

evidence base of how these covariates influence child cognition and to illustrate the benefits of early education programs in low-resource settings. The aim of this study is to evaluate the association between the federally funded education program Early Head Start (EHS) and the cognitive abilities of children in low-income family enrollees and assess if this association varies by the quality of the home environment and the existence of maternal depression. We hypothesize that the EHS program has a positive direct effect on infant cognition, and that maternal depression and a diminished home environment will modify this association, leading to reduced scores in infant cognition.

**Methods:** A large-scale impact evaluation of the EHS program for low-income pregnant women and families with children up to 3 years of age, this prospective study followed a diverse racial/ethnic group of 3,001 children from 17 sites, both urban and rural, from 1996 to 2010. The analysis examines infants from enrollment to age 3. Eligible families were randomly assigned to control or program groups with equal probabilities, with requirements including having a focus child less than 12 months of age at enrollment. Control groups were unable to receive program services until focus child was at least 3 years old. Data was collected using self-enumerated questionnaires, personal interviews, and direct observation. Statistical analyses included independent t-tests, linear regression, and testing for confounding, mediation, and interaction. Cognitive performance, the primary outcome, was measured by the Bayley Scale (2nd Ed.)

**Findings:** Of 2977 total subjects, 1503 subjects were randomly assigned into the program group. Independent t-tests indicated that exposure to EHS services had a significant effect on cognitive performance at 24 months ( $p=.0155$ ) and 36 months ( $p=.0698$ ). Linear regression analyses indicated that home environment and program status had interaction effects ( $p=.0376$ ) at 36 months but not 24 months. Maternal depression did not have interaction effects.

**Interpretation:** Results support the main hypothesis that cognitive performance follows a trend of being higher in children receiving EHS services. Home and environment and maternal depression had small or null effects on this association. This could be due to study design or inappropriate selection and use of assessment tools. Results inspire further research and suggest that EHS interventions may override the effect of these risk factors.

**Funding:** No funding was used for this analysis.

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### Evaluation of the stability of cervical specimens collected by swab and stored dry for human papillomavirus DNA testing

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**Background:** Human papillomavirus (HPV) DNA testing has been recommended for cervical cancer screening in developed countries. However, HPV DNA testing is reliable on a liquid based sample collection medium, which limits the implement of this screening method used in low-resource settings. This study aims to evaluate the stability of cervical specimens collected by swab for dry storage used for HPV DNA testing.

**Methods:** The hospital-based, random, and parallel comparative experimental study was conducted in the National Cancer Center, Cancer Hospital of Chinese Academy of Medical Sciences & Peking Union Medical College. Women aged 20-65 with written informed consent were eligible for enrollment. Patients who were pregnant or have history of hysterectomy were excluded from participation.

Patients previously referred to colposcopy for an abnormal Pap or had a HPV-positive result were also recruited. Two samples were collected for each woman using swab and CytoBrush in a random order and stored with swab sample in a tube and CytoBrush sample in cytology preserve medium. The swab and cytology specimens were randomly assigned to be stored at ambient, uncontrolled temperatures for fixed times: 2 days, 7 days, 14 days, and 28 days. The cobas HPV test (Roche) was performed to detect 14 carcinogenic HPV genotypes, including HPV16, HPV18, and 12 non HPV16/18 carcinogenic HPV types. Agreement between paired tests was evaluated by McNemar chi-square tests. Calculated by power analysis and sample size software, a sample size of 168 pairs achieves 80% power to detect an odds ratio of 3.00 using a two-sided McNemar test with a significance level of 0.05 for each storage time point.

**Findings:** 695 women were enrolled in this study. The agreement rates of carcinogenic HPV, HPV16, HPV18, and non HPV16/18 carcinogenic HPV between paired tests were 93.76%, 97.82%, 99.42%, and 93.18%, with kappa values (95%CI) 0.87 (0.83-0.91), 0.94 (0.91-0.97), 0.94 (0.87-1.00), and 0.86 (0.82-0.90), respectively. There was no significant difference in the agreement of paired tests even stratified by storage time. The sensitivity and specificity for detecting cervical intraepithelial neoplasia grade 2 or worse by cytology and swab samples using cobas 4800 HPV test were 89.9% (85.5-93.4%) and 53.5% (48.6-58.4%), 91.9% (87.8-95.0%) and 52.4% (47.5-57.3%), respectively.

**Interpretation:** Swab collected sample storage can last up to one month without loss of sensitivity and specificity and is simple, inexpensive, and portable, which make HPV testing accessible for cervical cancer screening in low-resource setting. Due to the limit sample size of the current study, large scale study on the issue is required to confirm this conclusion.

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### Quantification and characterization of the burden of traumatic injury in Haiti

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**Background:** The growing burden of morbidity and mortality attributed to traumatic injuries falls disproportionately on low and middle-income countries (LMICs). Trauma registries that allow for the quantification and characterization of traumatic injury are a critical part of trauma systems in high-income countries but are infrequently implemented in LMICs. In Haiti, scant epidemiologic trauma data exists; however, all patients presenting to an Emergency Room (ER) are recorded in a government-mandated logbook. The study had three aims: (1) to identify what categories of information are recorded in ER logbooks in Haiti; (2) to quantify the burden of trauma in Haiti using ER logbooks; and (3) to further characterize the epidemiology of traumatic injury in Haiti using an abbreviated trauma registry.

