Program Narrative

A. STATEMENT OF THE PROBLEM

The community included in the proposed program.

Our proposed project seeks support for a program led by the Ohio Department of Rehabilitation and Correction (ODRC) in partnership with the Ohio Department of Mental Health and Addiction Services (OMHAS). Our goal is to reduce the impact of opioid use disorder (OUD) in Ohio by providing technology-assisted treatment opportunities for affected populations. ODRC is responsible for adults with a felony conviction sentenced to a state prison with a statutory minimum sentence of at least six months. ODRC is also responsible for parole supervision, giving the department supervisory authority in both custody and community settings.

The impact of opioids in this community.

Data from the CDC show that Ohio had the second highest rate of drug overdose in 2016 (Hedegaard et al., 2016). Ohio had **3,613 opioid-related overdose deaths** in 2016, which at 33 per 100,000 people was a rate **2.5x the national average** (NIDA, 2018). Nearly two-thirds of these deaths were related to synthetic opioids (NIDA, 2018). Opioid use is still on the rise; estimates provided by the CDC of the annual increase in third-quarter opioid overdoses show that, from 2016 to 2017, Ohio experienced a **28 percent increase in the annual opiate overdose** rate (Vivolo-Kantor, 2018).

The partners committed to this effort.

The proposed project supports the Ohio Department of Rehabilitation and Correction (ODRC) in partnership with the Ohio Department of Mental Health and Addiction Services (OMHAS). ODRC operates all prisons in Ohio and is additionally responsible for supervising people after they have been released into the community. OMHAS collaborates with ODRC to provide treatment services to persons in ODRC custody and on community supervision.

Additional partners include a virtual-reality (VR) content production team (Nsena) and our action-research partner (New York University (NYU)). Nsena has extensive experience in creating VR content in criminal justice settings, and our research partners at NYU have experience assessing the user experience and outcomes associated with VR applications in criminal justice. Nsena will provide VR software necessary to implement web-based VR behavioral interventions to enhance the treatment of substance abuse. Nsena will also partner with ODRC, OMHAS, and NYU to provide necessary additional software in response to learning that occurs during the project, especially VR treatment's measured progress toward defined outcomes.

Problem to be addressed and alignment with the existing efforts.

Ohio has been heavily impacted by opioid use disorder (OUD), which is the leading cause of injury-related death in the state (ODH, 2015). Ohio has made great strides in responding to the opioid epidemic; the proposed program will strengthen our existing effort to mitigate the consequential impact of opioids in our state. In 2011, Governor Kasich created the Governor's Cabinet Opiate Action Team (GCOAT) to ensure high-level leadership in responding to the opioid crisis at the state and local levels, emphasizing reducing the supply of opioids, expanding

drug abuse prevention programs, and expanding access to treatment for OUD. Recent strategies include bolstering drug-interdiction efforts (including increasing penalties for trafficking in fentanyl); expanding the use of prescriber guidelines and Ohio's automated prescription reporting system; increasing education about and awareness of naloxone; and expanding access to drug treatment (GCOAT, 2018).

Prevalence of OUD is especially high among persons supervised by the criminal justice system (CJS), and a preponderance of opioid overdose deaths occur among persons who have a history of CJS involvement (Binswanger et al., 2007; Brinkley-Rubinstein et al., 2018). Fatal opioid overdose among opioid users often occurs soon after their release from jail or prison, contributing to an opioid-related morbidity and mortality rate for CJS populations that is 13 times that of the general population (Binswanger et al., 2013; Merral et al., 2010).

The partners in the proposed project, including ODRC, OMHAS, our action-research partner NYU, and Nsena, will collaboratively design and implement OUD-related treatment modules for people with OUD, delivered using virtual reality (VR). The purpose of this project is to develop VR products aimed at enhancing treatment services for people with OUD and others with opioid involvement. It will also explore the efficacy of VR treatment and whether VR is an effective supplement to traditional treatment methods or an alternative to traditional treatment methods when traditional methods are otherwise unavailable.

Given the low marginal costs of VR, if these technology-based treatment delivery methods prove effective, ODRC and other treatment providers would have a strong rationale for expanding the use of VR for enhancing cognitive-behavioral treatment (CBT) and OUD-related training (for staff and treatment participants), especially in reaching rural and other isolated populations who might not otherwise have reliable access to treatment. If effective, VR treatment

could be a cost-effective method for delivering critical services to populations in need, and would mitigate the damaging impact of the opioid crisis among people who do not have access to sufficient treatment.

