demographic transitions, doctors have conflicting views on this variable. Some believe that younger women are more likely to smoke while others believe that younger women are now less likely to smoke.[31,35] Older women are often less likely to quit during their pregnancy because they grew up in an environment where smoking was largely unrelated to health concerns and they are more likely to be addicted to nicotine after smoking for

[16] Age effects are likely correlated with education effects, as less educated women are typically associated with younger age at smoking uptake.[11] However, we do not have time to fully explore these many associations between demographic variables.

many years.[31,39] It is plausible that younger women in lower socioeconomic (SES) groups and older women in higher SES groups are the most likely to smoke at this point in time as the tobacco epidemic has progressed, which may explain the doctor's conflicting views on age.[27]

However, due to their communist history, prior studies have found that smoking during pregnancy in CEE persists across all SES groups, so this may not be a valid indicator of smoking behaviors.[24] Income is still not highly variable among post-communist societies and there are often status inconsistencies across income levels, so this measure does not always indicate different lifestyles.[27] While tobacco taxes typically lower smoking for only low SES groups, the drop in affordability of cigarettes in Romania led to a smoking decrease for all SES levels, indicating that SES is not a significant indicator for this population.[10,19] Additionally, as Romania is in earlier stages of the tobacco epidemic than most Western countries, smoking may still be seen as an indicator of high financial status.[19,35,40] However, some argue that this is only popular perception and that higher income and smoking are not correlated any more.[27,17]

Our last variable specific to the CEE context is residence. Historically, urban women have been more likely to smoke than rural women because urban areas quickly modernized after the revolution while rural areas remained more traditional.[19] However, many believe that Romania's current transition is making smoking widespread among both urban and rural areas. Recently, studies have even found rural women to be 1.9 times more likely to continue smoking during pregnancy.[24] Rural women typically rely more heavily on GP than gynecologists, whom typically advise women against smoking, so they may receive less information related to health-behaviors.[12] Thus, while smoking prevalence may be lower in rural areas, a higher percentage may continue to smoke while pregnant.

[17] Due to these conflicting views and lack of variability within income, we will not include SES in our model.

While age, education, income levels, and residential status may not vary in predicted ways across the entire Romanian population, they are often stratified across ethnic groups. However, when controlling for previously mentioned demographic variables, the ethnic effect disappears between Romanians and Hungarians, the largest ethnic minority, with 14% and 15% smoking during pregnancy respectively.[41,18] However, a substantial effect remains for the Roma population, as they have been found to have five times the odds of continued smoking during pregnancy than their counterparts.[24,41] This population has severe health issues and many live in isolated communities with smokers, making them both differentially exposed and vulnerable to tobacco usage.[23,41] 67% of the pregnant population smokes while 87% of women and 40% of all Roma are daily smokers.[19,24]

In addition to age, education, income, urban dwelling, and Roma origin, family dynamics play a large role in determining smoking behaviors. In general, Romanian women are less likely to smoke if they are married; the spouse effect is highly significant.[24,38] However, prior studies have found that women are twice as likely to continue smoking if there are any other smokers are in the home, likely because it is socially acceptable to smoke and the mindset for smoking is often determined by home environments.[27,32,42,43] Additionally, if a woman's spouse smokes, then she is at a much higher risk for prior and continued smoking and the spouse effect reverses.[37,39] Prior studies have found that of women that continued smoking, 74% had partners that smoked.[8,31]

In regards to SHS, women with smoking partners are often exposed to smoke in the home even if they themselves do not smoke, meaning non-smoking women are often at risk for adverse

[18] Hereafter, all mentions of the Hungarians refer to Romanian citizens that are of Hungarian ethnicity. Because our study took place in Transylvania, there is a large percentage of ethnic Hungarians.

health outcomes as well.[28] Because women have less power to negotiate a smoke-free home, they are often differentially exposed to smoke, so we expect exposure rates to be higher in our study than in the general population.[6]

B. Reproductive History and Health Behaviors

Women with unwanted pregnancies and other living children are found to be more likely to continue smoking during pregnancy and to delay their prenatal care.[15,24,42,44] This delayed prenatal care serves as a proxy for preventative measures taken by the woman and indicates that these women are not receiving medical advice early in their pregnancy to quit smoking. Alcohol has predicted continued smoking in Western countries, but prior studies in Romania have found that alcohol does not distinguish tobacco usage.[24,45] This is likely because women's alcohol consumption is often low, less than one drink per week.[24] Additionally, women don't view smoking as dangerous to maternal health while they do view alcohol abuse as dangerous because there are immediate consequences for the mother.[31]

C. Mental Health

There is much debate as to how smoking and mental health are correlated, with some doctors believing that mental health is only related to prior smoking behavior, not continued smoking during pregnancy.[31] Previous literature has found that high levels of social support are associated with higher quit rates, as support helps women make the decision to quit smoking and then adjust to the physiological, psychological, and social changes that are associated with quitting.[1,27,35,42,46] This social support then serves as both a buffer for stress and as a proxy for the quality of family and social experiences.[46] However, prior studies do not differentiate the types of social support that are relevant to our study. If a woman receives social support from her

friends and family and they are smokers, then the woman is not getting the kind of social support that we are interested in.

Without a proper support system, women often have low psychological resources, which are associated with higher levels of stress, anxiety, and depression during pregnancy.[46] Prior studies have found higher prenatal stress and depressive symptoms to be associated with continued smoking, and 61.5% of pregnant smokers say that smoking reduces their stress levels.[13,19,36,45,47] Additionally, smoking is a coping mechanism for stress caused by previously mentioned risk factors such as caring for other children and being unmarried.[37] Smoking also reduces anxiety, but pregnant smokers have more anxiety symptoms than quitters, making it an unclear relationship.[18,47,48,49] Additionally, all mental health indicators are closely linked to other factors, including marital status, nicotine addiction and SHS exposure, so it is difficult to establish a causal pathway between mental health and smoking.[27,36,50]

V. Model Construction

This study attempts to balance the historical transition of both the health system and the tobacco industry with the specific social factors associated with smoking behaviors during pregnancy in Romania. This mixed methods approach will allow us to best assess our findings and interpret where Romania currently exists in the tobacco epidemic, as the country is constantly transitioning and most prior studies are not up to date with 2014 indicators.[9]

The quantitative portion of this study uses data collected through the MAIA questionnaire in partnership with the Babes-Bolyai Center for Health Policy and Public Health. Women 18 years and older that sought out antenatal care in one of five state-owned healthcare facilities were asked by trained data collectors to fill out the questionnaire.[26] Women were told that this study would help determine the risk factors in pregnancy by documenting women's

sociodemographic characteristics, and exposure to nicotine, stress, and other indicators.[26] The study had a response rate of approximately 90% and 1,395 cases.

