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Connecting People and Place—Improving Communities through Integrated Data Systems: Chronic School Absenteeism in Public Schools in Pittsburgh, Pa.

■ by Sabina Deitrick

Attending school regularly is one of the most important things students need to do in order to achieve educational and academic success. Unfortunately, chronic absenteeism—missing 10 percent of school days or more in a school year—is all too common among students in grades K-12.

There are many factors influencing why children miss school. Research has shown that illness, physical and mental health, family background, social structures, school conditions, physical environment, and

neighborhood conditions all can contribute to school absences. Regardless of the reasons, education experts and practitioners have demonstrated that missing school has deleterious impacts on a child’s achievement with those impacts beginning as early as kindergarten.

The University Center for Social and Urban Research (UCSUR) has conducted research on chronic absenteeism in the Pittsburgh Public Schools (PPS) and the Clairton City and Woodland Hills school districts through the Connecting People and Place project, funded by

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Western Pennsylvania Regional Data Center

■ by Bob Gradeck

The Western Pennsylvania Regional Data Center (WPRDC) supports key community initiatives by making public information easier to find and use. The Data Center provides a shared technological and legal infrastructure to support research, analysis, decision making, and community engagement. The project launches in October 2015 and is managed by the University of Pittsburgh’s Center for Social and Urban Research, in partnership with Allegheny County and the City of Pittsburgh.

A critical role of the Data Center involves managing an open data portal, which serves as a data repository for use by the City of Pittsburgh and Allegheny County. Portals make data searchable and add other tools that enable public users to obtain and use data through a bulk download, application programming interface, or visualizations. While the federated portal will initially feature data from the City of Pittsburgh and Allegheny County, it is designed to scale over time as more organizations and municipalities share their information through the WPRDC. Following launch of the portal, other governmental and nonprofit organizations will also be able to share data using the Data Center infrastructure.

The Urban and Regional Analysis Program of the University Center for Social and Urban Research (UCSUR) has long served as a community information intermediary in Allegheny County. Information intermediaries help people find and use information to improve their communities. The Data Center is one in a long line of initiatives in this intermediary role. From 2005-2014, UCSUR operated the Pittsburgh Neighborhood and Community Information System, and today the urban and regional analysis program is home to the *Pittsburgh Today* regional indicators initiative and the recently launched Southwestern Pennsylvania Community Profiles community indicators project.

Over time, UCSUR realized that the broad use of data in the region was inhibited by a number of critical components, including a lack of a legal infrastructure, technologies that did not support the dissemination of raw data, incomplete data documentation, and a lack of capacity for managing information in a fragmented political environment. The Data Center provides this

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Connecting People and Place

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the Annie E. Casey Foundation and the Urban Institute, and through the National Neighborhood Indicators Partnership.

The goal of the project is to integrate place-based data with other sets of information on students to understand better multi-faceted factors affecting students' school attendance and chronic absenteeism. The means to do this is through data integration, which links different data sets together and creates a richer base of information. By bringing together administrative data sets from different sources, a more comprehensive analysis of interrelated factors affecting social conditions can be conducted.

For this project, UCSUR worked in partnership with the Allegheny County Department of Human Services (DHS). DHS is a national leader in data integration through its Data Warehouse. Combining internal and external administrative databases, including data from public school districts, DHS uses the Data Warehouse to improve services to its clients.

Integrating student data into its Data Warehouse allows DHS and school officials to analyze school outcomes for students involved in human services and work to develop successful strategies to help those in need. The data sharing efforts have been achieved through formal agreements and confidentiality standards.