**Methods:** Photographs were taken of one week of ER logbook entries at ten departmental and tertiary healthcare facilities representing 9 out of 10 of Haiti's national departments. Data points collected were compared amongst all logbooks to identify those that were

consistently recorded. The total number of adult and pediatric traumas, road traffic accidents (RTAs) and injuries due to violence were tabulated from each logbook. A time-limited observational trauma registry was created and all trauma patients presenting to three tertiary referral centers during one 8 – 12 hour period were recorded.

**Findings:** Logbooks were obtained from ten healthcare facilities with a median of 100 beds (range 40-300) All logbooks recorded patient name, age, date and hometown. A high degree of variability was observed in the amount of detail recorded for mechanism of injury, presenting symptoms, diagnosis, ER course and disposition. There was a median of 39 (range 20-114) trauma cases in one week. Pediatric trauma represented 4.4 – 42.4% of cases. Of the 8 facilities reporting mechanism, RTAs and violence represented a median of 22.6% (10.0 – 31.6%) and 9.4% (5.0 – 33.3%) of cases, respectively. Thirty-nine trauma patients were recorded in the abbreviated trauma registry. Modes of transportation to the ER included motorcycle (51.3%), car (17.9%), and foot (12.8%) with a median time from injury to presentation of 60 minutes (range 15-1170).

**Interpretation:** ER logbooks in Haiti began the injury surveillance process and could be useful tools with enhanced standardization. Although limited by sample size, an attempt to collect additional information in our registry such as vital signs and injury severity was unsuccessful due to a lack of protocolized trauma care and diagnostic modalities in Haitian ERs. Implementing a trauma registry, or augmenting existing ER logbooks to capture more data, can aid in further characterization of the trauma burden, identification of gaps in care and promotion of prevention strategies.

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### Treatment-seeking behavior and obstacles to compliance in diabetic patients of Southern India

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**Background:** Diabetes mellitus type II is major public health challenge in India. Anticipatory improvements in diabetes diagnosis and management must be made to accommodate the 65.1 million current diabetics and 31.9 million undiagnosed diabetics. We hypothesized that diabetes management may be influenced by subtle socio-ecological factors that can be targets for intervention. We evaluated the local treatment-seeking behaviors of diabetics focusing on the root causes of culture-specific barriers to treatment compliance.

**Methods:** A cross-sectional survey was administered in the local language (Kannada) to 204 self-identified type II diabetic adults aged 18 to 79 years at rural and urban clinical care settings in Mangalore, India. Fasting blood glucose level was measured in all participants prior to the survey. Participants that met the ADA goal (70-130 mg/dl) were considered “at target” for their management. Survey questionnaire included sociodemographic characteristics, treatment-seeking behavior (diagnosis of diabetes, healthcare provider contact, self care behaviors, access to information), and perceptions of obstacles (cost, access to care, quality of care, diet, emotional support). Statistical analysis was done using the statistical software IBM SPSS (version 22). Written informed consent was obtained from all

participants. This study was approved by IRB at both Nitte University and Wake Forest School of Medicine.

**Findings:** Out of 204 participants surveyed (mean age 55.0 years): 120 (59%) and 84 (41%) were male and female, respectively. In this study, only 77 participants were considered at target (37.7%). Predictors of at target status included age (OR 1.06, 95% CI 1.02-1.11) and rural living area (OR 1.92, 92% CI 1.02-3.60). Participants were commonly diagnosed with symptoms of diabetes (44.6%). Participants demonstrated frequent health care provider contact (51% in last one month, 74.5% in last three months). Accidental or purposeful deviation from the recommended medications or treatment plan was reported by 18.7% and 12.8%, respectively. From the whole sample, 111 participants (54.4%) were capable of receiving SMS messages by phone and 79 of them (71.1%) were willing to receive messages about diabetes. The most frequently self-reported obstacles to diabetes management were: medication costs (49.3%), treatment costs (46.6%), diabetic diet (33.8%), lack of relief on current treatment (17.4%), and transportation to appointments (16.7%).

**Interpretation:** Though most diabetics have frequent encounters with healthcare providers and report compliant behaviors, the majority do not meet recommended diabetes management guidelines. Screening of at-risk populations, targeted SMS campaigns, or diabetes-specific training for healthcare providers may improve clinical outcomes. Addressing cost and diet barriers will improve patient quality of life, but a larger study may indicate other impactful areas for intervention and their effects on diabetes control.

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### Effects of intimate partner violence on child maltreatment among women in Colombia

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**Program/Project Purpose:** 37% of Colombian women report being victims of physical abuse and 42% report physically punishing their children. We need to gather more information about the clustering of Intimate Partner Violence (IPV) and Child Maltreatment (CM) so as to establish a cause-and-effect relationship, especially in developing countries where the specific cultural and socioeconomic context might play an important role. Determining if IPV has a mediating effect on CM would help us identify at-risk populations so as to implement more appropriate interventions.

**Structure/Method/Design:** Our data was gathered from the Colombian Demographic Health Survey (DHS) 2010, which sampled over 41,000 women and over 37,000 households across 6 regions and 16 sub-regions in the country, distributed proportionately between urban and rural zones. To be included in our study, the respondent had to be a woman of reproductive age (15-49yo), currently living with her child (1-17yo) and partner, must be responsible for disciplining her child. The number of women who met the above listed criteria was 17,879. The analysis of the variables provided us with an odds ratio which allows us to determine any existing mediating effects that IPV may have between the mother's background (independent variables such as education level, age and wealth index) and our outcome (child maltreatment as physical punishment of child).