A. Outcome Variables

Women were first asked if they were a smoker six months prior to pregnancy. This is an important indicator, as these women may still have health problems after giving birth depending on how long they smoked for.[31] They also have a high risk of relapsing after pregnancy, as they may have only been planning to quit temporarily.[3,24,27,37] If women answered 'yes,' they were then asked if they were current smokers. Options included: 'smoking as much as before,' 'smoking a reduced number of cigarettes,' 'quit after learning about the current pregnancy,' and 'quit before learning about the current pregnancy.' For simplicity, we will combine both 'yes' and 'no' indicators into single variables. By asking women about both current and prior smoking, we will be able to compare risk factors associated with both behaviors. Finally, women were asked about their exposure to SHS on a daily basis. There is no risk free level of SHS, so our study will measure only 'yes, I am daily exposed' and 'no, I am not daily exposed'.[51] Most prior studies have focused on the mother's direct smoking, so this study will contribute to the literature by assessing how risks may differ between direct and indirect smoke exposure.

B. Risk Factor Variables

Based on qualitative interviews and literature review, this study measures a number of risk factors split into four categories: sociodemographics, reproductive history and health behaviors, environmental factors, and mental health. Within sociodemographics, we measure age as a categorical variable because there is no clear relationship between age and smoking in Romania and we measure education as having completed high school or less versus undergraduate or more. Additional sociodemographic variables include: ethnicity as Romanian,

Hungarian, Roma, and other; residence as urban and rural; living arrangement as married, unmarried with partner, and without partner. For reproductive history and health behaviors, we categorize the following: unwanted pregnancy as wanted pregnancy, wanted at a later time or didn't care, and didn't want now or at any time; having other children as this being their first birth, having one other living child, and having two or more living children; alcohol as having had a drink in the past year or not. Environmental factors include whether or not the women has another smoker in the home and whether or not she is exposed daily to SHS. Finally, mental health indicators are all measured using scales: the Lubben Social Network Scale (LSNS-6), Perceived Stress Scale (PSS), State-Trait Anxiety Inventory (STAI), and the Romanian version of the Edinburgh Postnatal Depression Scale (EPDS-R).[52,53,54,55,19] The first three scales were made into binary thresholds at the mean response level and the EPDS-R uses an established threshold of 11.[55]

C. Statistical Analysis

We present descriptive statistics to assess smoking behavior before and during pregnancy and exposure to SHS during pregnancy. These statistics also allow us to explore unadjusted associations between various prenatal risk factors, maternal characteristics, and smoking status and exposure. Logistic regression analysis was used to identify the independent effects of each risk factor after adjusting for the effects of all other variables included in the analysis.

There are likely problems with self-reporting as smoking status is often underreported due to stigma, which we take into consideration.[3,56] Another potential problem with our data is that women were interviewed at various stages in their pregnancy and we did not verify the week in pregnancy when the questionnaire was filled out.[26] However, prior studies have not found a

[19] Validity of the four scales is presented in Tables 1-2.

variable for 'pregnancy week' to be statistically significant.[24] Lastly, because we are utilizing cross-sectional data rather than time-series or panel data we are unable to establish causality between risk factors and smoking behaviors.

VI. Results

A. Descriptive Statistics and Unadjusted Associations (Tables 3-7)

Tables 3-7 present descriptive statistics on our sample of pregnant women overall and for the Roma population separately. We segment this data because Roma women are known to have a high prevalence of both risk factors and smoking behaviors but our study has only 28 Roma observations, so we are not likely to find significance in our regressions for this population. For outcome variables, approximately 30% of women smoked prior to pregnancy, and 14% of all women smoked during pregnancy while the remaining 16% that smoked prior to pregnancy quit either before or after learning about their pregnancy. In contrast, 58% of the Roma population smoked six months prior to pregnancy, with about 46% of all women smoking during pregnancy. Around 50% of all women are exposed to SHS daily.

Almost 55% of women have higher education, so this variable is not as stratified as historically non-communist countries. Our mean age is about 30 years and in most unadjusted associations young age became a risk factor, indicating a later stage in the tobacco epidemic than Romania has previously documented.[9] 81% are Romanian, 16.5% Hungarian, and 2.1% Roma, so our sample has a much larger Hungarian presence than all of Romania, which has a 6.1% Hungarian population.[57] Our sample also has less of a rural population than the country, with 33.7% versus the country's 47.2%.[58] While only about half of our sample is married, 98% are married or have a partner.

73% of women wanted their pregnancy, 21.5% wanted a pregnancy at a later time or didn't care, and only 5.5% stated that they did not want their pregnancy now or any time in the future. Importantly, only 27% of Roma women claim to want their pregnancy now, with 42% wanting it later and 30% never wanting a pregnancy. Unwanted pregnancy is associated with less social support, higher perceived stress, and higher depression during pregnancy. 67% of our sample has one living child and 16% have two or more, while only 17% have none.[20] As expected, about 50% have consumed alcohol in the past year.

About 59% of our sample has no smoker in the home while the remaining has at least one smoker and about 50% of women were exposed to SHS daily. Importantly, of Roma women living with a smoker, 100% were exposed to SHS on a daily basis while only 81% of the entire sample living with a smoker is exposed, indicating that no preventative measures are taken among Roma, such as family members smoking outside. Additionally, of Roma women not living with a smoker, 0% were exposed while 31% of the entire sample not living with a smoker was exposed, meaning that cohabiting with a smoker is the most important factor for Roma women's exposure. In the entire population, only 18% of women without a smoker in the home had smoked prior to pregnancy, but 51% with a smoker had smoked. Both environmental indicators (living with a smoker and being daily exposed) are associated with less social support, higher anxiety and depression, and higher current and prior smoking.

Thresholds for social support, perceived stress, and anxiety were set at the mean response level, but over 80% of Roma women had low social support and high stress and over 60% had

[20] To ensure parity, we conducted analysis for differences in number of pregnancies, living children, and births. Our results were as expected with most women having one or zero miscarriages or children that are not currently living. However, the questionnaire does not ask women at what week in pregnancy their miscarriage occurred, so we are not sure if all miscarriages reached 20 weeks of gestation, an important indicator for parity.[59]

high anxiety. 35% of all women had high depression while 70% of Roma women had high depression. Comparatively, 6.5-12.9% of women in Western countries have been found to experience depression at some point during their pregnancy.[21] Curiously, high social support was associated with less prior smoking but not with current smoking.