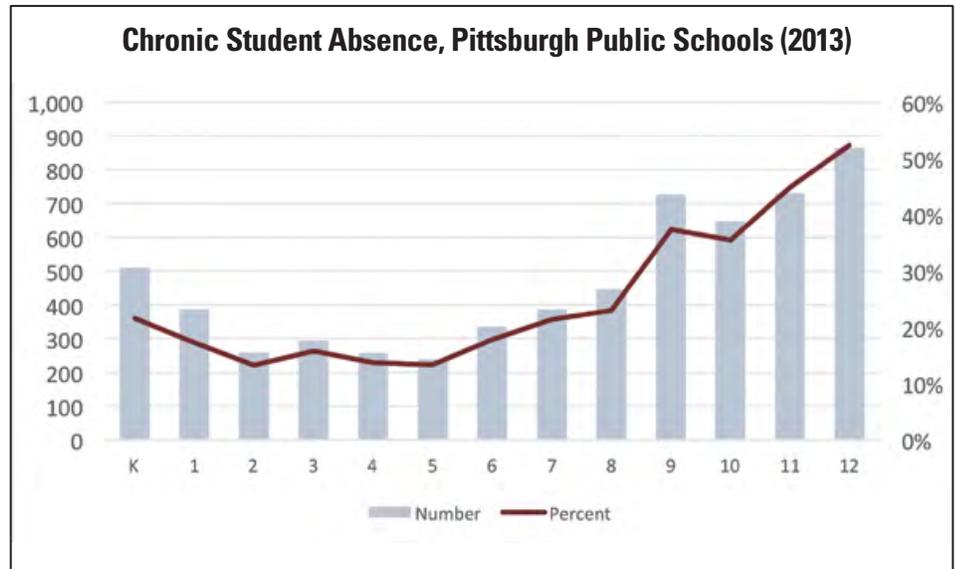


Figure 1. Chronic Absence, *Pittsburgh Public Schools (2013) by grade

*Chronic absence rate was computed by adding the number of days of excused and unexcused absences divided by total days enrolled for each student. The binary variable was created (no <10%; yes ≥ 10%).

DHS has worked with researchers at the University of Pittsburgh to study chronic absenteeism in the Pittsburgh Public Schools in the past. This project builds on that effort. The project specifically addresses chronic absenteeism by attributes of the student, place, and parcel that could potentially affect school attendance. We linked information from DHS, school-level data, and neighborhood and property data to discover new relationships between external factors and student attendance. By linking additional datasets covering neighborhood conditions with data on students, human services

involvement, and school attendance, we were able to construct a more detailed view into potential causes and interrelationships of factors affecting students' attendance and absenteeism.

The project included school-level data from the PPS and the Woodland Hills and Clairton City school districts for 2013. Though results here will focus on students in the PPS, chronic absenteeism was a critical issue across the three school districts (see Table 1).

Within the PPS, chronic absenteeism is a problem across all grades. A quarter of students or more in most grades experienced chronic absence from school in 2013 (see Figure 1). For this study, chronically absent students were identified as missing 10 percent or more days of the school year, regardless if they were excused and unexcused absences.

The project conducted different types of statistical analysis with the data, including Classification and Regression Tree Analysis (CART). CART is a data mining technique that identifies important predictor variables of a categorical dependent variable using a nonparametric, iterative process. It differs

Table 1. Number of chronically absent students per school district, 2013

School district	Number of students	Number of students chronically absent (≥10%)	Percent
Pittsburgh Public Schools	23,992	6,033	24.5%
Woodland Hills School District	3,620	1,029	28.4%
Clairton City School District	732	223	30.5%

from parametric statistical analysis by examining potentially many more predictors as well as examining interactions among predictor variables.

The CART data mining method is appropriate for large integrated data, as compiled here. For much of the research on chronic absenteeism, the addition of data on neighborhood and built environment conditions has not been extensively tested, making exploratory analysis with less clearly defined hypotheses is a valuable contribution.

Using results from the CART model, a combination of data on students and the built environment produced significant predictors of chronic absence. Specifically, data from the school district, DHS program involvement, census and other neighborhood indicators, and house assessments created the largest differences in students who were chronically absent from those who were not.

These interrelated predictors were the results when the model was tested for combining grades into two groups: grades K–5 and grades 6–12 (see Table 2). For both groups, the top eight predictors with the highest average importance value show a mix of student and neighborhood effects, and for both groups, the variable “within year school move” showed the strongest effects.

