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The power of academic-practitioner collaboration to enhance science and practice integration: Injury and violence prevention case studies

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Abstract

One of the most substantial challenges facing the field of injury and violence prevention is bridging the gap between scientific knowledge and its real-world application to achieve population-level impact. Much synergy is gained when academic and practice communities collaborate; however, a number of barriers prevent better integration of science and practice. This article presents three examples of academic-practitioner collaborations, their approaches to

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working together to address injury and violence issues, and emerging indications of the impact on integrating research and practice. The examples fall along the spectrum of engagement with non-academic partners as co-investigators and knowledge producers. They also highlight the benefits of academic-community partnerships and the engaged scholarship model under which CDC-funded Injury Control Research Centers operate to address the research-to-practice and practice-to-research gap.

Keywords

academic-practitioner collaboration; engaged scholarship; research-to-practice gap; case study; injury control research centers

Introduction

One of the most substantial challenges facing the field of injury and violence prevention, and public health more generally, is bridging the gap between scientific knowledge and its real-world application to achieve population level impact.^{1,2} Often termed the “research-to-practice gap,” this disconnect between science and practice can impede the uptake of research-informed solutions in real world settings while also compromising the extent to which practical realities inform research priorities (practice-to-research).³

While efforts around translational research are increasing, much of the focus is unidirectional, promoting a “science push” that prioritizes evidence-based interventions developed by scientists.²⁻⁴ This “Pipeline Fallacy”, or one-way flow of information and decision-making, often inhibits meaningful participation by practitioners and communities in program development.^{5,6} In turn, the essential knowledge and experience that drive program feasibility, utility, and success are sometimes missing from “evidence-based” programs, leading to issues with dissemination, implementation, and sustainability.^{5,6} A more purposeful integration of practitioner perspectives and practice-based evidence in the initial development of prevention approaches would yield better outcomes.⁵⁻⁹

Fostering academic-community partnerships and collaborations provide a substantial and underexplored opportunity for better integrating science and practice through providing opportunities for *all* key stakeholders (e.g., practitioners/service providers, community members/intervention recipients, researchers) to combine resources, expertise, and perspectives. Practitioners and researchers share an interest in addressing complex injury challenges in communities but through vastly different knowledge and experiences. Combining these different, but complementary, perspectives through effective partnerships is crucial to creating meaningful and sustainable impact. A number of barriers prevent this integration of science and practice: the privileging of scientific knowledge over practitioner and community knowledge; differing priorities and reward structures in universities and practice settings; limited community or organizational capacity or resources to adopt and sustain evidence-based interventions; and histories of mistrust and poor communication between researchers and practitioners.¹⁰⁻¹²

Recognizing these challenges, several approaches have emerged to address this problematic gap, such as knowledge translation, translation science, evidence-based practice, and practice-based evidence.^{2,5,6,13,14} “Engaged scholarship,” is one approach that aims to solve complex social problems through integrating research and practice.^{15–17} Van de Ven and Johnson offer a useful and much cited definition of engaged scholarship as a, “collaborative form of inquiry in which academics and practitioners leverage their different perspectives and competencies to coproduce knowledge about a complex problem or phenomenon that exists under conditions of uncertainty found in the world” (p. 803).¹⁸ Within this model, universities engage in and equally value the missions of research, teaching, and service to the community; work *with* communities; and “connect... the rich resources of the university to our most pressing social, civic, and ethical problems...” (p. 19).¹⁵ The Carnegie Foundation for the Advancement of Teaching published a seminal report that argues for the importance of universities actively engaging in civic discourse and helping solve critical social (and public health) problems with nonacademic partners.^{15,19} This requires universities to place a higher value on community outreach and engagement activities, and the complementary expertise of practitioners (and community members).^{12,17} The Carnegie Foundation report and others include actionable recommendations for universities to implement such an approach.¹⁹

Engaged scholarship requires equal valuing and inclusion of empirical and practical knowledge as part of the evidence-gathering and solution-generation process. This involves researcher-practitioner-community partnerships and collaborations with a unified approach to problem-solving, rather than a siloed approach where research and practice occur separately with messages sent back and forth across the divide. Hoyt’s framework¹⁶ describes the different levels and types of academic-community partnerships that exist (Table 1), with five stages of engagement that are derived from “systematic reflection” on a decade of engaged scholarship and community partnerships. This framework presents a non-hierarchical continuum of levels of engagement in which each stage serves a purpose, and important learning and action can occur at any stage. The stages can be useful in considering the quality, type, and needed resources within an academic-community partnership.