The project will target persons with histories of OUD in two settings: prison and community. A primary focus of the project will be to treat persons with histories of OUD in order to help them overcome opioid-related issues. The VR modules will be chosen and iteratively refined, by the stakeholder partners, but will likely include:

- (1) Modules on communicating about a history of OUD in job interviews or with family and friends.
- (2) OUD education and harm-reduction strategies, including making participants aware of the risk factors involved with opioid use, recognizing overdose, and responding to an overdose. This would include training in delivering naloxone (our proposed collaborators have worked effectively with the Pennsylvania Department of Corrections (PADOC) to create VR training for corrections officers to prepare them for responding to overdoses in prisons).
- (3) Modules to enhance CBT, focusing on key concepts such as managing social cues and cravings, problem solving, and decisionmaking skills. Prior research demonstrates that VR is an effective tool for delivering CBT components, such as inducing cravings for substances (Hone-Blanchet et al., 2014).

For prison settings, modules will also include a virtual introduction to resources available in the community to which persons will release, for example, a virtual tour of a treatment center (this approach has been used to good effect by PADOC). The VR software may also, for example, familiarize inmates with histories of OUD with scenarios that they will face in the community, which could be stressful and might become a catalyst for re-engaging with opioids.

The project will draw on the Patient-Centered Outcomes Research (PCOR) approach, using principles of engagement and knowledge sharing to include the perspective of potential recipients of VR treatment, in addition to treatment providers and corrections staff (PCORI, 2014).

The need for federal assistance to fund the proposed program.

The proposed project will enhance ODCR's capacity for responding to the treatment needs of impacted populations. Budget constraints and limited resources hinder ODRC's ability to explore potential new technologies, such as virtual reality (VR), for delivering evidence-based treatment to isolated and underserved populations. Our interest in federal funding is to provide the support necessary to develop, implement, evaluate, and refine technology-enabled treatment delivery, in collaboration with Nsena and NYU. We are enthusiastic to work with the BJA TTA providers under this solicitation and to learn of strategies that have shown promise elsewhere that we can integrate into our own response. The proposed project is well suited to federal support. Enhancing CBT treatment with VR has upfront costs, but the subsequent marginal cost of distributing and using the VR components is very low. The content planned under this award would include both customized content (of high relevance to Ohio prisons and community corrections) and generalized content (which could be used in any corrections setting). Software developed under this project will be available for distribution to corrections agencies and other groups across the United States, at no cost, giving the proposed project the potential to fuel a low-cost scalable solution to enhance treatment services for geographically isolated populations. This could give the project an impact beyond the life of the project and outside of Ohio's borders to other affected states.

Limited access to treatment in the proposed service area.

Persons in ODRC custody have access to treatment services from the Ohio Department of Mental Health and Addiction Services (OMHAS) and other providers. ODRC faces an enduring challenge of extremely limited treatment services available in custody settings. The pilot sites include two prisons: Dayton Correctional Institution and Warren Correctional Institution. A key component of the prison pilot sites will be to prepare people who are nearing their release date to meet the challenge of overcoming OUD-related issues after they are released into the community. In addition to the two prison sites, two community-supervision offices, both in isolated rural areas with limited access to treatment, have been selected as pilot community sites: Pike County Adult Parole Authority and Scioto County Adult Parole Authority. Persons under ODRC supervision have potential access to community, clinic, and other treatment services, but these services are often not present in rural settings. ODCR struggles to connect supervised people with OUD in rural settings to a sufficient level of treatment services. Out of necessity, ODRC supervisory officers themselves frequently become the de facto treatment provider for these clients. The two community pilot sites were selected due to the existing challenges of meeting the treatment service needs of persons with OUD who are supervised out of these remote offices.

Pilot sites.

Dayton Correctional Institution (DCI) is a women's facility with an average daily population of 838 inmates. DCI is located in the ODRC Southwest Region. DCI offers institutional benefits including release preparation, reentry programs, educational and apprenticeship programs, advanced job programs, and other cognitive-behavioral programs, but these are limited. 71% of

current DCI inmates have moderate (10%) or severe (61%) need for substance abuse treatment (internal ODRC data).