Each grade was also examined individually through the CART model. For instance, focusing on first grade students in the Pittsburgh Public Schools in 2013, 16.7 percent of students were chronically absent from school. Again, as with the above groups, the variable that created the largest difference between students who were chronically absent from those who weren’t was the “within year school move” variable.

Moving during the school year can create many disruptions for students, including changing schools, new transportation routes, delays in processing the change and reassigning children, and other family disruptions. The prevalence of the school move variable as a predictor suggests that

students who move are particularly at risk of missing school and may need additional attention from schools and stakeholders.

For first graders, two neighborhood effect predictors contributed to chronic absence: violent crimes and median sales prices of housing in the neighborhood. For first graders who did not move during the year, a violent crime in the neighborhood was enough of a predictor alone that 20.6 percent of the students were chronically absent. Violent crimes in a neighborhood appear as a predictor of chronic absence for other earlier

grades in the study, suggesting that awareness and outreach in elementary schools could be a possible outcome, as children, their families, or both make attendance decisions in the face of violent crimes.

The housing sales price variable is an important predictor reflecting the effects of neighborhood attributes on school attendance. Children living in lower housing market areas experience higher rates of chronic absence than those in higher housing markets.

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Table 2. Top Predictors, Chronic Absence in the Pittsburgh Public Schools by Grade Grouping, 2013

Grades K - 5		Grades 6 - 12	
Variable	Explanation	Variable	Explanation
Within year school move	Student moved during the year	Within year school move	Student moved during the year
Old for grade	Students > 6 years of enrolled grade	Free/reduced lunch	As indicated by school district
Ever in Mental Health	In DHS Mental Health program at any time in year	Ever in Department of Public Welfare	In any program any time over year (SSI, TANF, food stamps)
Ever in Department of Public Welfare	In any program any time over year (SSI, TANF, food stamps)	Ever in JPO	In Juvenile Justice at any time in year
Homestead exemption	County assessment data; Proxy of tenure of student's household	Old for grade	Students > 6 years of enrolled grade
Violent crime rate	City of Pittsburgh crime data*	Percent black	Census data*
Median sales price	County assessment data; gauge of housing market where student lives*	Percent below poverty	Census data*
Percent below poverty	Census data*	Homestead exemption	County assessment data; Proxy of tenure of student's household

* Neighborhood indicators expressed or compiled for Census tracts.

Connecting People and Place

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This would not be an unusual outcome from our understanding of poverty and social conditions, but with CART, the interactions of variables on the dependent variable are combined in “nodes” and can be understood as an interaction affecting chronic absence.

The highest levels of chronic absence for PPS first graders in 2013 from the CART nodes results showed that 48.4 percent of students who moved during the year and lived in a census tract with a house median sales of < \$33,500 were chronically absent.

The next predictor of chronic absence among PPS first graders were for those enrolled in a DHS Mental Health Program. Students in social service programs are at risk for missing school, and program and school stakeholders are already working with these students to improve attendance. The remaining largest predictors among first graders were those who are “old

for their grade;” students receiving free/reduced lunch; followed by those living in a neighborhood with housing stock largely built before 1914, over 100 years old. These important predictors show that factors of the person, neighborhood, and the built environment can contribute to a student missing school.

In another grade, the first predictor that created the largest split between seventh graders who were chronically absent or those who were not was the indicator of involvement in a Department of Public Welfare poverty program, including food stamps, Temporary Assistance for Needy Families and Supplemental Security Income.

An important predictor in other grades, involvement in a public welfare program, adds more depth through the CART model with interactions among predictors. For those seventh graders in a Department of Public Welfare program and who moved during the year, 52.4 percent of these students were chronically absent, the

highest combination of predictors across the CART model for seventh graders.

Other neighborhood factors that were predictors of chronic absence for seventh graders included neighborhood indicators measuring tax delinquencies, median housing sales prices, number of violent crimes, and a proxy measure of homeownership or rental tenure.