As part of promoting sustainable and research informed injury and violence prevention, the Centers for Disease Control and Prevention (CDC), National Center for Injury Prevention and Control (CDC’s Injury Center) funds 10 Injury Control Research Centers (ICRCs) at universities and medical centers around the country. The ICRC funding mechanism, introduced 30 years ago, supports a three-pronged purpose that mirrors the Carnegie Foundation’s suggested functions of academia: 1) conduct relevant, high-quality injury and violence prevention research; 2) train the current and next generation of injury and violence prevention researchers and practitioners; and 3) bridge science and practice through outreach activities to local, regional, and national stakeholders.^{20,21} ICRCs work collaboratively to form long-term partnerships with injury and violence prevention organizations and practitioners both within and beyond their states and regions. Through their partnerships and outreach, ICRCs are tasked with bridging the gap between research and practice through applied and translation research, collaborations with non-academic partners, and engagement with local and regional communities and coalitions. This article presents three examples of ICRC academic-practitioner collaborations, their approaches to collaboratively

addressing injury and violence, and emerging evidence of their impact on integrating research and practice.

Case Examples

Vacant Lot Greening (University of Pennsylvania and the Pennsylvania Horticultural Society)

The University of Pennsylvania Injury Science Center (Penn) has worked with the Pennsylvania Horticultural Society (PHS) for nearly 10 years (well before becoming a CDC-funded ICRC) after the directors from each group met at a community meeting. PHS had been greening vacant lots and felt the efforts had a positive impact on violence and community well-being, but this hypothesis had never been formally studied. Vacant lot greening is a simple and low cost intervention aimed at addressing the negative impact of blighted vacant spaces through the removal of graffiti and trash and planting of grass and trees. The PHS Land Care Program, in conjunction with the City of Philadelphia's Division of Housing and Community Development, had already greened over 12,000 parcels (16 million square feet) of vacant land. Penn scientists had completed earlier community-based focus groups asking Philadelphia residents what they thought were the most problematic aspects of their neighborhoods in terms of health and safety. These early studies repeatedly pointed to the prevalence of abandoned buildings and land as residents' leading concern for urban health and safety.

Past studies and Penn-PHS experiences suggested that changing these abandoned spaces via greening could have a positive impact on health and safety for residents.²²⁻²⁴ Penn proposed a formal scientific evaluation of the program to transform anecdotes into measurable evidence. For the first study, the PHS team gave the Penn team the locations and dates of all vacant lots that had been greened to date. This sharing of data was made possible after a considerable amount of trust was built between both partners over multiple meetings, and both partners believed the pursuit to be worthwhile even though efforts may result in null findings. The Penn team designed and conducted a quasi-experimental study of 10 years of vacant lot greening, comparing lots that were greened and lots that could have been greened but were not. Both organizations participated in the process; the study methodology was selected based on the expertise of the Penn team, while PHS's on the ground experience was vital for understanding how lots were selected for greening and choosing suitable control lots. The study did support the anecdotal evidence for vacant lot greening, demonstrating significant decreases in gun assaults across the city around greened lots compared to controls, as well as nuisance crimes, stress, and sedentary behavior in certain sections of the city.²⁵

Building on these initial findings, the teams worked closely together to conduct a pilot randomized control trial (RCT) of vacant lot greening, the first ever prospective experimental analysis of a community greening intervention. Several key steps enabled this RCT. First, PHS staff guided Penn researchers through several tours of different Philadelphia neighborhoods, teaching them the nuances of the lot selection and greening process. This resulted in a study protocol that was true to existing PHS work, but also clearly defined and replicable. Second, PHS brokered a relationship between Penn and the City of Philadelphia,

who granted the legal rights to work on the vacant lots randomly selected for study. Vacant lots were randomly selected by the Penn team for greening, and PHS contractors conducted the actual greening. PHS understood the importance of blinding in this trial, so none of the contractors were aware that the lots they greened were part of a study (and participants in the study were not told that the study involved greening). Study results indicated that people felt significantly safer after greening; the study also found a non-significant trend toward decreased crime in greened areas relative to non-greened areas.²⁶ In a qualitative study, people described a substantial negative impact of vacant and abandoned neighborhood spaces on community well-being, as well as physical and mental health²⁷ Additionally, the team conducted a trial to determine how people responded physiologically to their neighborhood environment and found significant heart rate decreases while viewing newly greened vacant lots.²⁸