Warren Correctional Institution (WCI) is a men's facility with an average daily population of 1,279 inmates. WCI is a Level 3 institution, which is general population but designed for persons who are more likely to engage in disruptive behavior or have done so previously. WCI offers institutional benefits including release preparation, reentry programs, educational and apprenticeship programs, and other cognitive-behavioral programs, but these are limited. 63% of current WCI inmates have moderate (14%) or severe (49%) need for substance abuse treatment (internal ODRC data).

Pike County Adult Parole Authority (PCAPA) consists of one parole supervisor and three parole officers who supervise 150 people in the community on parole, post-release control, and probation status. In addition to supervision, PCAPA provides random drug testing, risk assessment, programming/interventions, and case-plan development. From 2011 to 2016, the unintentional drug overdose rate in Pike County was 28.4 per 100,000.

Scioto County Adult Parole Authority (SCAPA) consists of one parole supervisor and three parole officers who supervise 275 people in the community on parole, post-release control, and probation status. In addition to supervision, SCAPA provides random drug testing, risk assessment, programming/interventions, and case-plan development. From 2011 to 2016, the unintentional drug overdose rate in Socio County (34.1 per 100,000) was higher than the state's average overdose rate. Across Ohio, 86.4% of all unintentional drug overdose deaths involved opioids (ODH, 2016). Drug treatment in Scioto is disproportionately focused on OUD: 85% of substance abuse treatment requests at the Scioto County Counseling Center are for opioid addiction.

We anticipate that about 60% of the program funds will be devoted to the community sites (Scioto and Pike), and about 40% to the prison sites (DCI and WCI), as there are some efficiencies in reaching participants in custody settings.

Programs already in place.

Across ODRC, OMHAS provides a number of treatment programs upon which this project will build. Programming is very limited for higher-security inmates due to their restrictive housing and stricter limitations on their movement. These people receive little to no programming, and VR could provide an opportunity to expand these or other programs to include them. Existing OHMAS programs include:

- AOD Screening: reception screening for AOD use history with the Texas Christian
 University Drug Screening V Instrument.
- **AOD Intensive Program Prison**: A 90-day program focusing on education, training, work, substance abuse treatment, community service, conservation work, and/or other intensive programming for eligible inmates in accordance with Ohio Revised Code 5120.32.
- AOD Services for the Dually Diagnosed: For persons with co-occurring substance abuse and mental illness disorders, a holistic approach is determined by a multidisciplinary team that includes ODRC's Bureau of Mental Health Services.
- **Brief Intervention Program**: Brief Intervention is a six-week, 24-hour cognitive-behavioral program that uses evidence-based strategies to assist inmates as they work to make positive changes in their criminogenic thoughts and behaviors and change patterns of substance use.
- Recovery Maintenance Program: A 16-hour program provided following successful completion of the Treatment Readiness Program and the Intensive Outpatient Program.

• Treatment Readiness Program: A 48-hour program delivered daily for a minimum of 12 hours a week. A minimum of 10 hours must be cognitive-behavioral treatment specific. The remaining hours will consist of Recovery-Oriented Supplemental Groups.

In Pike County, available community services include one recovery-services center, one mental health agency, one case-management service agency, and one faith-based recovery agency. In Scioto County, there is a counseling center with recovery services, a recovery outpatient center, an outpatient intensive-services facility, a crisis center, and a faith-based center. In both counties, program leaders will seek to partner with existing treatment options, when possible, to help deliver VR treatment.

Components necessary to fully implement the project.

In order to fully implement the project, ODRC needs VR software that addresses the particular needs of its populations. Additional staffing resources are required to provide project coordination and oversight and to work with our partners to adjust software and refine administrative protocols in order to achieve the greatest impact. VR is a relatively new technology. Although VR has shown benefits in enhancing CBT in clinical applications in prior research, there is still much to be learned about CBT treatment via VR in correctional settings. This underscores the need for a close partnership between our collaborating stakeholders and action research to provide regular feedback on VR treatment processes and outcomes, so that we are able to rapidly make midcourse adjustments when indicated by the data. Without federal funding, ODRC would not be able to consider such a project, despite the potential of VR to help expand treatment availability in Ohio and other states.

Opioid impact within the proposed service area.