B. Adjusted Associations Between Outcomes and Risk Factors (Table 8)

Table 8 provides the results of logistic regressions for three binary outcomes: prior smoker or not, current smoker or not, and currently exposed to SHS on a daily basis or not. After adjusting for covariates, women ages 36-44 are more likely to have previously smoked than ages 31-35 (Odds Ratio (OR) = .305, $p < .01$) but there are no significant results for younger age groups. There is no significant relationship between education and prior smoking, but highly educated women are less likely to continue smoking during pregnancy or be exposed to SHS (OR = .409, $p < .05$; OR = .452, $p < .1$). Prior studies found the same likelihood for women with less than a high school degree to continue smoking as we found for women with a high school degree, indicating that a bachelor's degree is the threshold for an educational buffer to smoking in Romania.[24] Hungarian women are more likely to continue smoking as compared to Romanian women (OR = 3.393, $p < .05$). We do not have any significant associations between residential status and smoking behaviors, but having a smoker in the home may be a better indicator for SHS exposure than living in an urban or rural environment. We found that unmarried women with a partner are more likely to have previously or currently smoked than married women (OR = 8.756, $p < .05$; OR = 3.368, $p < .05$), which has previously been attributed to different levels of social support.[24] However, cross-tabulations reveal that social support levels are evenly split between living arrangement categories. In close, for sociodemographic indicators, higher education and being married serve as the strongest buffers against tobacco usage and exposure.

We found that women that wanted to be pregnant at a later time were more likely to have previously smoked but less likely to continue smoking than women that wanted their pregnancy at that time (OR = 2.381, $p < .1$; OR = .443, $p < .05$). We found no associations for having other children or alcohol use after adjusting for other variables. Women with other smokers in the home are more likely to have previously smoked, continue smoking, and be exposed to SHS (OR = 5.864, $p < .01$; OR = 3.102, $p < .01$; OR = 20.098, $p < .01$). However, we did not quantify the quit attempts made by women that live with other smokers, which are likely to be lower than quit attempts made by women without smokers in the home. Those exposed to SHS are more likely to continue smoking during pregnancy than those that are not (OR = 19.546, $p < .01$).

Mental health indicators present many problems for reverse causality, as exposure to smoke may cause women to have withdrawal symptoms, which increases their stress, anxiety, and depression levels.[27] Additionally, we have problems with timing lags, as women are asked about their current social support and mental status but about prior smoking, so we do not expect much significance for this outcome variable. Interestingly, we found that women with high social support are more likely to be exposed to SHS but we found no association with smoking habits (OR = 2.383, $p < .05$).[21] High stress levels are associated with more continued smoking (OR = 1.934, $p < .1$), which is supported by prior literature, but we found no significant associations for anxiety or depression in the expected directions. These results are likely because stress, depression, and anxiety scales are all highly correlated.

[21] Our social support scale measures many facets of social support, so women with high social support may not have support in ways that help decrease their smoking habits or exposure.[27] Additionally, the scale gives higher scores to those with support from more people, so it weighs the quantity of support, which may lead to skewed results.

VII. Discussion

Our results suggest that Romania is indeed progressing along the tobacco epidemic, as age and education indicators are now similar to those found in Western studies. Romania initially experienced social acceptability of smoking and an underdeveloped tobacco control strategy after the Ceausescu regime ended, which led to higher smoking rates among those with high SES, high education levels, and young age.[9,13] As smoking popularity has decreased and legislation has become more holistic, smoking uptake has decreased among younger populations while prevalence remains high for older women.[27] Additionally, gynecologists find that younger women tend to not smoke or to have quit before pregnancy while older women are more likely to have smoked in the past and to be addicted to nicotine.[31,35] However, doctors also find that young women in their twenties consider smoking to be culturally sophisticated, which may explain why we do not see significance for the younger age groups of ages 18-25 and 26-30.[35] In regards to education level, the high prevalence of smoking in the 1990's and early 2000's has led to current health inequalities, which then prompted health promotion strategies. Highly educated women then respond more quickly and favorably to these strategies than those with less education.[9] This response resembles stage three of the tobacco epidemic, as women are now more aware of the risks of smoking and those with higher education are quitting at larger rates than less educated women.[35] Importantly, both age and education indicators show opposite trends than those found in the GATS 2011 survey, indicating that Romania is undergoing a critical and fast transition in the tobacco epidemic that is critical to respond to.[9]

Our study also confirmed that, in conjunction with other literature in this region, an ethnic effect exists for the Roma population. While our study found that Hungarian women are more likely to continue smoking than Romanian, this is likely because the clinic site in Targu-

Mures has a high percentage of Hungarian women, making it a skewed sample. Once we singled out Roma women from the rest of the study, we found results for this population that are in line with prior studies.[24,31] These results are likely due to two primary factors. First, tobacco control programs still do not target sub-populations, neither pregnant women nor Roma women.[6] While Roma have theoretical access to health services, many lack practical access, as they are often discriminated against in the healthcare system and do not know their health-related rights.[23] Secondly, many Roma live in isolated communities in which living conditions are overcrowded, smokers are likely to be in close contact with pregnant women, many women live with other smokers, and healthcare facilities are not nearby.[23,60] Thus, this pregnant population often experiences multiple deprivations.

In contrast to studies analyzing pregnant women in other industrialized countries, our study found that having an unwanted pregnancy, more prior children, and consuming alcohol were not risk factors for prenatal smoking or smoke exposure. Our study did find that women that wanted their pregnancy later or did not care were more likely to have smoked prior to pregnancy. This result is plausible, as women would not have preemptively quit smoking without planning their pregnancy. Additionally, many women consult a gynecologist prior to pregnancy if they wish to become pregnant and are then advised to quit smoking, so women that did not want a pregnancy at this time would not receive such advice.[19] The best distinction here may then be between planned and unplanned pregnancy rather than wanted and unwanted pregnancy. While prior literature finds that women with unwanted pregnancies are over five times more likely to have been prior smokers, this literature combines the categories of 'wanted to be pregnant later or did not care' with 'unwanted pregnancy'.[24] While we may see more statistical significance by this combination, theory suggests that we should separate these categories

because attitudes of women within them are very different. While prior literature has found women with an unwanted pregnancy to have more current smoking, we found that women with unplanned pregnancy are less likely to continue smoking.[24] Women in this category may feel blame or guilt towards their pregnancy and be hyper-aware of their health behavior, which explains this counterintuitive finding.