In both trials, grant money obtained by the Penn team from the Centers for Disease Control and Prevention, National Institutes of Health, and the Robert Wood Johnson Foundation fully funded the greening that PHS conducted for research purposes. The results of both studies led to several large, ongoing federally-funded trials of vacant lot greening of hundreds of lots across Philadelphia and multiple other cities. Penn and PHS team members met monthly and all team members had input into the design of the trial and day-to-day implementation strategies once the trial began. Similarly, all team members had a voice in discussing primary and secondary data analysis. Early results of one of the citywide randomized controlled trials have shown that greening of vacant lots again significantly reduces gun violence and nuisance crimes, as well as health outcomes such as depression and mental illness, especially for residents living in poverty (D.E. Polsky, unpublished data, 2017).

In total, the Penn-PHS partnership has resulted in the greening of almost 500 vacant lots in Philadelphia, and the generation of scientific evidence that improving vacant blighted spaces through greening can reduce violent crime and improve other health outcomes. This evidence is equally available to Penn and PHS for advancing individual and organizational goals and visibility. Members of the team have co-presented nationwide at conferences and seminars for both practitioner and academic audiences. This has not only served to widely disseminate their work, but has contributed to the long-term success of the partnership through the clear appreciation for and recognition of their complementary roles and expertise. The PHS and the City of Philadelphia's vacant land greening efforts are now known as a scalable and sustainable model of urban change for health and safety.

Motor Vehicle Passenger Safety (Columbia University and New York State Department of Health)

As part of their CDC-funded Core Violence and Injury Prevention Program (Core VIPP) and Core State Violence and Injury Prevention Program (Core SVIPP) activities, the New York State Department of Health (NYSDOH) in Albany began holding periodic meetings on injury and violence issues and invited others, including the Columbia University Injury Control Research Center (CU-ICRC), to participate. The meetings brought together diverse groups operating in a geographically large state, many previously unknown to each other and

with no other means of connecting.¹ The full-day meetings included morning presentations on state-relevant injury and violence data, research, and programs, and afternoon workgroup sessions designed for group members to delve deeper into specific issues. Initially, collaborations between the NYSDOH and the CU-ICRC took the form of sharing information and mutual support through attendance, speaking engagements, and participation in each other's meetings and conferences. During one meeting, the NYSDOH identified rear seat motor vehicle safety as an important local issue, and asked for CU-ICRC assistance in creating a flyer aimed at educating drivers and their passengers on the dangers of riding unrestrained in the rear seat. This led CU-ICRC researchers to discover large gaps in the scientific literature, particularly related to rear-seated adults.

Prompted by NYSDOH's initial request, CU-ICRC researchers conducted several studies on rear seat safety using publicly available data sets and fed the information back to the NYSDOH for use in the public education campaign. Simultaneously, NYSDOH epidemiologists analyzed motor vehicle crash and health data (e.g., emergency department visits and hospitalizations) to better understand the burden of injury from motor vehicle crashes across the age span. Several specific questions about the nature of motor vehicle crashes (e.g., modifiable characteristics, comorbid conditions, roadway type, etc.) emerged that could best be answered through collaboration between the two groups. Specifically, NYSDOH had the strong relationships needed to acquire and use motor vehicle crash and health data and experience linking and analyzing these multiple data sets while CU-ICRC researchers had extensive experience examining factors associated with motor vehicle injury and mortality. More specifically, CU-ICRC researchers brought knowledge of the relationships among the crash, vehicle, and occupant characteristics that were useful for including in models predicting morbidity and mortality. As part of this partnership and through a collaborative small pilot grant, a training component was added that also helped bridge the geographical distance between the two groups. A Columbia University student intern worked onsite at the NYSDOH analyzing the Crash Outcome Data Evaluation System (CODES) database containing linked hospitalization, emergency department, and Department of Motor Vehicle crash data to better understand the outcomes of riding unrestrained in the backseat of a taxi in New York City. A collaborative process was established between NYSDOH and the CU-ICRC for overseeing this new project, including joint supervision and training of the intern; weekly conference calls for reviewing data, analyses, and findings; and a plan for sustaining the project through an ongoing internship position for Columbia students.

