18th Annual
Capitol Graduate Research Summit

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Fort Hays State University
Kansas State University
Pittsburg State University
University of Kansas
University of Kansas Medical Center
Wichita State University

Fort Hays State University

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University of Kansas

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Manvendra Singh
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Matheus Oliveira de Souza
FIGHTING COVID-19: DISCOVERY OF MONOCLONAL ANTIBODIES AGAINST SARS-COV-2

Ankit Verma
A SUSTAINABLE PROCESS FOR RECYCLING OF LITHIUM-ION BATTERIES

University of Kansas Medical Center

Nadia Alissa

THE CHEMONKINE C-C MOTIF LIGAND 2
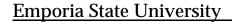(CCL2) PLAYS AN IMPORTANT ROLE IN

THE EXPRESSIVE THERAPIES CONTINUUM AND DE-ESCALATION
Sarina Durrant

Department of Counseling Education, Emporia State University

The positive impact of art therapy with Autism Spectrum Disorder (ASD) is well documented (Anderson, 1992). Clients with ASD often experience periods of escalation due to sensory overstimulation (Woo, Donnelly, Steinberg-Epstein, & Leon, 2015). Following the apex of a client's escalation, they begin to de-escalate and re-regulate to their surroundings; this experience can be disorienting and time consuming for the client and their therapist (Sanctuary Web, 2020). The theory of the Expressive Therapies Continuum (ETC), when utilized by an art therapist working with clients with ASD, can enhance the de-escalation process. The ETC consists of three levels; these levels are kinesthetic and sensory art-making, perceptual and affective art-making, and cognitive and symbolic art-making. In the ETC system, the sensory and kinesthetic experience of artistic expressions trigger emotionally affective and perceptual responses that help reshape psychological and decision-making processes (Hinz, 2009). In this research, I developed a survey to gather data on the ways in which the ETC is used by art therapists working with clients with ASD and if used during the process of de-escalation, which level of the ETC was most effective based on their experiences with their clients. The data from this research will add to the literature available on art therapy and clients with ASD as well the literature available for the way the ETC is utilized in the therapeutic setting.

COMPARISON OF UNAPPLIED VS. APPLIED LIQUID C

Emporia State University

RARE DISEASE, RARE INFORMATION: USING SOCIAL MEDIA TO SATISFY UNMET

UTILIZING AN OSA SCREENING TOOL IN PRIMARY CARE
Jaime Berry
Department of Nursing, Fort Hays State University

Obstructive sleep apnea (OSA) is a sleep-related breathing disorder that results in lack of oxygen to the brain, despite a person's ability to breathe independently. OSA has been associated with long-term adverse effects including cardiovascular disease, neurologic disorders, and metabolic dysfunction. Shockingly, about 80%-90% of adults with OSA remain undiagnosed and fragmented quality of sleep continues undetected, despite the number of risk factors present. The consequences of undiagnosed and untreated OSA are economically costly and can result in medically serious conditions. It is essential that a convenient, inexpensive, and validated screening tool be utilized in the adult primary care setting. The purpose of this project was to implement the use of the STOP-BANG screening tool to increase provider identification of OSA risk factors, improve referral rates for polysomnography (PSG) testing in at risk patients, and facilitate prompt diagnosis and treatment geared towards improving one's quality of life. In a three-month timeframe, results show an.4 (e)-2.7 (sca)-2.7 (re)4 (a)-2.7 os, i providerosreig2s(a)-2.7 os

(l)1 vhilnhi17 (s)5.4 ((f)TJ0.023 Tc 0.013 Twp)13.9 uG(h-2 (e.6 (a))076 lth)8.7 isl.6 (c)08.7 tinmad8

SEXUAL VIOLENCE IN RURAL PLACES: POLICY IMPLICATIONS FOR FIRST-RESPONDING LAW ENFORCEMENT OFFICERS
Viviana Lizarraga[1], Dr. April Terry[2]
[1]Department of Psychology, Fort Hays State University, [2]Department of Criminal Justice, Fort Hays State University