An increasing number of people admitted to ODRC are involved with heroin or other opioids, as shown in Figure 1. Persons with histories of OUD represented about 2.9 percent of total admissions in 2000 and constituted 17.2 percent of admissions in 2016. This has placed a strain on treatment services in ODRC facilities, and these issues continue to burden people after they are released into the community. When persons with histories of OUD are released from ODRC custody into rural areas, treatment is often unavailable to them due to geographic isolation.

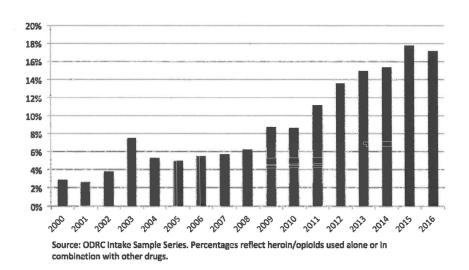


Figure 1. Heroin/Opioid Involvement as a Percent of Total ODRC Admissions

B. PROJECT DESIGN AND IMPLEMENTATION

Objectives.

Together, the partners will (1) develop a stakeholder-inclusive implementation plan; (2) collaborate with public health agencies, community-based treatment providers, and first responders to identify treatment modules and education modules that can be delivered using

virtual reality (VR) (including CBT, training on naloxone administration and virtual orientations to medication-assisted treatment, and other evidence-based treatment available in the community). Using the PCOR approach, the module content will also be informed by the patient perspective (in this case parolees and inmates with histories of OUD) in addition to the perspectives of clinicians and corrections staff; and (3) evaluate these technology-assisted treatment programs for enhancing the treatment of persons with OUD.

Implementation of project components.

If funded, the ODRC will notify project partners, including OMHAS. ODRC will hire a fulltime Project Coordinator (PC), dedicated to effective implementation of the COAP project. The PC job description will be posted immediately following notification of an award, with the goal of having the position filled by December 1, 2018. An initial full-day planning meeting will be set for December 2018 and will include a presentation by the NYU action-research partner on existing data (assembling information to document the impact of the opioid epidemic), additional data-collection needs, prior research on corrections-based VR and VR applications in CBT, and how the proposed project fits within the sequential-intercept model. The PC will lead the team in the development of a project action plan and logic model, in collaboration with other stakeholders and the action-research partner. The PC will liaise with the BJA TTA provider as necessary and will coordinate communication between project stakeholders, including scheduling quarterly in-person meetings and monthly scheduled update calls. The PC will monitor the project budget, with ultimate oversight by ODRC. The budget is described in more detail in the Budget Narrative and includes travel expenses for two staff to attend the annual BJA national meeting in Washington, D.C., each year of the project.

A fulltime Treatment Coordinator (TC) is also included in the project. The TC will be responsible for managing the day-to-day administration of module development and VR-enhanced CBT treatment across the pilot sites and additional service areas as necessary. The PC will be responsible for tracking treatment outcomes and will help to identify promising approaches for the use of VR in delivering behavioral interventions to treat substance abuse.

The stakeholder team, with input from NYU, will assess the current treatment options available to people in ODRC custody and under ODRC supervision at the pilot sites, and, in partnership with project partners, identify gaps that may be filled by VR treatment options. VR modules will include both 360-degree video and computer-generated imagery (CGI). 360-degree video enables a 360-degree view, which gives the user the feeling of being immersed within the VR context. CGI VR provides computer-generated content that allows the user to interact with the content. Users can navigate a scenario, with a changing point of view, and can engage software features. 360-degree video could, for example, be used to introduce someone about to be released from prison to a treatment facility in the community to which they will be referred. CGI VR could train persons to administer naloxone to someone in need.

Initial VR modules will be identified by March 1, 2019. At that time, initial VR equipment will be purchased and distributed to the sites. Sites will begin to use "off-the-shelf" virtual programming (initially limited to 360-degree video) at the sites, to establish feasibility for using the technology, and the NYU team will solicit initial feedback from participants. The initial suite of OUD-customized modules will be selected and produced. The PC will create a data-sharing agreement between the collaborating partners, to be prepared by May 2019.

The project team will track outcomes of people who participate in VR-enhanced treatment.