We did not find statistical significance for either prior children or alcohol consumption. Previous literature has found that women in their first pregnancy and ones that have not consumed alcohol are less likely to smoke, as they are more cautious of their child's health.[42] However, many women in their first pregnancy in Romania smoke because they are afraid of giving birth and are aware that smoking increases the likelihood of premature birth and lower birth weight.[19] Additionally, many women that are smoking claim that their relatives and friends smoked during pregnancy and the child is healthy.[19] In juxtaposition, we expect women with two or more children to smoke more because once women have more children they are likely less cautious of their children's health and are preoccupied with other matters.[24] Because there are varying reasons that indicate women being more or less likely to smoke in their first pregnancy, the sign of the relationship here is unclear.

In regards to alcohol, women are typically not advised against consumption during pregnancy and some are even advised by their gynecologist to have one drink per week to satisfy cravings.[35] This variable does not differentiate between the amount of alcohol consumed, and we suspect that most women only have one or two drinks per week, as doctors do not believe that their female patients abuse alcohol.[31] Alcohol is easy to see the effects of and has obvious limits while smoking does not, so doctors do not see it as a comparable health behavior during pregnancy.[31] In conclusion, we then see that we cannot use health behavioral indicators from

other industrialized countries in the Romanian context. Behavioral responses are often not cross-cultural, so Romania must develop more culturally aware proxies for health behaviors during pregnancy than simply replicating those from other countries.

While health behaviors differ distinctly across societal contexts, social environmental factors remain the same. Women's mindsets are often determined by their environment, and a smoking environment has a strong affect on women's smoking behaviors across societies. Some even say that the women's mindset is the strongest indicator of pregnancy related smoking habits and exposure.[27,61] The strongest indicator in our model is having other smokers in the home, as it is the only indicator significant across all three models. When other smokers are in the home, women's environments are acceptant of smoking and women often lack the social support to quit.[13,32,61] Doctors often advise women to create smoke-free environments in the home, but 80-90% of spouses do not quit, so the largest problem is often in the household and associated with daily exposure to SHS.[31,22] Women are more likely to be exposed to SHS if they have high levels of social support as well. This is likely because women may have support from a smoker and the law allows smoking in many public places, mostly restaurants and cafes.[27,37] Many women are then exposed to SHS when they are with friends and loved ones in private and public places.[27]

While these environmental factors are crucial, we cannot overlook mental health risk factors, which remain understudied and undiagnosed. Many women and healthcare providers still see smoking as an issue of willpower, not as medical or psychological.[19] We found that high stress is associated with more continued smoking, which is supported by previous literature.[24] This is likely because the stress associated with pregnancy makes it more difficult for women to

[22]An additional risk factor is that if there are other smokers in the home, the woman is much more likely to experience smoking relapse after giving birth or breast-feeding, as her mindset on quitting is often temporary rather than permanent.[31] However, we do not have time to fully explore postpartum relapse in this section.

quit smoking.[18,46,48] However, we found no association with anxiety or depression and smoking behaviors. There is not consensus in the literature as to whether depression or stress are determinants of continued smoking during pregnancy, and our findings support the theory that stress, but not depression, is associated with continued smoking during pregnancy.[24,47] However, we are not using diagnosed depression or stress, so our measures of mental health must be perceived and accepted by women in the Romanian culture.[61] Because mental health remains largely socially unaccepted, there is often a misunderstanding with psychology and mental health issues, so women may have answered the questions incorrectly.[61] Additionally, it is possible that mental health issues are not stimuli for smoking or barriers against quitting in the Romanian population.[24]

VIII. Conclusion

In conclusion, it is widely known and accepted that pregnant women are particularly vulnerable to the negatives of tobacco use yet the Romanian population has a high amount of women that smoke before and during pregnancy and are exposed to SHS during pregnancy.[6] Romania continues to experience a double burden of tobacco usage, as both women's and men's smoking rates are high, so pregnant women are at risk for direct and indirect smoke exposure throughout their pregnancy and the postpartum period.[28]

We found through our quantitative and qualitative analysis that Romania is progressing along the tobacco epidemic and some indicators of smoking now parallel those of Western countries. Specifically, indicators for age and education have flipped in the past three years, with younger and more educated women now being less likely to smoke. However, we cannot disregard specific cultural and societal factors. Due to Romania's communist past, we must address health behaviors and mental health on a country level, as these indicators are unique to

the Romanian context and have been disregarded in the medical system.[27] We also must emphasize the need for programs for sub-populations, as there are not targeted programs for pregnant or Roma women. Finally, as Romania's tobacco control legislation is tightening and we see health inequalities arising, the household level is becoming a much stronger determinant of smoking behaviors and exposure than the national level. Having other smokers in the home and being exposed to SHS are the strongest indicators for women's direct and indirect smoke exposure.

These determinants of tobacco usage are constantly changing and are clearly specific to Romania. Thus, we cannot replicate programs used in other societies without modifications. No one structural or service-based program will fully address the nuanced issue of tobacco behaviors during pregnancy; we must focus on integrating programs and targeting services to pregnant women. Tobacco control cannot be an autonomous effort; it must be multi-sectored and gender-specific. Only whole of society interventions that respond to the ever-changing epidemic will be successful at addressing pre-pregnancy smoking, prenatal smoking, and prenatal smoke exposure in a way that is sustainable and effective throughout time.