Jury Decision Making: The Influence of Mock-Juror Demographics on Verdict Outcomes

Haley Moon, Brooke Mann

Department of Psychology, Fort Hays State University

Research has demonstrated that jury decision-making is complex, and jurors can be influenced by several factors in a criminal court case (ForsterLee, Horowitz & King, 2006; Kutys, 2012). Several defendant characteristics including gender (Davidson & Rosky, 2015), race (Poulson, 1990), attractiveness, mental illness, and socioeconomic status (Feingold & Mazzella, 1994) have been deemed as influential in jury decision making. With an abundance of research surrounding defendant demographics, there seems to be a gap in the literature when investigating juror demographics and the potential impact they may have on verdict outcomes. Within the limited amount of research available, there appears to be a connection between verdict outcomes and juror age in that mock-jurors who are considered "younger" propose a guilty verdict more often than older individuals (Mossière & Dalby, 2008). Moreover, female jurors are found to be more likely to elicit a harsher punishment than male participants, especially when the defendant is black (FosterLee et al., 2006).

The purpose of this study is to cast a spotlight on the jurors, rather than the defendant and find potential factors that may influence verdict outcomes. The findings from this study imply that several juror demographics do impact verdict outcomes. Males were more likely to select a verdict of guilty than females who also chose a verdict of Guilty but Mentally Ill more often than any other verdict outcome provided. Furthermore, participants who were Caucasian chose a guilty verdict more often than any other ethnic group. This information provides important implications regarding the jury selection process which in turn could benefit both the prosecution and def

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experiment, participants were asked to see a series of Airbnb photos and evaluate their booking intention.The results showed that a higher number of photos, organized photos, and congruent first photo with a headline increase customers' booking intention. The findings of this study provide Airbnb hosts a practical and effective way of presenting photos to captivate travelers by making the best use of their photos. A higher booking intention would encourage more travelers to visit the State and consume products and services, which provides economic benefits with local businesses. Moreover, increased consumption would create more job opportunities in the hospitality and tourism sectors. Eventually, an increased number of Airbnb guests could contribute to the local economy and employment in the long term.

GENERAL TRADE POLICY UNCERTAINTY AND U.S. TRADE FLOWS

Tian Liu, Leilei Shen, and Peri da Silva
Department of Economics, Kansas State University

The spectacular increase in the world exports in the last 50 years was made possible due to the presence of a rules-based international trade system sponsored by the General Agreements on Tariffs and Trade (GATT) and its successor agreement, the WTO. In the last decade, however, there has been a substantial increase in US trade policy uncertainty (TPU) towards US allies and other WTO members. This shift in policy has further undermined the WTO efforts to transform all trade barriers into tariffs. It is then imperative to better understand how TPU affects trade flows. We use a text-mining approach to construct a general index of US TPU at the bilateral (156w radeng

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ECO-FRIENDLY FLAME-RETARDANTS FOR BIO-BASED POLYURETHANE FOAMS

Felipe M. de Souza, J. Choi, Ram K. Gupta
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Bio-based polyurethanes are the future of polymer industries as crops based chemicals provide a stable source of raw materials that are low cost and eco-friendly. Among those materials, carvone, an essential oil easily extracted from spearmint, dill, and bay leaf, was chemically converted to provide flame-retardant polyurethane foams. The chemical derived from carvone oil for polyurethane was characterized using the industrial standard to see its suitability for polyurethane industries. The carvone oil-based polyurethane foams were blended with aluminum trihydroxide and aluminum hypophosphite as flame-retardants to reduce the flammability of the foams. The foams were characterized by closed-cell content, density, compressive strength, thermalgravimetric analysis, and horizontal burning test. Results have shown that closed-cell content was about 95% which makes them very suitable for thermal insulation applications. It was also observed that the flammability of the foams was significantly reduced by the addition of a small amount of aluminum trihydroxide and aluminum hypophosphite. For example, the polyurethane foam containing about 15% of aluminum trihydroxide displayed a weight loss of about 12% and a burning time of 58 seconds, while the foam with about 13% of aluminum hypophosphite showed a weight loss of about 3% and a burning time of 5 seconds. The foams without the flame-retardants showed a weight loss of about 45% with a burning time of about 90 seconds. This research demonstrates that renewable resources can be used to prepare polyurethane foams with significantly reduced flammability making them very suitable for many applications such as in constructions and automobiles where flammability of polyurethane foam is a major hurdle.