As part of the outcomes of the project, local data demonstrating that the increased risk of injury associated with riding unrestrained in the rear seat extended beyond children were disseminated widely to staff charged with providing community injury prevention programming, trauma centers, Department of Motor Vehicles officials, policymakers, and others who could utilize the information for decision-making and programs. At the time of this writing, there were active initiatives making use of these data for public awareness and safety activities, such as developing public service announcements (PSAs) for showing on

¹These meetings formally operated as the NYSDOH Injury Community Planning Group (currently the Injury Community Implementation Group).

taxi TV and other sites aimed at emphasizing the importance of all occupants being restrained in the rear seat. For example, one of the findings from the collaboration—that children involved in a motor vehicle crash while riding rear-seated in taxi's are twice as likely to be injured as those traveling in private vehicles—is among the options being considered for the PSA.

The fruits of this ongoing academic-practice partnership—which yielded important, actionable data—helped to raise the profile of this injury issue among injury prevention professionals, policymakers, and residents and visitors. It also stimulated the co-writing of a grant to support further analysis of CODES in aging and frail adult populations, a conference on rear-seat safety, a webinar²⁹, a scientific meeting abstract, and forthcoming peer-reviewed manuscripts³⁰ coauthored by the NYSDOH and CU-ICRC collaborators. Additionally, the NYSDOH/CU-ICRC academic-practice partnership provided a training opportunity for interns, strengthened scientific collaborations through use of diverse perspectives, and increased access to the CODES database to narrow scientific gaps and strengthen evidence-based public messaging around rear seat passenger safety.

InjuryFreeNC Academy (University of North Carolina Chapel Hill and North Carolina Division of Public Health)

The North Carolina Department of Health and Human Services, Division of Public Health, Injury and Violence Prevention Branch (NC IVPB) and the University of North Carolina Injury Prevention Research Center (UNC IPRC) have a long tradition of collaborative activities extending over 20 years. In 2012, NC IVPB and UNC IPRC launched the InjuryFreeNC Academy for training community-based practitioners.

The impetus for developing InjuryFreeNC academy came from a series of strategic planning meetings held in 2008, as part of NC IVPB's Core VIPP/SVIP activities for developing a state Injury and Violence Prevention (IVP) strategic plan. NC IVPB convened a diverse partnership of NC injury prevention stakeholders, including the UNC IPRC, SafeKids North Carolina, the trauma care community, Brain Injury Association, and state entities such as the Division of Medical Assistance, Mental Health Services, State Bureau of Investigation, and Drug Control Unit. A key theme emerged in the process of updating the state's strategic plan: cultivating skills, knowledge, and capacity among community leaders who work (formally or informally) in injury and violence prevention practice.

To address these training needs, the strategic planning group recognized that the injury prevention practitioner “workforce” includes people from a diverse range of agencies whose primary job description is something other than injury prevention, but whose job includes prevention activities. Examples include law enforcement officers, social workers, health care providers, and other practitioners who share a commitment to preventing specific injury issues, but often lack formal training in injury prevention theory and public health practice. To address this gap, the 2008 IVPB strategic planning process included two goal areas—Building the Injury Prevention Community, and Workforce Development. Based at a university with expertise and a long history of providing injury prevention training, the UNC IPRC was uniquely positioned to partner with the NC IVPB to address this challenge. Staff from the UNC IPRC headed the Workforce Development goal team and surveyed almost

200 injury prevention practitioners in the state about training needs and interests.³¹ Survey findings were used by the UNC IPRC and the NC IVPB to design the InjuryFreeNC Academy and training sessions, focused on bringing scientific knowledge to practitioners in a training setting, with the ultimate goal of increasing the implementation of evidence-based injury and violence prevention strategies in communities. The UNC IPRC and IVPB team drew heavily on lessons learned from previous training initiatives in the state, including the PREVENT training model.³²

The UNC IPRC and IVPB strategic planning team, which included injury prevention practitioners, felt that successful training requires relevance to the specific injury topic of focus; includes practical skills that are quickly and easily applied in the workplace; incorporates adult learning theory; and includes the perspectives of volunteers, advocates, and diverse professional groups. To achieve this, the InjuryFreeNC academy: 1) includes practitioner perspectives when developing concepts and planning; 2) structures facilitation of practitioner work through multi-disciplinary teams (as opposed to individuals); 3) prioritizes experiential, active learning of public health and injury prevention concepts; 4) uses a collaborative governance model; and 5) provides supplemental online resources.