IX. Recommendations

Based on article and health report assessments, our qualitative interviews, and quantitative data analysis, we find that Romania must use preventative efforts to target smoking cessation before pregnancy and ensure that women do not relapse postpartum. To do so, tobacco control must include both structural and service based interventions.[1]

A. Structural Recommendations

Structurally, this means increased collaboration between government, society, and health system entities.[1,23,29] Romania must mobilize inter-sector support to address the social

determinants of tobacco use and strategically utilize existing mechanisms for discourse.[1] This requires mostly increased enforcement, as many anti-smoking laws are in place yet go unmonitored and unimplemented.[25,29] To ensure proper enforcement, public private partnerships (PPP) must be fostered.[30] Complex social issues require this multilateral system, so Romania's health system must become geared towards holistic health services and work in collaboration with policy actors and CSOs. Prior research has found that smoke-free legislation has led to smoke-free homes and an increase in smoking cessation in pregnant women when enforced, thus contributing to reduced female smoking and smoke exposure during pregnancy and subsequently better health outcomes.[3,4] However, when unenforced, this legislation has no effect on maternal smoke behaviors or birth outcomes.[4]

Beyond basic monitoring of law enforcement, Romania must monitor the behavioral outcomes of these policies.[10] As the tobacco epidemic progresses, policies have different effects on specific sociodemographic indicators.[10] For example, we have seen in the past few years that smoking has become less sophisticated and highly educated people are smoking less, potentially indicating that smoking bans in the workplace have been more effective for white-collar jobs.[10,13] Additionally, behavioral outcomes differ across cultures, as previously mentioned, so Romania must closely monitor how the population responds to policy interventions. To ensure substantial effects for policies, price increases, taxes, smoke-free legislation, and advertising bans must work together to denormalize tobacco.[1,9,10,19] Each of these strategies targets different social determinants at different times in the tobacco epidemic; only a multi-methods approach is sufficient.

In addition to multilateral collaboration, integration must increase within the health system itself. Gynecologists, GP, and mental health practitioners remain highly unconnected,

which influences patient's view of the health system greatly. Doctors indicate that there is not trust within the health system and there is no support network across disciplines, thus MCH services and programs are highly disjointed.[19,35] For example, GP currently do not ask about women's unhealthy behaviors, leaving this to the gynecologist.[8] However, many women do not see a gynecologist before their pregnancy or in the first trimester, so many women are not questioned about their smoking behaviors until later in their pregnancy, if at all. Additionally, women are not questioned about stress and anxiety levels by their GP or gynecologist, leaving out mental health issues altogether.

To solve this nuanced problem, healthcare workers must be made more aware of the many causes of tobacco usage, document patient's tobacco-use status on a regular basis, be trained in proper smoking cessation counseling, and attend capacity building programs for health system integration.[1,3,13,46,23] The WHO recently developed guidelines for managing tobacco use and exposure to SHS during pregnancy, which should serve as a guideline for Romanian healthcare facilities.[3,28,24] Collaboration within the health sector and adherence to international guidelines will then allow for smoking cessation programs to be built into the system rather than functioning as a separate entity. Doing so then increases the capacity for subpopulation programming, as the general population would receive smoking cessation programming in healthcare appointments and national attention could be turned to at-risk subpopulations and

[23] These trainings must focus on the addictive aspects of tobacco usage as well.[28] While our study focuses primarily on structural and social determinants of tobacco use, we must mention that tobacco is often viewed as a behavioral issue only, which is incorrect.

[24] Examples of the WHO guidelines include asking all women about their tobacco use and exposure at the first antenatal visit and each subsequent visit and counseling partners and other family members.[3]

pregnant women.[1,46,25] Focus on tobacco use and SHS exposure during pregnancy must be woman-centered and gender-sensitive, culturally appropriate and socially acceptable, and delivered in a non-judgmental manner.[3] This programming in Romania must also give special attention to the Roma population.[23,29,30,31,41] Only by catering to pregnant women, focusing on those most at risk, and integrating the health system will we see a positive social transition among health indicators for tobacco use.[19]

B. Service Recommendations

While Romania is in need of inter-sector collaboration and health system integration, there is also a high need to deinstitutionalize tobacco control efforts. As smoking is becoming less socially accepted nationally, more targeted programs are needed that aim to change the individual mindsets and behavioral choices for smoking habits during pregnancy.[26]

To prevent smoking before pregnancy, many have suggested targeted educational programs and community-based efforts.[1,21,23,62] Doctors observe that many women start smoking in high school, so educational programs should begin at this time.[31] The participatory approaches of education and community-based efforts adapt tobacco control to local contexts and issues.[32,62,27] By catering these approaches, Romania will most sustainably create smoke-free family and social lives by building the capacity for self-enforced tobacco control.[1,32,62]

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[25] The most systemic way to monitor equity among subpopulations is to create a Gini coefficient to tobacco, thus quantifying the health and social inequalities that Romania experiences for tobacco usage.[1] However, these monitoring strategies are more technical than we have time to fully explain.

[26] These efforts must be both curatively and preventatively based. As health inequalities are increasing, the curative aspect is made simple, as Romania can target women that are experiencing poor health that is related to smoking or smoke exposure.[27]

[27] The SDC is developing pilot projects for community integrated health and social services.[23] The project is planned to be implemented from 2015-2017 and will serve as an important indicator for the feasibility of such projects in Romania.

Beyond general education and community efforts, recent studies have suggested targeting women's partners.[28,36,37] In our study, 98% of women were either married or had a partner, indicating that this type of intervention would reach virtually all women in our sample. Additionally, partners are likely sources of social support so this intervention should be highly effective. Alternatively, women often experience high stress and domestic violence during pregnancy, so they should not be burdened with convincing their partners to quit; it must be part of larger efforts.[28]

There is a current project, the Proactive Sustainable Preventive Intervention (PRISM), working on this topic by combining motivational interviews with problem-solving techniques for both smoking women and their partners throughout the pregnancy.[61] The project focuses on the partner supporting the woman during pregnancy to quit smoking and on monitoring his own smoking behavior.[61] By exploring the root causes of smoking between partners, the PRISM study hopes to both lower smoking rates during pregnancy and prevent postpartum relapse.[61,28]

The study is likely to have substantial results because it targets the mindset of both pregnant women and their partners, as many women that have quit smoking before or during pregnancy have the mindset that quitting is temporary and they plan to relapse after.[27,61] Many women see quitting as a behavior change, so returning to smoking after birth is a resumption rather than a relapse, not a negative outcome associated with postpartum triggers.[37] By ensuring the right kind of social support from the partner and encouraging both parties to permanently quit, partner interventions are likely to change the mindsets of women in a way that structural

[28] By preventing postpartum relapse, women's children are then exposed much less to SHS, which is a critically important factor. Children are particularly vulnerable and will experience much more health inequalities if they are exposed to SHS.[27] While we do not have time to sufficiently explore the many implications of postpartum relapse, we must make note of the effect it has on children.

and broad education changes cannot. In close, both structural and service-based recommendations must be synthesized to target the mindset of women's smoking behaviors. Only then will we see Romania enter the realm of comprehensive tobacco control and improved MCH outcomes.