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The historic emergence of SARS-CoV-2 into human populations has led to the spread of severe *coronavirus disease 2019* (COVID-19). Over 500,000 Kansans – about one in every five people – are at high risk of developing severe disease, as characterized by respiratory or cardiac failure and sometimes death. Treatment options for patients afflicted with severe disease are currently restricted due to limited drug supplies and difficult administration formats, creating life-threatening bottlenecks in patient care. While vaccination treatments are underway, a combination of vaccines and drug treatments will be required to defeat the virus. To combat the COVID-19 crisis, this research utilizes cutting-edge drug discovery technology to expand our repertoire of anti-SARS-CoV-2 intervention options. Extending upon Nobel prize winning *yeast surface display* technology, this research rapidly screens hundreds of thousands of *monoclonal antibody* (mAb) drug candidates to quickly identify potential antibody drugs that target vulnerable sites of weakness on the SARS-CoV-2 virus. Utilizing a strong interdisciplinary skillset we define the molecular neutralization mechanisms of a newly discovered antibody: *mAb 910-30 (patent pending)*, to fill critical gaps in our scientific knowledge of anti-SARS-CoV-2 immunity. The immediate results from this research help generate precision targeted medicines against SARS-CoV-2, and the larger impacts of this work serve to move our communities towards safer living conditions. Looking ahead, this research also lays the ground work needed to counteract future emerging biothreats by demonstrating the power of this technology to rapidly discover new drugs in a time of global crisis.

HUNGER AND HEALTH: UNDERSTANDING THE ACCEPTABILITY AND APPROACH OF A HEALTH COACHING INTERVENTION IN THE FOOD PANTRY

Kelsey Fortin, M.S.E., and Susan Harvey, PhD
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Intersections between hunger and health are gaining traction. New interventions emphasize collaborations between the medical and social service sectors. With health coaching interventions showing promise targeting chronic disease management in the medical setting, this project aimed to understand the acceptability and approach of a health coaching intervention within a Douglas County food pantry. To explore this question, researchers used a mix of reviewing existing pantry data and conducting surveys and interviews with food pantry clients, staff, and volunteers. Existing pantry data revealed high rates of chronic disease and poor nutrition among pantry clients at large. Similarly, client participants in the current study reported high rates of both

incentives. Volunteers and staff reported the need for client education in food preparation, basic nutrition and physical activity, and assistance through additional health expertise. All three stakeholder groups supported hosting a health coach within the pantry focused on overall health programming. In conclusion, high rates of chronic disease, partnered with low nutrition and physical activity literacy among pantry clients demonstrates the need to address health behaviors. Each stakeholder group provided program approach recommendations and indicated acceptability of a health coaching program. With this important feedback from key pantry stakeholders, findings will inform the development and implementation of a health coaching program pilot within the food pantry setting.

A SIMPLE TECHNOLOGY FOR MAKING VALUE-ADDED PRODUCTS FROM CORN LIGNIN

Steffan Green[1,2], Michael Lundin[1], Thomas Binder[1], and Bala Subramaniam[1,2]

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University of Kansas

Erosion-Connectivity Mapping (ECM) framework to determine where erosion sources and pathways (connectivity) overlap to help aid in watershed management. We apply this model to five lowland watersheds in Johnson County, Kansas, USA, with urban land use ranging from 21% to 89%. Erosion modeling results indicate high risk areas near streambanks and roadway systems with similar patterns in connectivity modeling. The ECM framework results indicate that, on average, only 3±2% of the study area is highly erodible and highly connected. In contrast, the vast majority (62±2%) of the land is poorly erodible and poorly connected. Much of the landscape is highly connected but poorly erodible (31±2%), and the remaining land is highly erodible, but poorly connected (3±2%) indicating that erosion is more likely to be the limiting factor in sediment transport. A field assessment of 35 sites provides broad support for the ECMs in accurately modeling overlapping areas of erosion and connectivity. This study provides a method for combining RUSLE and IC in a new tool (ECM) to identify spatial patterns in