Including practitioner perspectives during planning has been a priority so that the material provided to each cohort is relevant to the real-world problems and needs that practitioners face in their communities. Thus, each academy “cohort” (or training cycle) includes extensive planning led by a Planning Committee (jointly facilitated by UNC IPRC and NC IVPB); interdisciplinary practitioners provide input into the topics, format, and presenters for each cohort. For each training cycle, the Planning Committee members are often instrumental in “spreading the word” about the Academy to the practitioner community. Planning Committee members sometimes present and provide mentorship during the training.

For each training cycle, the Academy invites applications from cross-disciplinary teams rather than individuals. Each team comprises approximately 3–5 people from diverse professional backgrounds (e.g., health department, law enforcement, hospital outreach) who seek to work together on an injury problem of mutual interest in their community. This fosters connection between agencies (such as child protective services, law enforcement, and domestic violence services). Not only do team members represent multiple regional organizations, they must also nominate a specific project or activity that they wish to collaborate on over the next six months. Thus, the practical realities and needs of the practitioner teams are used in the experiential team-focused learning examples.

As in all aspects of the Academy, governance and oversight is a collaborative endeavor. Each new training cycle has led to insights and refinements of the structure and training content. These are collaboratively discussed between NC IVPB and UNC IPRC. While NC IVPB contributes the majority of funding through its CORE VIPP/SVIPP funding, the UNC IPRC occasionally supplements with its ICRC award. The leveraging of these two funding sources has ensured adequate, continuous resources for the Academy.

Given that the Academy's short training period does not permit time for extensive literature review, UNC IPRC and NC IVPB collaboratively created the injuryfreenc.org website as additional support. This site provides evidence-based information on a wide variety of injury prevention policies and programs, including summarizing the evidence base for each injury topic area (and non-injury topics). Future Academies will include use of other online systems, such as closed Facebook groups.

In the four years since its inception, the InjuryFreeNC Academy has become a key strategy for engaging stakeholders within a training infrastructure that is systems-orientated, inherently collaborative, and interdisciplinary. Academies to date have focused on child abuse and neglect, suicide, prescription drug overdose, and most recently shared risk and protective factors across multiple forms of injury and violence. In pre- and post- single group evaluations of the trainings, participants self-report increased knowledge and professional competency. In addition to the educational content, peer learning takes place between teams. The program has become a key strategy for long-term change towards a climate of safety in North Carolina, with the ultimate goal of reducing mortality and morbidity from injury and violence.

Discussion

These three examples illustrate that academic-community partnerships take many forms and comprise a variety of activities. While these particular cases explicitly feature ICRC work with community partners, they are meant to serve as illustrations of the ways that any academic-community collaboration can function and benefit partners' individual and collective work with thoughtful development and maintenance. Building upon Hoyt's framework of stages of engagement, each example meets at least stage four criteria (i.e., Authentic Engagement) as evidenced by partners sharing and co-creating knowledge freely across organizational and professional boundaries.¹⁶ While initial roles and responsibilities were maintained, there was considerable integration of expertise and perspectives, and democratic, shared leadership. In the Penn-PHS partnership, roles were fluid as both researchers and practitioners contributed to the study design and, ultimately, the presentation of research findings across practice and academic communities. In the UNC IPRC-NC IVPB partnership, academic team members led and participated in NC IVPB strategic planning workgroups. Finally, over time all of the collaborations extended beyond the primary collaboration partners to include other stakeholders in the community and their respective networks.