X. Appendix

Interview Guideline: Dr. Magdalena Ciobanu

1. Can you speak more about your day-to-day tasks and projects?
2. Can you speak more specifically about your involvement with the GATS and FCTC?
3. There is one question in the GATS pertaining to the population's view of smoking around pregnant women. Have you seen this view change over time?
    a. What do you think the primary reasons are for the shift in perspective, if there has been one?
        i. Does it mostly involve regime and policy changes, or mostly social determinants?
    b. Are there other projects measuring social and sociopolitical determinants of smoking and other lifestyle behaviors during pregnancy or among mothers?

Interview Guideline: Dr. Adrian Toma & Dr. Gheorge Gica

1. Can you speak to women's attitude and morale towards hospital regulations regarding smoking?
2. During pregnancy specifically, do these regulations change for women smoking?
3. Are patients advised to stop smoking during pregnancy?
    a. Are they given counseling or referred to other resources?
4. Are there systems in place to help prevent postpartum smoking relapse?
5. What are the primary demographic indicators for women to smoke during or after pregnancy?
    a. For example, does it vary by age, education level, and urban environment?

6. Do you believe that undiagnosed mental disorders and stress and anxiety are typically associated with increased prevalence of smoking during pregnancy, as these are not diagnosed in hospitals?
7. What adverse health outcomes have you seen for mother and/or child when smoking continues during pregnancy?
    a. Is the point at pregnancy which the mother stops smoking important?
8. What do you see as the best strategies for interventions to prevent smoking during pregnancy in Romania?
    a. For example, previous literature has listed awareness of health professionals to conduct health sector counseling as the best intervention. However, other studies have found deinstitutionalization to be the best solution. This involves focusing on prevention before pregnancy, building family and social supports, and creating smoke-free environments.

<u>Interview Guideline: Ms. Alexandra Ciuntea</u>

1. What is the procedure for introducing the MAIA study to women?
2. When approaching women for the MAIA questionnaire, what was their initial reaction?
3. Were they reluctant to speak on the topic of lifestyle behaviors or other pregnancy-related topics?
4. Once you explained the study, how did their attitude change, if at all?
5. What do you believe the primary reasons are for women refusing to participate?
6. Did you have problems with women not coming back for the follow-up survey?
7. As a psychologist, have you noticed a linkage between smoking behaviors and mental health?

Interview Guideline: Dr. Razvan Chereches

1. Can you speak to your background in public health, specifically how and why you started the Center for Health Policy and Public Health?
2. Due to your specialty in health systems, can you speak to how the attitude and morale about smoking during pregnancy has changed since the 1989 regime change?
3. Are there other important occasions at which attitude and morale has changed as well, such as when Romania's tobacco control efforts increased in 2004?
4. How have Romania's formal regulations and procedures changed for smoking during pregnancy over the past 25 years?
    a. Does this involve changes in doctor's guidance or only hospital regulations?
    b. Are more resources provided today for women than before?
5. Since the regime change, have you seen other social determinants of maternal health change?
        a. Have these affected lifestyle behaviors of pregnant women?
6. What policies and procedures have been most effective at increasing health-seeking behaviors and positive lifestyle choices during pregnancy?
    a. Or, is it mostly tied to social environments separate from formal structures?

Interview Guideline: Dr. Claudiu Marginean

1. Can you speak more to your involvement with the MAIA project and how you became involved?
2. Can you speak to women's attitude and morale towards hospital regulations regarding smoking?
    a. During pregnancy specifically, do these regulations change for women smoking?
3. Are patients advised to stop smoking during pregnancy?

a. Are they given counseling or referred to other resources?

4. Are there systems in place to help prevent postpartum smoking relapse?
5. What are the primary demographic indicators for women to smoke during or after pregnancy?
    a. For example, does it vary by age, education level, and urban environment?
6. Do you believe that undiagnosed mental disorders and stress/anxiety are typically associated with increased prevalence of smoking during pregnancy, as these are not diagnosed in hospitals?
7. What adverse health outcomes have you seen for mother and/or child when smoking continues during pregnancy?
    a. Is the point at pregnancy which the mother stops smoking important?
8. What do you see as the best strategies for interventions to prevent smoking during pregnancy in Romania?

<u>Interview Guideline: Ms. Andra Brinzaniuc</u>

1. Can you speak about your background with the Center and how you became specifically interested in maternal and child health?
2. Can you speak more to your specific involvement with the MAIA project?
3. Can you speak to the current project on postnatal smoking relapse, the PRISM study?
    a. What do you believe are the largest indicators of prenatal and postnatal smoking relapse?
4. Due to your prior research, what do you see as the largest social determinants to smoking during pregnancy?
    a. How many of these determinants do you see as related to the family environment versus the cultural environment of the society at large?

5. Due to your prior research, what do you see as the largest sociopolitical determinants to smoking during pregnancy?
6. Do you see all of these determinants as directly related to mental health as well?
7. Prior research disputes as to whether smoking during pregnancy is related to stress, anxiety, and clinical depression or only stress and anxiety, which do you see as correct?

Interview Guide: Ms. Marina Ciorba

1. Can you describe the process for Romanian hospitals to document smoking behaviors?
    a. How does this process differ by department and specialization?
    b. How does this process apply to children of smokers?
2. What different codes are used for patient's files regarding smoking behaviors?
3. Why do you believe that these protocols vary for departments within the healthcare system?
4. On a country level, is this data published or made available to the public?

Interview Guide: Dr. Cristian Meghea

1. Can you speak about your background with the Center and how you became specifically interested in maternal and child health?
2. Can you speak about the PRISM study and the smoking relapse prevention program?
3. What have you found to be the largest indicators for prenatal and postnatal relapse?
    a. Are these mostly family, society, or politically based?
4. Even though your PRISM and (Smoking During Pregnancy in Romania) SPRO studies do not directly relate to mental health, do you see these determinants as related to mental health?
5. Nicotine paper states that nicotine addicted smokers are more likely to have depressive symptoms, but this was not compared to women who did not smoke, what do you think this comparison would show in relation to depressive symptoms?

a. Would you expect differences for depressive and stress symptoms?

b. Many see nicotine addiction as primary reason for continued smoking, do you believe this to be the case?