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THE CHEMOKINE C-C MOTIF LIGAND 2 (CCL2) PLAYS AN IMPORTANT ROLE IN SKELTAL MUSCLE WASTING ASSOCIATED WITH BREAST CANCER

Nadia Alissa[1], Wei Bin Fang[2], Gage Brummer[2], John Thyfault[3], Paige Geiger[3], and Nikki Cheng[2]

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The American Cancer Society estimates that in 2021 alone, approximately 2400 new cases of breast cancer will be diagnosed in Kansas. Up to 40% of breast cancer patients experience an understudied condition called Skeletal Muscle Wasting (SMW). SMW causes significant muscle loss, weakness, and fatigue, resulting in a severely reduced ability of patients to tolerate anti-cancer drugs. Although this condition is associated with significantly lower survival rates compared to patients with relatively normal muscle mass, we do not yet understand the mechanism by which it occurs in breast cancer patients.

SMW has been linked to elevated levels of CCL2, a chemokine highly expressed in breast cancer. CCL2 expression is associated with high mortality rates in breast cancer patients. To investigate the role of CCL2 in muscle wasting we treated mouse muscle cells with high levels of CCL2. This led to increased expression of markers of muscle degradation, MuRF-1 and Atrogin-1, with reduced muscle cell proliferation and muscle cell size. This indicates that high levels of CCL2 cause muscle degradation. In a mouse model of human breast cancer, CCL2 released from the tumors was found to reach skeletal muscle tissues, corresponding to increased muscle degradation. Our results indicate that CCL2 knockdown/removal in the primary breast tumor decreases the expression of markers associated with muscle degradation (MuRF-1 and Atrogin-1). Using a second model of aggressive breast cancer and following knockdown of CCL2 in the tumors, a Grip Strength meter was used to measure how strongly mice could grip onto a metal bar. Our results show that mice in which CCL2 was knocked down, exhibited greater grip strength than those mice in which CCL2 levels remained unaltered. Therefore, removal of CCL2 reduces muscle degradation and increases grip strength in a mouse model of breast (of)6. miit cldd (i)-2

modifications, but many cases require the addition of medication to fully control the diagnosis. While there are numerous drugs to choose from in order to control GDM, insulin remains the first

line treatment. However, this recommendation is based on sparse published data. In 2017 the American College of Obstetricians and Gynecologists published updated guidelines that noted deficiencies present in our current knowledge of the safest and most efficient treatment options for pregnancies affected by medication controlled gestational diabetes (A2GDM). The purpose of this study was to determine if there was a difference in the incidence of adverse maternal-fetal and newborn outcomes based on exposure to either oral hypoglycemic agents (metformin and glyburide) or insulin in our patients affected by A2GDM.

Methods

After local IRB approval, we performed a retrospective cohort study with patient information obtained through our electronic medical record system. Data was collected between 1/1/2013-5/1/2018 and included all A2GDM mothers with a singleton gestation who delivered at KUMC. We excluded pregnancies with fetal chromosomayietforme5n01Bpormice

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The tool has been tested for reliability and validity within structured, community-based settings, however, it has not been used in home-based settings. The second aim was to determine if inter-rater and intra-rater reliability could be reached between coders using data from the home-based videos. Nine minutes of video was obtained for the study. Participant provided video was challenging to obtain and presented some coding challenges as quality differed from training

videos. Inter-rater reliability agreement was reached between primary and secondary coders ranging from .842 to .888. Intra-rater reliability was met with substantial agreement to almost perfect agreement and ranged from .792 to .929. The OHAIRE coding tool is a promising measure of in-home human-animal interactions that may require adaptations for coding home-based interactions.
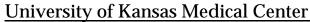
Keywords: Therapeutic recreation, Autism Spectrum Disorder, human-animal bond, human-animal interaction, OHAIRE coding tool, social interaction.