Neighborhood effects were not always among the important predictors of chronic absenteeism in all grades. For instance, for eighth graders in 2013, moving during the year was the most important predictor. However, for chronically absent students who did not move during the school year the most important predictors were receiving a free or reduced lunch and being in the DHS program, Children, Youth and Families.

Continued work on this project extends to area stakeholders in reducing chronic absence. There are many important and successful efforts well underway to promote awareness about chronic absenteeism and

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Students in the Urban and Regional Analysis Program at UCSUR Fall 2015:

Chengying Luo is a PhD student at the University of Pittsburgh in the Department of Economics. She completed her bachelor’s degree in finance at Shanghai Jiao Tong University. Her main research interests are urban economics and economic development. Luo’s current research uses structural and empirical methods to evaluate the effects of institutions and policy changes on housing markets and financial markets. At UCSUR, she is a GSR, working on the advancing entrepreneurship on the Mon Valley project, conducting firm and employment analysis in the region.

Rachel Peterson is pursuing a Master of Social Work degree with a concentration in community organization and social administration in Pitt’s School of Social Work. Peterson received her Bachelor of Social Work degree from Temple University in May 2015, where she gained valuable experience working with individuals and families in the Philadelphia metro area. She joined UCSUR as a social work fellow and is assisting with both academic and social service implementation of the Southwestern Pennsylvania Community Profiles data tool and Web site.

Abigael Wolensky is pursuing a Master of Public Administration with a major in urban affairs and planning at the Graduate School of Public and International Affairs. Wolensky completed her undergraduate degree in urban studies and history at the University of Pittsburgh, with a concentration in urban policy and administration. She serves on the board of Auberle in McKeesport, through her participation in the Johnson Institute for Responsible Leadership Portfolio Program at GSPIA. Wolensky is also co-leader of the Metropolitan Action Group at GSPIA, a student group focused on connecting those interested in urban affairs with opportunities throughout the Pittsburgh region. At UCSUR, Wolensky researches entrepreneurialism and small business development in the Mon Valley as a part of UCSUR’s project with the Institute for Entrepreneurial Excellence and Advancing Entrepreneurship in the Mon Valley Region, funded by the U.S. Economic Development Administration and U.S. Department of Commerce.

Western Pennsylvania Regional Data Center

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infrastructure while institutionalizing the role of a data intermediary within a regional open data infrastructure.

Our work is inspired and performed by colleagues in national and international communities of practice. We are deeply appreciative of our partners in the National Neighborhood Indicators Partnership (NNIP), a collaboration of the Urban Institute with local partners in 35 cities to further the development and use of neighborhood-level information systems for community building and local decision-making. The Data Center will provide a number of services to support data publishers:

- The Data Center has partnered with Digital Scholarship Services at the University Library System to develop a standard for properly documenting data through metadata.
- Since open data programs do not provide access to sensitive data, the Data Center has also provided guidance on how publishers can prevent datasets containing personally-identifiable or other sensitive information from being shared inadvertently on the data portal.
- One final role the Data Center’s work involves helping publishers implement automated publishing processes (often referred to as “Extract Transform Load,” or ETL).

The Data Center will also support data users through a variety of trainings, programs, events, and services. One of the mechanisms that will be used to build relationships among data users, learn about data, and discuss shared publication and research priorities will involve data user group meetings. These meetings will cover a variety of topics, consist of a mix of presentations and conversations, and are open to everyone.

Data user guides will also be developed in the coming months to give data users a sense of the purpose for which the data was collected, business processes, software,

how applicable standards were involved, suggested data applications (and how to use it), and other details that will help data users. The Data Center will also be involved in research projects, conduct a series of training sessions and workshops, and provide technical assistance and support to a wide variety of data users in the broader ecosystem.

The Data Center’s work would not be possible without the trust of our partners and support from the Richard King Mellon Foundation and the University of Pittsburgh.