Across each case, common elements emerged as critical for facilitating partnerships and engagement (Table 2). First, partnerships often began through researchers and practitioners sharing spaces and opportunities to connect and discuss common interests or concerns. Often these meetings were convened for purposes other than fostering collaboration. Once specific projects began, partners convened regularly (typically weekly or monthly), which fostered the co-learning and trust building required for effective collaborations.¹⁶ Long-lasting engagements were cultivated through multiple projects that evolved over time to address knowledge gaps and practice needs. While each example highlights a distinct project or focus, activities included numerous smaller projects. In other words, often, a synergistic,

“domino effect” of one inquiry or action led to another organically, building off prior engagements. All of the examples highlight mutual resource sharing, including physical space, technology (for meetings), data, funding, personnel time, external network connections, and leadership. At some point each partnership solicited or included external funding to support various efforts and activities. Finally, all of the cases were considered mutually-beneficial by all members in working toward a common good for their communities and society—from revitalizing and reducing neighborhood violence to preparing a diverse public health workforce.

Challenges, barriers, and innovative solutions arose in each of the three cases. Penn, PHS, and city leaders, for example, struggled to find an ethical and scientifically sound way to handle the issue of control groups not receiving the benefits of greening efforts. They were able to address all stakeholders’ concerns through reasoned and respectful dialogue, and use of an innovative study design and additional funding that allowed for the later greening of control lots.³³ To maintain and grow their collaboration despite the geographic distance between them, the CU-ICRC and NYSDOH established an internship position placing a CU-ICRC student onsite at NYSDOH, and used innovative technology to “meet” regularly. Finally, when the UNC IPRC and NC IVPB faced the challenge of sustaining funding for the Injury Academies, both organizations collaboratively braided funding streams to ensure continuity. Each collaboration demonstrates how successful partnerships creatively approach political, geographical, and financial barriers.

Implications for Policy and Practice

These examples provide several relevant implications for practice, including the importance of:

- Creating meaningful and mutually-relevant opportunities for researchers and practitioners to meet and interact as a way of sparking potential collaborations
- Seeking joint funding for project sustainability
- Valuing, utilizing and leveraging each partner’s unique strengths and perspective, while also allowing for cross-over into what is often considered the domain of the other (e.g., practitioners informing study design and researchers helping to support implementation efforts)
- Making space for and finding creative or flexible (within each partner’s context) solutions to addressing challenges or barriers that may hinder partnership or project development

Together, these three cases highlight the challenges, and benefits of academic-community partnerships and how ICRCs function under an engaged scholarship model. These examples, provided by three currently CDC-funded ICRCs, are salient examples of the type of longstanding partnerships and science-practice integration efforts that exist across many ICRCs. The ICRCs and their work with practitioners and communities move beyond the traditional “science push” model and represent the latter stages of engagement in Hoyt’s framework.¹⁶ The ICRCs demonstrate that valuing practitioners as equal and long-term

partners is key to achieving more authentic, effective, and sustainable integration of science and practice and to producing population-level impact on injury and violence. Partnerships such as these improve the quality and relevance of prevention research, the effectiveness of public health practice, and the health and safety of communities.

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Table 1Five Stages of Engagement¹⁴

Stage 1- Pseudo Engagement	Relationship is time-limited and unidirectional. Researchers often provide expert advice or transmit knowledge to the community, or engage with communities for the purpose of data collection.
Stage 2- Tentative Engagement	Beginning of bi-directional effort and knowledge. Practitioners/community members and academics begin learning and working more collaboratively, and community activities begin to influence the scholarship of academic partners. Engagement expands to larger networks and relationships
Stage 3- Stable Engagement	More established bi-directional work, and sufficient trust and value placed on engagement to accommodate more risks and compromises among partners. Engagement based on a longer-term commitment and tolerance for adaptations, challenges, and responsibilities involved in maintaining partnerships.
Stage 4- Authentic Engagement	Mutual "commitment to continuity" by all partners that allows for the co-creation of knowledge.
Stage 5- Sustained Engagement	Full engagement, mutuality, and power-sharing among partners. Knowledge is co-generated and used to influence organization and social systems to achieve change and impact. Partnership is sustained beyond specific individuals and projects.

Table 2

Common Elements of ICRC University-Practitioner Engagement

Regular Convenings	<ul style="list-style-type: none"> • Logistical coordination • Relationship and trust building
Longstanding Engagements	<ul style="list-style-type: none"> • “Domino Effect” of synergistic co-generated activities • Ongoing partnerships- not time or project limited
Sharing of Resources	<ul style="list-style-type: none"> • Physical space • Technology • Data • Funding • Personnel • Networks/Connections
Mutual Benefit	<ul style="list-style-type: none"> • Common goals • Shared vision

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