Interview Guide: Mr. Dudley Tarlton

1. Can you speak more about your background at the UNDP and with the FCTC?
    a. Was this mostly on an international level or specific to each country?
2. What policies did you work with regarding tobacco usage as the Regional Policy Specialist for Europe?
    a. Did any of this work focus on CEE specifically?
    b. Did any of this work involve sub-populations, specifically pregnant women?
3. Have you worked with the WHO on their assessment of social determinants of tobacco use?
    a. What do you see as the largest social determinants of tobacco use?
    b. What do you see as the largest sociopolitical determinants of tobacco use?
4. Compared to other world regions, are these determinants different for CEE due to the communist regime?
    a. How have these determinants changed since the 1989 revolution or led to different transitions than other countries?
5. What health systems and policies have you helped put in place to best address the issue of smoking in Eastern Europe?
    a. What do you see to be the best future interventions? Does this involve deinstitutionalization, better health systems, etc.
6. What do you see as the largest challenges still faced by this region?

Interview Guideline: Mr. Thomas Krajnik

1. Can you speak more about your work with Romania at the SDC?
    a. Does this mostly involve multilateral agreements on an international level with other countries or solely between Romania and Switzerland?
        i. Can you speak about some of the current and past projects involving the SDC in Romania?
    b. Can you describe the process for the SDC to invest itself in health related projects in Romania?
        i. Do these projects address sociopolitical elements, social elements, or both?
2. Has any of your work involved non-communicable disease and lifestyle behaviors?
    a. Does any of your work address tobacco usage specifically?
    b. Are these projects catered to sub-populations?
3. Has any of your work involved maternal and child health issues?
    a. Does any of your work address tobacco usage within pregnancy?
4. What have you seen to be the largest determinants of tobacco use and other behavioral health issues?
5. Compared to other regions, are these determinants different for CEE and other post-communist areas?
    a. How have these determinants changed since the 1989 revolution or led to different transitions than other countries?
6. What do you see as the best future interventions for this country regarding health? Does this involve deinstitutionalization, better health systems, etc.
7. What do you see as the largest challenges still faced by this country in regards to health?

<u>Interview Guide: Dr. Edouard Tursan D'Espaignet</u>

1. Can you speak about your work with the WHO's unit for the Tobacco Free Initiative?
    a. Is this program catered to world regions or countries or is it done on an international level?
2. Are there other international organizations that play a large, independent role in tobacco initiatives or does the WHO mostly delegate tasks to other United Nations agencies?
3. Prior to the FCTC, had the WHO installed a large-sale tobacco initiative?
    a. What works on tobacco control have you been involved with since then?
4. Can you speak more about the guidelines for managing tobacco use and exposure to secondhand smoke in pregnancy?
    a. Are these guidelines catered to countries and regions or are they on an international level?
5. What aspects of your work involve CEE specifically?
    a. Are any projects catered to sub-populations, specifically pregnant women?
    b. Due to the 1989 revolutions and overthrow of communism, has your work differed for this region?
6. Have you been involved with the social determinants of tobacco use or primarily the policy-level?
7. What systems and policies have you helped put in place that have best addressed the issue of maternal smoking and smoke exposure?
8. What do you see as the best future interventions? Does this involve deinstitutionalization, better health systems, etc.
9. What do you see as the largest challenges faced in CEE in regards to tobacco usage among pregnant women?

Interview Guide: Dr. Lubna Bhatti

1. Can you speak about your involvement with the GATS?
    a. Can you explain how the WHO decides to implement the GATS in specific countries and the process for carrying out the survey?
2. What was your experience working with the GATS in Romania specifically?
3. What was your experience with the healthcare sector in Romania as opposed to public health entities?

Interview Guide: Ms. Yvona Tous

1. Could you talk more specifically as to how the FCA works with FCTC on a multilateral level?
2. Could you talk more specifically as to how the FCA works with CSOs on the country level?
    a. Does this mostly involve including tobacco control policies into the national level development programs?
3. How has the FCA worked in Romania specifically?
    a. Is any of your work catered to sub-populations such as pregnant women?
4. In post-communist countries, how has our work differed, as CSO's were not allowed in these countries before the revolution?
5. Have specific interventions and interactions been catered to these countries in CEE?
6. What have you seen as the largest barrier to tobacco control in Romania?
    a. Mostly sociopolitical or sociodemographic?
7. What interventions have you seen work best in Romania for tobacco control?

Table 1

Scale Validity				
		Model 1: Prior Smoking	Model 2: Current Smoking	Model 3: Exposure to Smoking
Omnibus Test of Model Coefficients	χ^2	64.27	102.02	95.27
	df	21	16	20
	N	194	237	195
	p-value	0.00	0.00	0.00
Hosmer-Lemeshow Goodness of Fit Test	χ^2	5.10	7.56	8.86
	df	8	8	8
	p-value	0.75	0.48	0.36
Pseudo R Square Statistics	Cox & Snell R Square	28.2%	35.0%	38.6%
	Nagelkeke R Square	41.0%	46.8%	51.7%
Classification Table	Block 0	73.2%	55.7%	54.9%
	Block 1	79.9%	76.8%	81.5%
	Sensitivity	48.1%	74.3%	75.0%
	Specificity	91.5%	78.8%	86.9%

Table 2

Scale Validity		
	Cronbach's Alpha	Number of Items
Social Support Scale	.884	6
Perceived Stress Scale	.622	10
State-Trait Anxiety Scale	.601	20
Edinburg Postnatal Depression Scale	.851	10

Table 3

Demographic Characteristics		
	N	*%*
Age		
18-25	113	13.8
26-30	325	39.8
31-35	229	28.1
36-44	149	18.3
Education		
High School or Lower	611	45.3
Undergraduate or Higher	739	54.7
Ethnicity		
Romanian	1,104	81.2
Hungarian	224	16.5
Roma	28	2.1
Other	4	0.3
Current Residence		
Rural	443	33.7
Urban/Suburban	871	66.3
Living Arrangement		
Married	1,165	85.6
Not Married, With Partner	168	12.3
Other	28	2.1
Monthly Income		
$0-216	158	11.8
$217-464	327	24.3
$465-928	523	38.9
$929-1,547	262	19.5
$1,548-2,166	40	3.0
More than $2,166	34	2.5

Demographic Characteristics: Roma		
	N	*%*
Age		
18-27	9	56.3
28-30	2	12.5
31-34	2	12.5
35-44	3	18.8
Education		
High School or Lower	27	96.4
Undergraduate or Higher	1	3.6
Current Residence		
Rural	16	84.2
Urban/Suburban	3	15.8
Living Arrangement		
Married	13	50.0
Not Married, With Partner	12	46.2
Other	1	3.8
Monthly Income		
$0-216	11	44.0
$217-464	12	48.0
$465-928	1	4.0
$929-1,547	0	0.0
$1,548-2,166	1	4.0
More than $2,166	0	0.0