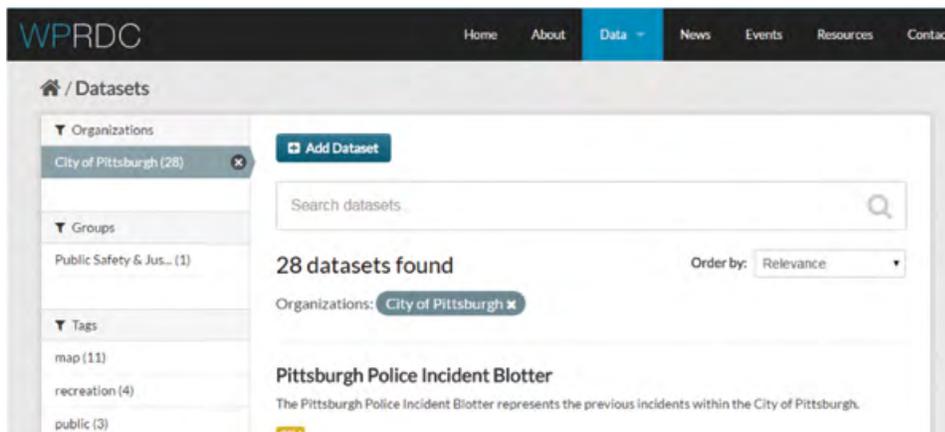


Figure 1: Western Pennsylvania Regional Data Center Open Data Portal

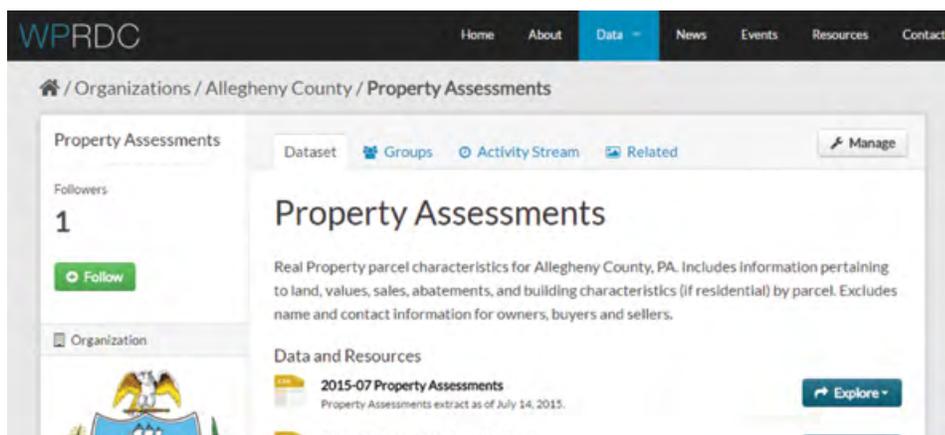


Figure 2: Western Pennsylvania Regional Data Center Open Data Portal

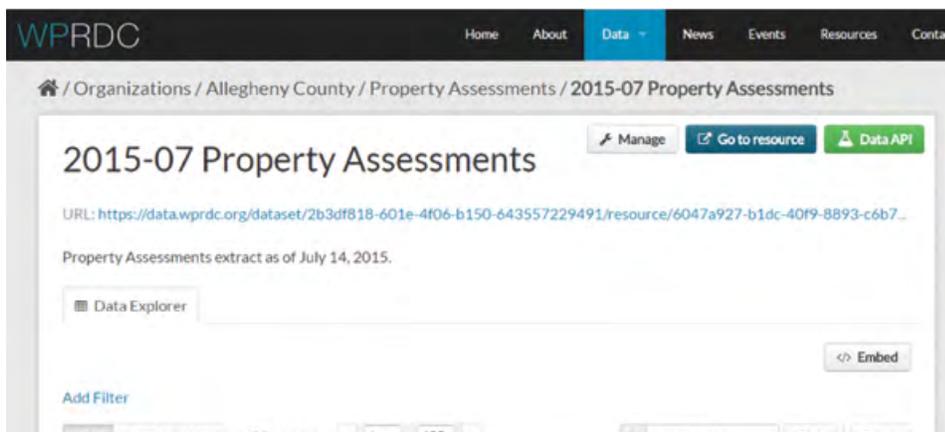


Figure 3: The Open Data Portal provides data access through download, API, or online visualization.