Using an action-research approach, these data will help identify further opportunities for VR

modules, guided by the pitfalls experienced by people with OUD and other opioid-related issues. In Years 2 and 3 of the project, the stakeholder team will identify opportunities to improve outcomes through an expansion or refinement of virtual reality-enhanced treatment services. The PC will be responsible for tracking and reporting performance measures quarterly to BJA and the stakeholder team. In addition to performance measures required by BJA, the stakeholder team will create fidelity measures as part of the project's action plan. These measures will guide NYU's Year 1 and Year 2 project process evaluations.

This project funding will be used to support the following Category 2 allowable use of funds:

- Purchase hardware and software needed to implement web-based behavioral interventions to treat substance abuse
- Provide training and staff support to manage the proposed project or provide services
- Develop, purchase, and/or maintain web-based services and electronic applications that can
 be accessed from computers, tablets, and/or smart phone devices that are designed to enhance
 or support treatment and recovery-support services.
- Support the mandatory PC position

Enhancing our capacity to respond to opioid abuse.

We expect that VR treatment services will expand our ability to administer high quality treatment services to targeted populations, especially for persons who are in isolated areas with limited access to treatment services. We believe that this treatment will have a positive impact on project goals, including the reduction of opioid use and overdoses as well as reduction of crime and recidivism.

Working with pilot sites.

Each of the pilot sites operates under the authority of ODRC, and coordination will be occur within the management structure of ODRC with the leadership of the Project Coordinator. The Treatment Coordinator will additionally coordinate treatment services within the proposed program, and will provide supplemental treatment administration, particularly within the proposed community sites where targeted people are dispersed and therefore more difficult to service.

Collaborators.

The ODRC will collaborate with the Ohio Department of Mental Health and Addiction Services (OMHAS) under the Bureau of Correctional Recovery Services (BCRS). OMHAS provides all recovery services and programming related to substance abuse to ODRC prisons.

BCRS is a partnership between OMHAS and ODRC to treat ODRC inmates who are in need of substance abuse recovery programming. BCRS works to instill in its clients an improved sense of responsibility and the ability to become law-abiding citizens.

The treatment regimen includes screening and treatment recommendations for all reception inmates; various intensities and modalities of AOD programs at parent institutions; and continuing care that includes referrals to supportive and treatment-enhancing activities throughout the inmate's incarceration. As recovery inmates approach release, referrals to community providers that deliver recovery supports are offered via the OMHAS Community Transition Program.

Two subawards will be granted. NYU (Betagov/Litmus), the action-research partner, will participate in stakeholder convenings, conduct focus groups to assess user experiences, and

conduct and oversee a process and outcomes evaluation. Led by

BetaGov/Litmus is a team of faculty, researchers, and practitioners who work with criminal justice agencies in 26 states to implement and test process improvements. BetaGov/Litmus has expertise in research and in implementation and practice improvement. They also have staff who specialize in system coordination, case management and substance-abuse-treatment policy. The team has the expertise and experience necessary to carry out the tasks of the project in collaboration with ODRC and other project partners. BetaGov/Litmus will provide ongoing analysis, monitoring, and assessment of the treatment's impact, and will collaborate with project partners to prepare a final report that thoroughly assesses the results of the project. Representation in 26 states affords the team the potential to rapidly disseminate results throughout its practitioner network. This is important to the proposed project, as it allows the modules developed under this award to be disseminated rapidly, and at no cost, to other corrections systems. The team is represented on opioid task forces and is familiar with working in settings that convene corrections and health officials to work together towards a common goal. Senior members of the team have long histories of briefing large audiences of practitioners and policymakers, including legislators. The team has worked with state agencies and counties in Ohio since 2014. BetaGov/Litmus assists on research procedures, including data-infrastructure support and data visualization, and promotes development and testing of process improvements and supports practitioners' efforts in design, implementation, analysis, and dissemination of research to test innovations and existing practices. BetaGov/Litmus helps drive data-driven decisionmaking and is a strategic partner in helping agencies move toward a public health approach.

Nsena will provide VR software necessary to implement web-based VR behavioral interventions to treat substance abuse. Nsena will also partner with ODRC, OMHAS, and NYU to provide necessary additional software in response to learning that occurs during the project, especially VR treatment's measured progress toward defined outcomes. Nsena is an experienced provider of both 360-degree video as well as CGI VR content in criminal justice settings, including corrections and policing. Nsena will provide no fewer than 16 VR software modules in this project.