Table 4

Reproductive History & Health Behaviors

	N	%
Unwanted Pregnancy		
Wanted Pregnancy	989	73.4
Wanted Pregnancy Later or Did Not Care	290	21.5
Unwanted Pregnancy	69	5.1
Other Children		
First Birth	102	17.1
One Child	400	67.0
Two or More Children	95	15.9
Alcohol Consumed in the Past Year		
Yes	631	49.8
No	636	50.2

Reproductive History & Health Behaviors: Roma		
	N	%
Unwanted Pregnancy		
Wanted Pregnancy	7	26.9
Wanted Pregnancy Later or Did Not Care	11	42.3
Unwanted Pregnancy	8	30.8
Other Children		
First Birth	3	20.0
One Child	5	33.3
Two or More Children	7	46.7
Alcohol Consumed in the Past Year		
Yes	7	31.8
No	15	68.2

Table 5

Environmental Factors		
	N	%
Other Smokers in the Home		
Yes	452	41.3
No	643	58.7
Exposure to Secondhand Smoke		
Yes	632	50.1
No	630	49.9

Environmental Factors: Roma		
	N	%
Other Smokers in the Home		
Yes	16	76.2
No	5	23.8
Exposure to Secondhand Smoke		
Yes	16	69.6
No	7	30.4

Table 6

Mental Health		
	N	%
Social Support		
High	755	58.0
Low	547	42.0
Perceived Stress		
High	669	55.0
Low	547	45.0
Anxiety		
High	652	56.6
Low	499	43.4
Depression		
High	439	35.4
Low	801	64.6

Mental Health: Roma		
	N	%
Social Support		
High	4	15.4
Low	22	84.6
Perceived Stress		
High	20	87.0
Low	3	13.0
Anxiety		
High	11	61.1
Low	7	38.9
Depression		
High	801	70.8
Low	439	29.2

Table 7

Smoking Characteristics		
	N	%
Prior Smoking		
Yes	380	29.7
No	898	70.3
Current Smoking		
Yes	175	45.3
No	211	54.7
Smoke Exposure During Pregnancy		
Yes	632	50.1
No	630	49.9

Smoking Characteristics: Roma		
	N	%
Prior Smoking		
Yes	13	54.2
No	11	45.8
Current Smoking		
Yes	11	78.6
No	3	21.4
Smoke Exposure During Pregnancy		
Yes	16	69.6
No	7	30.4

Table 8		Model 1: Prior Smoking		Model 2: Current Smoking		Model 3: Exposure to Smoking	
		Odds Ratio	95% CI	Odds Ratio	95% CI	Odds Ratio	95% CI
Sociodemographics							
Age	18-25	,559	.097-3.227	*Not Included in Model*		2,710	.538-13.659
	26-30	1,082	.389-3.009			1,757	.579-5.329
	31-35	0.305**	.104-.895			,950	.344-2.623
	36-44	*ref*	*ref*			*ref*	*ref*
Education	High School or Lower	*ref*	*ref*	*ref*	*ref*	*ref*	*ref*
	Undergraduate or Higher	,751	.315-1.791	0.409**	.201-.834	0.452*	.192-1.065
Ethnicity	Romanian	*ref*	*ref*	*ref*	*ref*	*ref*	*ref*
	Hungarian	1,523	.516-4.494	3.393**	1.158-9.94	,746	.282-1.977
	Roma	,000	,000	,000	,000	,000	,000
	Other	,000	,000	,955	.029-31.499	,000	1,000
Residence	Rural	*ref*	*ref*	*ref*	*ref*	*ref*	*ref*
	Urban	,548	.217-1.386	,980	.482-1.994	1,727	.659-4.522
Living Arrangement	Married	*ref*	*ref*	*ref*	*ref*	*ref*	*ref*
	Unmarried, with Partner	8.756**	1.619-47.355	3.368**	1.310-8.658	,727	.122-4.340
	Other	,856	.085-8.638	1,245	.210-7.369	,877	.053-14.562
Reproductive History & Health Behaviors							
Unwanted Pregnancy	Wanted Pregnancy	*ref*	*ref*	*ref*	*ref*	*ref*	*ref*
	Wanted Pregnancy Later or Did Not Care	2.381*	.859-6.599	0.443**	.205-.954	,906	.344-2.387
	Unwanted Pregnancy	.729	.058-9.225	.363	2.415	.363	.055-2.415
Other Children	First Child	*ref*	*ref*	*Not Included in Model*		*ref*	*ref*
	One Child	.643	.226-1.828			.713	.258-1.976
	Two or More Children	.294	.054-1.601			1.124	.212-5.959

Table 8		Model 1: Prior Smoking		Model 2: Current Smoking		Model 3: Exposure to Smoking	
		Odds Ratio	95% CI	Odds Ratio	95% CI	Odds Ratio	95% CI
Alcohol Consumption (in the past year)	No Alcohol	*ref*	*ref*	*ref*	*ref*	*ref*	*ref*
	Some Alcohol	.686	.299-1.574	.558	.271-1.150	1,941	.865-4.358
Environmental Factors							
Other Smokers in Home	No Other Smokers in Home	*ref*	*ref*	*ref*	*ref*	*ref*	*ref*
	Other Smokers in Home	5.864***	2.043-16.832	3.102***	1.448-6.644	20.0979***	8.291-48.715
Exposure to Secondhand Smoke	No Exposure	*ref*	*ref*	*ref*	*ref*	*ref*	*ref*
	Some Exposure	2,309	.800-6.666	19.546***	6.789-56.242	*Not Included in Model*	
Mental Health							
Social Support	No Social Support	*ref*	*ref*	*ref*	*ref*	*ref*	*ref*
	Social Support	,642	.267-1.545	1,193	.594-2.396	2.383**	1.005-5.647
Perceived Stress	Low Perceived Stress	*ref*	*ref*	*ref*	*ref*	*ref*	*ref*
	High Perceived Stress	1,746	,668	1.934*	.916-4.086	,951	.395-2.288
Anxiety	Low Anxiety	*ref*	*ref*	*ref*	*ref*	*ref*	*ref*
	High Anxiety	,930	.401-2.154	1,259	.634-2.501	,897	.405-1.985
Depression	Low Depression	*ref*	*ref*	*ref*	*ref*	*ref*	*ref*
	High Depression	0.352**	.127-.978	,645	.311-1.337	1,978	.839-4.661

* p-value < .1, ** p-value <.05, *** p-value <.01

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