UCSUR Names Recipients of 15th Annual Steven D. Manners Awards, 2015

Each year, the University Center for Social and Urban Research (UCSUR) awards the Steven D. Manners Faculty Development Award for promising research and infrastructure projects at the University of Pittsburgh. These awards honor the memory of Steve Manners, a sociologist who began working at the center in 1974 and served as its assistant director from 1989 until his death in September 2000. In research and service to the center and the University community, Steve Manners was dedicated to improving social conditions in the urban environment. UCSUR awarded the first Steve Manners award in 2001.

The 2015 Steven D. Manners award winners are:

Carissa A. Low, PhD, Assistant Professor of medicine and psychology, Biobehavioral Oncology Program, University of Pittsburgh Cancer Institute, “Technology-based assessment of stress during cancer treatment.”

The proposed pilot study will use passive data collected by mobile devices (or smartphones and wearable direct-to-consumer fitness trackers with built-in heart rate monitors) to predict ecological momentary assessment of psychological stress during cancer treatment. The goals of the proposed research are to test the feasibility and acceptability of using smartphone and wearable wrist sensors to predict stress ratings during chemotherapy for colorectal cancer; and to develop preliminary machine-learning models to predict patient-reported stress from passively sensed data. The proposed study represents the first effort to integrate passive smartphone and physiological sensor data to predict stress as well as an initial attempt to develop automated stress detection models in the context of active cancer

treatment, a time of significant and fluctuating daily psychological stress. The pilot data collected from 25 patients over four weeks of chemotherapy will be critical to establish feasibility and proof-of-concept for this work. If feasibility and preliminary models are supported, this data will guide an external funding application to develop and test a real-time behavioral intervention to reduce stress during cancer treatment.

Elizabeth Votruba-Drzal, PhD, Associate Professor, Department of Psychology, University of Pittsburgh, “The Intersection of Race and Socioeconomic Status in Early Family Life.”

Racial and socioeconomic achievement gaps appear in early childhood, persist into adulthood, and undermine long-term well-being. Existing research typically examines whether socioeconomic inequalities explain racial skills disparities however, a growing literature exploring the intersection of race and SES reveal that the academic returns to SES differ for black and white families. The processes underlying within-SES racial gaps remain unclear. Yet, increasing evidence suggests that differential proximity to (dis)advantage and corresponding disparities in social capital, cultural capital, and wealth shape family life in critical ways. Nonetheless, no studies have directly explored these pathways. This qualitative study will identify the causal pathways through which distal family factors influence micro-level processes in the family, and thus inform future empirical work and theoretical perspectives on how racial and economic skills gaps emerge and take shape.

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increase students’ school attendance. In Allegheny County, the United Way’s Be There Attendance Campaign has been a major effort in developing partnerships to promote awareness and create strategies to get kids in school.

This project was conducted with Feifei Ye, Joshua Childs, and Caiyan Zhang of Pitt’s Department of Education. UCSUR will continue with other National Neighborhood Indicator Partnership (NNIP) project participants to further understand and expand data integration for important policy issues. UCSUR has been a member of the NNIP, based at the Urban Institute, since 2008.

Through the earlier Pittsburgh Neighborhood and Community Information System and now the Southwestern Pennsylvania Community Profiles (*see PEQ December 2014*), UCSUR has long worked to provide neighborhood-based information to the public and communities and will continue to do so in many ways.

Urban and Regional Brown Bag Seminar Series 2015-16 Calendar of Events

University of Pittsburgh University Center for Social and Urban Research (UCSUR)

Unless otherwise noted, all presentations begin at noon and take place at UCSUR (3343 Forbes Avenues, across from Magee-Women's Hospital of UPMC).
RSVP to swpa@pitt.edu.