C. CAPABILITIES AND COMPETENCIES

Management structure.

of Programming Development and Evaluation. They will oversee the execution of the grant, including the effort to assemble stakeholders in the planning phase and ensuring interagency collaboration throughout the project period. All project partners are committed to working with BJA's designated TTA providers.

Project coordinator.

A full-time project coordinator (PC) will be identified at the outset of the project (either from within ODRC or as a newly created position) and will manage the day-to-day operations of the project during the planning and implementation phases. The PC will ensure fidelity of strategy implementation and will work with the action-research partner to track outcomes of the components being tested to improve outcomes. The PC will report to the grant program administrators and work closely with project leadership in the four pilot sites, our action-research

partner (NYU), Nsena, and the designated BJA TTA provider. In collaborating with the TTA provider, the PC will take the lead responsibility for coordinating the stakeholder group, liaising with collaborating partners, coordinating travel to BJA-required events, and facilitating access to the data necessary for this project. To be responsive to issues identified in the data, the PC will be ready to work with the BJA TTA provider and NYU to make midcourse adjustments if data suggest a promising direction for VR software. The PC will liaise with NYU and will be responsible for tracking and reporting the required performance measures.

Treatment coordinator.

A full-time treatment coordinator (TC) will be identified at the outset of the project (either from within ODRC or as a newly created position) and will manage the day-to-day administration of treatment across the pilot sites and additional service areas as necessary. The TC will work closely with project leadership in the four pilot sites, our action-research partner (NYU), Nsena, and the designated BJA TTA provider to coordinate the administration of treatment via VR software, collect data on outcomes, and identify promising VR approaches for treating OUD and other opioid-related issues.

Barriers.

Virtual reality is a new technology, especially in applications involving corrections populations. Staff will need to be trained in facilitating treatment using VR. While the method has great potential for improving the access of people, especially geographically isolated people, to behavioral treatments addressing opioid issues, unforeseen issues may arise over the project term. We expect that not all of the VR treatment modules will prove to be effective, but we

expect that some will and that we will be able to focus resources on improving and expanding on successful approaches in the later stages of the project.

Experience providing services in rural communities.

ODRC supervises persons after they have been released into the community, including in rural areas. Officers provide the people they supervise with programming, interventions, risk assessment and case-plan development in addition to referring them to existing community resources, when available.

D. COLLECTING AND REPORTING DATA.

The Project Coordinator (PC) will be responsible for coordinating the collection of data and submitting the required quarterly performance measure data to BJA using its online Performance Measurement Tool (PMT). The PC will also assist in the collection and transmission of fidelity measure data to NYU. Additional performance metrics will be developed by the stakeholder team in the initial action plan. Processes, responsible team members, and a collection protocol will be completed after NYU has assessed the existing data sources and project needs and the stakeholder team has reviewed and finalized the recommendations, in March 2019. Likely proposed outcomes include reduction in drug use and recidivism rates. Input from stakeholders will inform selection of additional outcomes in other domains such as stable housing, family functioning, employment, and physical and mental health. The PC and NYU will work with BJA's designated TTA provider(s) and a BJA evaluator who may conduct a site-specific or cross-site evaluation in future years

As part of their assessment, NYU will include an analysis of state and federal data privacy laws, to include HIPAA (Health Insurance Portability and Accountability Act). A subset of participants will be tracked in finer detail. Depending on what data elements are included in outcome measures, consent forms may be required, including a HIPAA Waiver of Authorization. Data used for research purposes will be deidentified or aggregated.

E. IMPACT, OUTCOMES, EVALUATION, & SUSTAINMENT

The focus will be on delivering VR-enhanced behavioral treatment to people with OUD, with the intended goal of comprehensive improvements across a range of behavioral outcomes. We expect that VR treatment services will expand our ability to administer high-quality treatment services to targeted populations, especially for persons who are in isolated areas with limited access to treatment services. We believe that this treatment will have a positive impact on project goals, including: (1) reduced opioid use, (2) reduced opioid overdoses, both fatal and non-fatal, (3) reduced use of emergency medical and safety services, (4) reduced criminal activity (by selfreport and administrative records/arrests), (5) reduced number of supervision violations, (6) reduced reincarceration, and (7) reduced rule violations in incarceration facilities. Additional impacts of the project include the potential for extension of VR treatment to other areas. Assisted by the action-research partner, NYU, ODRC will be closely involved in data analysis and evaluation research as part of this project, and the project coordinator (PC) and treatment coordinator (TC) will be responsible for ensuring that accurate data are collected. The VR equipment and software obtained for this project can be used long after the life of the project. If these treatment methods prove effective, our efforts are likely to be sustained beyond the project duration (three years) through both public sources of revenue and private donations. The

marginal ongoing costs of using the VR modules is extremely low. Early demonstrations of effectiveness will give us a basis to seek funding to expand the program through appropriations and additional grants.

NYU will post synopses of project processes on relevant websites, including those of the applicant team's institutions, so that other criminal justice agencies and treatment providers may learn from the experience of the ODRC-led team. The VR content developed in this project can also be made freely available to other criminal justice agencies and treatment providers.

Based on the planned consensus-oriented development of the OUD-treatment strategies, we are confident in its feasibility and sustainability, which will be examined in the process evaluation assisted by NYU. Having gained early support from stakeholders and continuing to involve them in the strategy planning and implementation, we expect continued long-term support for the strategy and future developments. Collaborative design yields an implementation that is likely to yield fewer implementation barriers, less resistance, less potential for turf battles, and better prospects for sustainability as the needs and preferences of stakeholder groups (including the state agencies, and program participants) are incorporated.

References:

- Binswanger IA, Stern MF, Deyo RA, et al. (2007). Release from prison—a high risk of death for former inmates. *New England Journal of Medicine*, **356**(2):157–165.
- Brinkley-Rubinstein L, Zaller N, Martino, S, et al. (2018). Criminal justice continuum for opioid users at risk of overdose. *Addictive Behaviors*, doi.org/10.1016/j.addbeh.2018.02.024.
- Governor's Cabinet Opiate Action Team (GCOAT). Retrieved from fightingopioidabuse.ohio.gov on June 5, 2018.
- Hedegaard H, Warner M, & Miniño AM. (2017) Drug overdose deaths in the United States, 1999–2016. NCHS Data Brief, no 294. Hyattsville, MD: National Center for Health Statistics.
- Hone-Blanchet A, Wensing T, & Fecteau S. (2014). The use of virtual reality in craving assessment and cue-exposure therapy in substance use disorders. *Frontiers in Human Neuroscience*, **8**:844.
- Kwon H, Choi J, Roh S, Yang B-H, & Lee JH. (2006). Application of virtual reality-cue exposure therapy for reducing alcohol craving. *Annual Review of CyberTherapy and Telemedicine*, **4**:161–166.
- Lee JH, Kwon H, Choi J, & Yang B-H (2007). Cue-exposure therapy to decrease alcohol craving in virtual environment. *Cyberpsychology & Behavior*, **10**:617–623.
- Merrall, LC, Kariminia A, Binswanger IA, et al. (2010). Meta-analysis of drug-related deaths soon after release from prison. *Addiction*, **105**(9):1545–1554.

- National Institute on Drug Abuse [NIDA]. (2018) Opioid summaries by state. Retrieved from drugabuse.gov/drugs-abuse/opioids/opioid-summaries-by-state/ohio-opioid-summary on May 29, 2018.
- Ohio Department of Health [ODH]. (2015). Ohio drug overdose data: General findings.

 Retrieved from odh.ohio.gov/-/media/ODH/ASSETS/Files/health/injury-prevention/2015-Overdose-Data/2015-Ohio-Drug-Overdose-Data-Report-FINAL.pdf on June 8, 2018.
- Ohio Department of Health [ODH]. (2016). Ohio drug Overdose Data: General findings.

 Retrieved from odh.ohio.gov/-/media/ODH/ASSETS/Files/health/injury-prevention/2016-Ohio-Drug-Overdose-Report-FINAL.pdf on June 5, 2018.
- Patient-Centered Outcomes Research Institute [PCORI]. (2014). Engagement rubric for applicants. Retrieved from pcori.org/sites/default/files/Engagement-Rubric.pdf on June 8, 2018.
- Vivolo-Kantor AM, Seth P, Gladden RM, et al. (2018) Vital signs: Trends in emergency department visits for suspected opioid overdoses—United States, July 2016–September 2017. Morbidity and Mortality Weekly Report, 67:279–285.