No Room for Narcotics: An International Comparison of Orthopedic Post-Operative Pain Outcomes

Jack Nolte

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Background: In the Summer of 2019, the Dr. Archie A. Heddings Special Program at the University of Kansas Medical Center (KUMC) began to sponsor the travel and lodging of students interested in collaborative research and international experience to Botosani, Romania. Dr. Heddings, a fellowship trained orthopedic traumatologist had connected professionally with the Orthopedic Traumatology department at this hospital and aimed to further create an educational and productive research collaboration between our two programs for the general improvement of patient care. Dr. Heddings established this special program with the strongly held belief that each department had techniques and unique practices that could be exchanged to promote an overall improvement in patient care for Romanian and American patients. This benefit is in addition to the personal and academic growth that could be had by the students of this program. The goal of this international collaborative undertaking is to compare and objectively quantify the difference in post-operative pain treatment and outcomes between two orthopedic traumatology departments. **Methods:** All patients who underwent surgical treatment by an orthopedic surgeon at the Spitalul Judetean de Urgenta Mavromati Botosani in Botosani Romania between May 23rd, 2019 and November 23rd, 2019 were assessed in real time by hospital staff, and their information was recorded on collection forms. Demographic information including the date of operation, indication for procedure, procedure performed, age and sex were collected. Nursing staff recorded all analgesic and anti-inflammatory medications given to the patients during the first and second 24 periods after their surgery, and a Romanian surgeon collected a 0-10 pain score from these same time periods. These sheets were scanned and securely transferred to the KUMC team for compilation into a Microsoft Excel   spreadsheet for processing and analysis. A biostatistician from KUMC will help to determine which indications for treatment and treatments have statistical power

for comparison to KUMC patients. The Healthcare Enterprise Repository for Ontological Narration (HERON) search discovery tool will be used to collect the reciprocal data points from the KUMC Electronic Medical Record (EMR) for all patients treated at KUMC during this same

six-month period. Differences in post-operative 0-10 pain scores, as well as the quantity of post-operative analgesia and anti-inflammatory medication administered will be analyzed by a consulting KUMC biostatistician. The biostatistician will ensure appropriate statistical tests are used, and that results are reported accurately in subsequent presentations and publications of this research.

Results: 554 Romanian patients were treated in the six-month time frame, and their information collected for analysis. This study is pending biostatistician review to determine which indications for treatment and treatments have statistical power for comparison to KUMC patents.

Conclusion: From the subjective observation of two individual KUMC affiliated individuals who have visited the Spitalul Judetean de Urgenta Mavromati Botosani, there is a striking difference not only in how our attending surgeons and staff approach the management of post- operative pain, but also a difference in apparent post-operative pain outcomes. In an attempt to quantify these differences in an objective fashion, a study was developed with significant collaboration between the Orthopedic Tr (e)-2.6 7u(t)-2 p4.7Biw.oTJ3 Trl 0 T7andivi(re)4 (a)-2.7 (t)-2 paiwio(ng)6.(

communicable disease. The Pandemic™ game is an affordable one-time cost, requires minimal staging, and can be played anywhere, making it a prospective teaching tool for health-allied or interdisciplinary teams in Kansas academic settings or professional practice.