2015 Fall Presentations

Modeling Community Mapping: Mashing Up Government Data and Online Community Data in Korea

Friday, October 9, 2015

Sungsoo Hwang, PhD, Associate Professor, Department of Public Administration, Yeungnam University, Korea, and visiting scholar, Trachtenberg School of Public Policy and Public Administration, George Washington University

Urban Renewal in Europe: Is Renewing Deprived Areas of European Cities a European Matter?

Wednesday, October 21, 2015

Aisling Healy, PhD, Assistant Professor, Department of Political Science, Université Jean Monnet

Interdisciplinary Modeling of Environmental Resources: Insights from Three Recent Projects

Friday, November 13, 2015

Michael Blackhurst, PhD, Research Development Manager, Urban and Regional Analysis Program, University of Pittsburgh Center for Social and Urban Research

Understanding and Addressing the Housing Crisis for America's Lowest Income Households

Friday, December 4, 2015

Andrew Aurand, PhD, Vice President for Research, National Low Income Housing Coalition, Washington, D.C.

2016 Winter/Spring Presentations

The Monroeville Doctrine: The Suburbanization of Industrial Research in 20th Century Pittsburgh

Friday, January 22, 2016

Patrick Vitale, PhD, Faculty Fellow, Draper Program, New York University

Coupling Systems, Building Coalitions: Connecting Housing, Energy, and Transit in U.S. Cities

Friday, February 26, 2016

Barbara Wilson Brown, PhD, Assistant Professor of Urban and Environmental Planning, University of Virginia

Operating the Game-theoretic National Interstate Economic Model: A Numerical Example of Aviation Cyber Security

Friday, April 15, 2016

Jiyoung Park, PhD, Associate Professor, Department of Urban and Regional Planning, University of Buffalo

Friday, May 20, 2016

Anna Santiago, PhD, Professor, School of Social Work, Michigan State University, Senior Editor, *Journal of Community Practice*





University of Pittsburgh

University Center for Social and Urban Research
3343 Forbes Avenue
Pittsburgh, PA 15260

Recent Publications by the University Center for Social and Urban Research

State of Aging in Allegheny County (6/14)

Hilltop Housing Market Analysis (2013)

Report on Undergraduate Withdrawal with an Emphasis on Freshman Withdrawal after the First Term: 2007-08 to 2012-13 (2013)

Marcellus Shale series (2012-2013)

Pittsburgh Today & Tomorrow: The Facts and the Future of our Region (ongoing)

The Pittsburgh Regional Environment Survey (2013)

The STEM Gap (2013)

Hazelwood Neighborhood Profile 2010 (10/12)

Young Adults Report (8/12)

The Pittsburgh Regional Quality of Life Survey (7/12)

Who Moves to Lawrenceville and Why? (5/12)

Migration Trends in the Pittsburgh Region: Update (12/11)

City of Pittsburgh Neighborhood Profiles—American Community Survey, 5-Year Estimates, 2005–2009 (6/11)

Incorporating Mt. Oliver Borough's Data in the PNCIS: Project Summary and Lessons Learned (7/11)

Foreclosure in South Pittsburgh's Hilltop and Effective Responses (7/11)

City of Pittsburgh Neighborhood Profiles—Census 2010 Summary File 1 (SF1) Data (7/11)

Allegheny County Health in Black and White, Volume Two, Black Papers on African American Health (8/11)

Estimating the Supply and Demand of Affordable Housing in Allegheny County (3/11)

University of Pittsburgh
University Center for Social
and Urban Research
3343 Forbes Avenue
Pittsburgh, PA 15260

Phone: 412-624-5442

Fax: 412-624-4810

E-mail: ucsur@pitt.edu

Web site: ucsur.pitt.edu

Twitter: twitter.com/ucsur

Pittsburgh Economic Quarterly
Editor

Sabina Deitrick

Assistant Editor

Anna Aivaliotis

University Center for Social
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