WHEAT PROTEIN-BASED BIO-SCAFFOLD FOR NEURAL REGENERATION

Ryan Brice and Li Yao

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Spinal and peripheral nerve injuries are common in both civil and military environments and are primarily the result of transection injuries or burns. In the majority of nerve injuries, the nerve ends cannot be directly sutured. Biomaterial conduits can act as a bridge to connect two damaged nerve ends together, providing channels to guide nerve growth. In the proposed project, we fabricated a novel multichannel neural conduit with a hybrid composition of collagen and wheat glutenin (WG) for nerve repair and regeneration. Collagen is a common biomaterial that mimics a microenvironment suitable for neural growth. However, collagen materials have weak mechanical properties. The WG component in the proposed neural conduit can increase its mechanical strength. In this project, a WG-collagen neural conduit has been fabricated and a number of studies are performed to characterize the mechanical, molecular, chemical, and biocompatible properties of the neural conduits. Because gliadin is toxic to animal tissue, the glutenin will be extracted from the wheat gluten and the gliadin component will be removed. Our preliminary study by western blotting showed that gliadin has been effectively removed from WG. Adult human astrocytes (HA) were cultured on top of WG-collagen and shown to support cell growth. The outcome of our study indicates that the neural conduit is suitable to be grafted into the injured rat nerve to investigate nerve regeneration and functional recovery.

A SURVEY OF KANSAS SPEECH-LANGUAGE PATHOLOGISTS' KNOWLEDGE AND CONFIDENCE REGARDING LITERACY INTERVENTION

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The connection between spoken and written language has been well established in the research literature. Spoken language is a crucial component in supporting the development of reading and writing. For the past 19 years, speech-language pathologists (SLPs) have had a role in providing literacy services. SLPs are trained in the areas of speech, language, and communication. Their knowledge and expertise regarding spoken and written language qualifies SLPs to intervene in the area of literacy. However, SLPs report that they are still not completely confident in providing services. A recent report indicated Kansas' students are not at grade level in reading and writing. This is alarming, as literacy is integral to be successful in college and the workplace. If literacy intervention is not provided, students will not be prepared to meet the demands necessary to contribute to the flourishing development of the economy in Kansas, as they will not have the necessary skills required when entering the workforce. The current study aims to (1) assess Kansas school-based SLPs' knowledge and confidence with providing literacy services through the distribution of an online survD(hacCT4)6.7 (m-2 (but)pn(h)gne)-2.7 (d)6.7 r(di)-2 (s)2.05

initiate multiple cell-microbe interactions. As a first step, through numerical simulations we analyzed the physics of droplet merging and conducted a parametric study to analyze the effect of droplet/fluid properties and droplet gap on their behavior. This study resulted in the generation of a preliminary design-chart – a plot of the droplet fate (merged or non-merged) vs minimum droplet gap d – for a fixed actuation voltage (8 V) and fixed electrode gap (10 microns). We found that for successful merging of the aqueous droplets, the magnitude of the electric field VWUHQJWK(9GX VEWmd E R X W 0 9 PI R U   1 PDQG D E R X%WPI R U   4 N/m. These observations are in good agreement with the existing literature.

AN ENERGY CONSUMPTION MODEL UNDER TIME-OF-USE RATES FOR SCHEDULING OF MANUFACTURING SHOPS
Ali Mokhtari-Moghadam and Deepak Gupta

hospital due to stroke. Aphasia, which frequently occurs secondary to stroke, results in loss of the ability to speak freely. One cause of difficulty producing conversational speech is an impairment in the ability to build sentences. Existing treatments have shown improvement in spoken ODQJXDJHHJ7KRPSVRQHWDO 'R\O H HW DO ments may Hx WreaWh full D W recovery potential. People with aphasia express eagerness to find new therapy approaches to improve communication abilities and to have home therapy programs in addition to in-person therapy. There continues to be a need for effective sentence production treatments that can be easily translated into a home program. This presentation reports results from a treatment study examining whether a computerized sentence building task has therapeutic value for people with aphasia. The treatment is based on a sentence processing task known as the word maze, first developed by Freedman and Forster in 1985. Seven people with aphasia performed the task once or twice per week in forty-minute long periods for a total of 6-8 sessions. All participants showed improved task accuracy and increased scores on the Assessment for Living with Aphasia. Two participants showed an 8-point increase on the Western Aphasia Battery-R Aphasia Quotient.

WHAT FACTORS HAVE AN EFFECT ON THE LIFE EXPECTANCY OF KANSAS CITIZENS?

Lisa Vayda and Jodi Pelkowski
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Life expectancy is a common measure of public health and has been positively correlated with economic growth. This research focuses on how access to basic needs and socio-economic factors, often the focus of state-

NOTES: