The Recovery Ready Community Index: A Public Health Assessment Tool

November, 2020

By Shawn Dorius, Cassandra Dorius, Elizabeth Talbert, Kelsey Van Selous, Ilma Jahic, Masoud Nosrati, and Matt Voss

Public Science Collaborative
Science consulting for the public good

This publication was made possible by funding from the Iowa Department of Public Health Substance Use Bureau, Centers for Disease Control, and Substance Use and Mental Health Services Administration. Dorius, S., Dorius, C., & Talbert, E. *Advancing Substance Use Recovery in Iowa*. 1/10/2020-9/29/2020. (Subaward $260,000). Its contents are solely the responsibility of the authors and do not necessarily represent the official views of the funding agencies or sponsors.

Acknowledgements

We gratefully acknowledge the help and support of our state collaborators, Monica Wilke-Brown and Kevin Gabbert (Iowa Department of Public Health Bureau of Substance Abuse), who were instrumental in the design and implementation of this project. We also appreciate and acknowledge the support of the following individuals, without whom the project would not have been as successful:

Linkage to Care Advisory Board: Todd Lange, Steve Arndt, Susie Sher, Kathy Tryen, Tammy Noble, Mindi Tennapel, Jennifer Husmann, Sarah Fineran, Katrina Carter, Julie Baker, Jennifer Nu, Jay Blakley, John Hallman, Daniel L Lewis, Christopher Vitek, Gagandeep Kaur Lamba, Monica Wilke-Brown, Sarah Vannice, Toby Yak, Jen Pearson, Catherine Lillehoj, Elizabeth Mcchesney, Patrick C McGovern, Liz Sweet, Moran Cein

Data Science for the Public Good Student & Faculty Support: Shawn Dorius, Cassandra Dorius, Heike Hofmann, Atefeh Rajabalizadeh, Kishor Sridhar, Jessie Bustin, Matthew Voss, Joel Von Behren, Andrew Maloney, Grant Durbahn, Vikram Magal, Kelsey Van Selous, & Masoud Nosrati

PROTECTING AND IMPROVING THE HEALTH OF IOWANS

IDPH IOWA Department of PUBLIC HEALTH

IOWA STATE UNIVERSITY

Key Terms

Acute care model approaches substance use as a pathological, acute illness. It is characterized by crisis interventions, clinical assessments, admission to treatments geared toward stabilization, with a focus on symptom suppression, short-term service-oriented relationships. Acute care typically ends at discharge from treatment (termination of the service relationship) with the expectation of permanent resolution of alcohol or other substance problems.

Comprehensive continuum of care model is holistic approach to recovery that views long-term recovery as an often-circular process characterized by sequences of relapse, treatment, incarceration, and short-term remission. This cyclic life trajectory is especially prevalent among vulnerable populations (e.g. fewer resources).

Opioid use disorder pathological cycles of destructive opioid use characterized by loss of control of opioid use, risky opioid use, impaired social functioning, tolerance, and withdrawal symptoms from opioids.

Recovery Capital framework rests on the assumption that the recovery from substance use is more than the absence of substance use in an otherwise unchanged life. This framework proposes that sustained recovery and prevention of relapse can be fortified by mobilizing social, personal, environmental and cultural resources. The goal is physical, mental and social wellbeing, enhanced quality of life, and meaningful life goals. Social position and the socio-economic context of substance use effect the acquisition and accumulation of recovery resources (capital).

Recovery Community Centers are community-oriented, local organizations developed around the concept of social capital incubators. The center links members of the recovery community to different support services and recovery resources near them. Peer mentors facilitate the accrual of recovery capital by linking members to, for example, recovery coaching, medication assisted treatment, employment or education linkages. Located in the heart of the community, Recovery Community Centers often support mobilization efforts, peer support meetings, service and community outreach activities, and destigmatize campaigns.

Recovery Oriented Systems of Care is a strength-based framework that builds on strengths and resilience of individuals, families, and communities to promote sustainable wellbeing, good health, and recovery from substance use problems. Recovery Oriented Systems of Care (ROSC) support continuity of service and care by linking formal systems of care to existing community resources and informal systems of care. ROSC emphasize sustained recovery management, a coordinated multi-system approach, with flexibility to meet diverse and unique needs of individuals in, or seeking, recovery. ROSC assumes recovery is a process along a continuum that requires the ongoing monitoring of individuals in or seeking recovery, involvement of peers and allies for support, individualized and comprehensive services, continuity of care that is aligned with personal belief systems, and commitment to peer-delivered recovery support services.

Recovery Ready Community Index is a tool that assesses community recovery readiness by measuring the breadth and depth of existing community recovery resources. Resources include formal and informal resources and clinical and non-clinical systems of care service providers, such as hospitals, treatment centers, mutual aid and support groups, recovery coaches, churches, and parks. Assessment of assets and

the channeling of existing assets to support individuals in, or seeking, recovery can substantially enhance communities' efforts to effectively respond to substance use.

Recovery Ready Ecological Model helps assess and identify elements found to be supportive of recovery as well as elements that might act as barriers to successful recovery. This model proposes that communities and professional sectors collaborate to provide a holistic infrastructure promotes sustained recovery.

Substance Use Disorder is here defined as any use of alcohol or drugs that is compulsive and/or dangerous. It is characterized by impaired social or physical control, risky use, sustained and heavy substance use despite experiencing the harmful consequences of heavy use, and pharmacological criteria. Other symptoms include escalating use due to chemical tolerance and cravings to use drugs despite negative consequences.

Sustained Recovery is dynamic, intentional process of self-directed change through which individuals utilize internal and external resources to voluntarily resolve these problems, heal the wounds inflicted by alcohol or other substance-related problems, actively manage their vulnerability to such problems, strive to develop and maintain a healthy, productive, and meaningful life.

Table of Contents

Recovery Ready Communities

Recovery Community Centers (RCCs) represent low-cost, member driven, voluntarist, locally managed, and community-engaged pathways to sustainable recovery for people with **substance use disorder**, or SUD. RCCs accomplish these goals by linking people to existing resources and infrastructure and promoting a vibrant recovery culture based in a physical community center where people in recovery can visit, engage with others in recovery, and access resources. This approach is validated by academic studies and is promoted by both the SUD community and public health officials. However, finding the right communities for RCC development in Iowa has proven difficult, underscoring the fact that Iowa is one of just a few states in the U.S. that has yet to adopt the recovery community model[1].

Which Iowa communities are recovery ready and are best positioned to support a Recovery Community Center? To answer this question, we reviewed scientific literature on substance use recovery and engaged key stakeholders who work directly with the SUD population in Iowa to understand which kinds of community resources champion SUD recovery. Based on what we learned, we identified 17 unique community-based resources and collected nearly 16,000 data points across almost all of Iowa's 944 cities and towns. We then analyzed and mapped these resources for the purpose of identifying high value, 'Recovery Ready' communities. These efforts culminated in the development of a first-of-its-kind index: **The Recovery Ready Community Index (RRCI)**. The index is derived from community-based scores on four resource dimensions essential to recovery: breadth, depth, size, and strength.

Table 1. Recovery Ready Communities

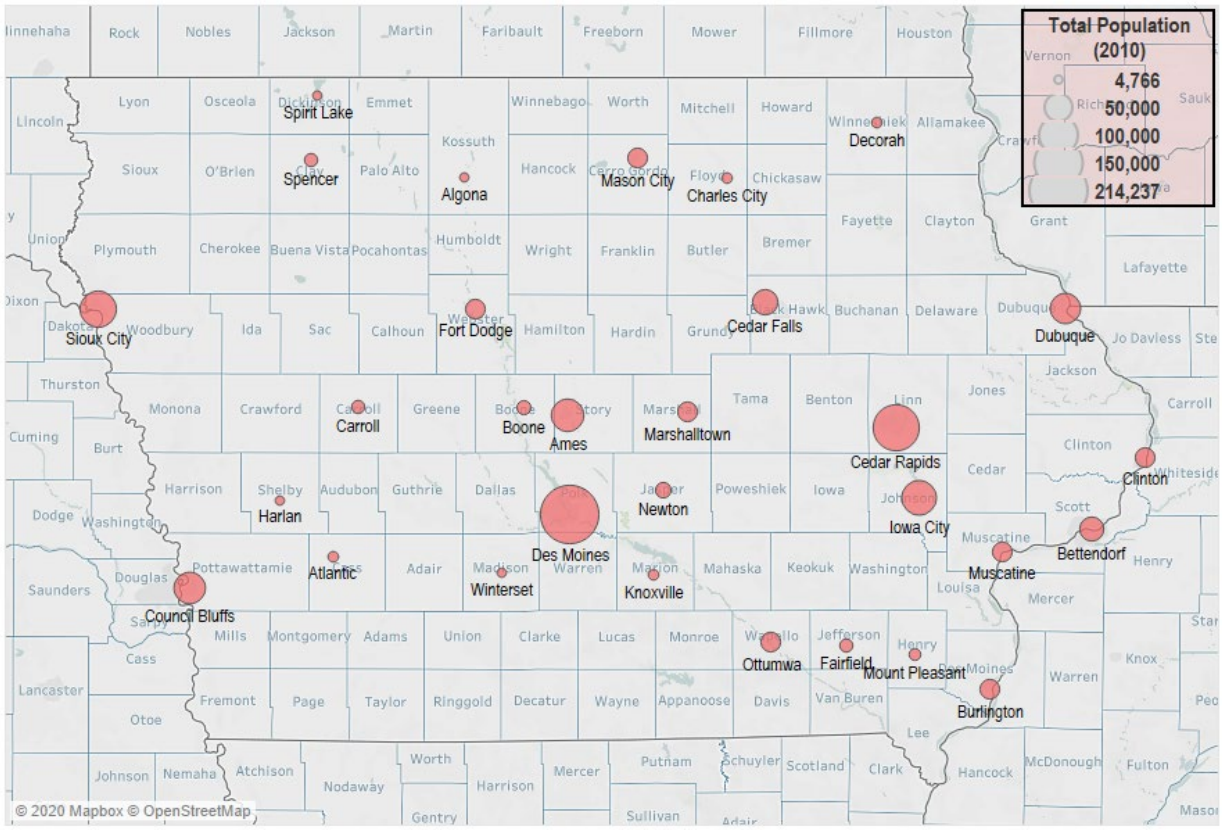
First Tier	*Second Tier*	*Third Tier*
Sioux City	Atlantic	Burlington
Mason City	Carroll	Knoxville
Fort Dodge	Decorah	Charles City
Dubuque	Clinton	Winterset
Ames	Muscatine	Spirit Lake
Iowa City	Fairfield	Newton
Ottumwa	Bettendorf	Algona
Council Bluffs	Harlan	Cedar Falls
Marshalltown	Boone	Des Moines
Cedar Rapids	Spencer	Mount Pleasant

NOTES: These cities scored high on many of the four dimensions of the RRCI and should be well positioned for RCC development efforts.

The thirty Recovery Ready Communities identified in Table 1 are located in every region of the state and include a diversity of cities from major metropolitan areas, micropolitan areas, and communities of less than 10,000 residents. We categorized the top 30 recovery ready communities into three tiers of readiness based on the breadth and depth of local recovery infrastructure and the size and strength of the local substance use recovery culture. Each town had at least nine of the 17 types of recovery infrastructure assessed, which can be leveraged to enhance the chances of sustainable recovery. We propose future work to support the development of Recovery Community Centers in Iowa might use this list as a starting place for conducting detailed community profiling and targeted community outreach. We believe each of these communities can benefit from, and also be a benefit to, a Recovery Community Center and its members. Figure 1 provides a spatial overview of the top 30 Recovery Ready Communities in Iowa based on this index. The circle sizes are scaled to the size of the population in each community.

[1] Iowa did see the opening of two *collegiate* recovery centers in 2018, but does not have a formal RCO/RCC network.

Figure 1. Recovery Ready Communities



NOTES: Circles identify the top 30 recovery ready communities in Iowa. The size of circles are scaled to the size of the total population of each city.

What is Recovery?

Though substance use recovery is an evolving concept that has been defined in a number of ways over the years, an emerging consensus is that recovery is a voluntary path toward improved personal wellbeing coupled with a diminished risk of substance use relapse (see Appendix Table C1 for list of recovery definitions). As noted by Bill White (2007):

> Recovery is the experience through which individuals, families, and communities impacted by severe **alcohol and other drug** (AOD) problems utilize internal and external resources to voluntarily resolve these problems, heal the wounds inflicted by AOD related problems, actively manage their continued vulnerability to such problems, and develop a healthy, productive, and meaningful life.

In White's view, resources help individuals, families, and communities in two ways. First, they help solve alcohol and other drug-related problems (for example, addiction, unemployment, housing instability, family separation) and second, they support health, productivity, and meaning in post treatment life. The appeal of this view is that it is explicit and direct in its recognition that recovery involves not only internal

resources such as mental, emotional, and genetic factors, but also external ones. In thinking about where to focus federal and state resources to develop a network of community-based recovery centers in Iowa, a key question is, "*What kinds of external resources matter most for sustained SUD recovery*?"

> *"Recovery is the experience through which individuals, families, and communities impacted by severe alcohol and other drug (AOD) problems utilize internal and external resources to voluntarily resolve these problems, heal the wounds inflicted by AOD related problems, actively manage their continued vulnerability to such problems, and develop a healthy, productive, and meaningful life."*
>
> *William L. White, 2007*

If we knew which resources were most helpful to long-run recovery, we could target towns and cities with large stocks of 'recovery resources' to grow Recovery Community Centers. To answer this question, we reviewed the scientific literature on substance use recovery, giving special attention to theories of SUD recovery and frameworks that involved external resources. We also reviewed focus group data collected by Iowa's HIPWUD Board to understand how Iowan's who use drugs define recovery (HIPWUD, 2020). More broadly, we looked for models of recovery that included the community in which recovery happens and the wider ecological factors, such as access to nature and connection to faith communities, that constitute external recovery resources.

The road to long-term recovery is challenging and oftentimes characterized by sequences of relapse, treatment, incarceration, and short-term abstinence, each which can be more extreme and harmful for people with few resources (Laudet and White, 2008; Kelly et al., 2020). The scientific literature indicates that the majority of treatment services rely on an **acute care model** of interventions, which results in a "revolving door effect" characterized by multiple acute care episodes (Grove-Paul et al., 20, p.6). Conversely, the **disease management paradigm** is viewed as more a holistic approach to recovery that not only addresses problem substance use behaviors, but also the myriad of other needs of an individual in recovery. Common needs of people with SUD include vocational training, employment services, housing assistance, pro-social support and connections to the local community, building (or rebuilding) family and friendship networks, and perhaps most importantly, a sense of purpose and meaning in life that agrees with the values, beliefs and motivations of pro-recovery behaviors of people who use drugs. In our review of the recovery literature, we identified the **Recovery Oriented Systems of Care** (ROSC) theoretical approach as an especially promising framework to guide recovery efforts in Iowa, owing to its holistic visioning of SUD recovery options and its flexibility in supporting a variety of demographic, cultural, and socioeconomic subgroups who constitute the recovery communities of Iowa.

ROSC shifts the recovery process in the direction of a collaboration between public health workers, clinical care providers, the local community, and the recovery population by linking them within a system of care and support. The innovation of the ROSC model is its recognition that service delivery should incorporate clinical treatment into a long-term recovery capital framework to address the proximate problem of

substance use addiction *and* the myriad of other needs of an individual in recovery. Recovery capital refer to substance use recovery that is self-motivated, durable, and calibrated to the resources in the community and available to a person in recovery. Growing an individual's recovery capital is viewed as critical for **sustained recovery**. ROSC encourages an individualized and self-directed approach to recovery that builds on the strengths and resilience of individuals, families, and communities to chart a course toward sustainable recovery from substance use related problems. ROSC empowers individuals by providing them with the information, tools, resources, life-skills, and supports they need for long-term recovery (McKay, 2016).

Table 2. How People in Iowa Who Use Drugs Define Recovery

What does "Recovery" mean to you?
Finding a new purpose - finding purpose in something other than just yourself - getting active in your community and getting involved in things outside yourself
getting your head right - getting your life right
When you're not using drugs, your mind becomes clearer
Being able to function on a daily basis without having to get high
Acceptance
Recovery is making the decision to live your life without drugs.
Staying clean
A lifetime
A long-term decision
Recovery is - if you fuck up and use once, you're not still in recovery. So if people use or have a slip, they feel like my whole recovery is gone. Your recovery is still there, you just had a slip.
People need to know that slips are okay. It's part of the process.
Getting rid of the drug doesn't clear up the other problems in your life.
Changing your lifestyle. When you get your life back.
I see recovery as more about changes of life rather than just changing your relationship to drugs.
I've maintained a meth addiction without using heroin and currently I smoke weed, but I don't consider myself in active addiction. I still have to pay attention to doing with myself so I'm not a piece of shit person.

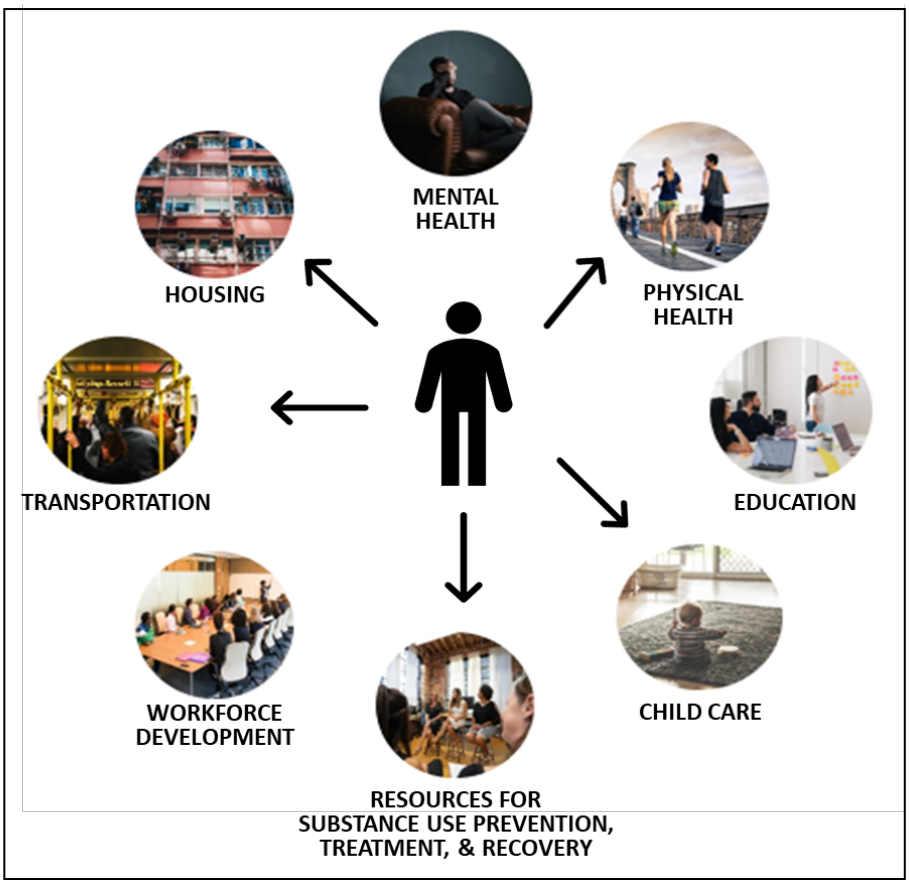
NOTES: This information was collected from focus groups conducted in 2019. The study design was guided by Health Initiatives for People Who Use Drugs (HIPWUD) advisory body, a cluster of working groups focused on improving the health and well-being of people who use drugs.

The ROSC framework leverages the notion of 'recovery ready', with the assumption that communities should utilize evidence-based prevention strategies to engage in early intervention and education of individuals and communities about the dangers of substance use. This framework encourages communities to provide opportunities for individuals in, or seeking, recovery to find housing, education, and employment, as well as access to the kinds of supportive environments that facilitate long-term recovery and a higher state of individual wellbeing (Ashford et al., 2019). Two related theories, the **Recovery Ready Ecological Model** (Ashford et al. 2019; Haberle et al. 2014; Matto 2004; Best et al. 2016), and the **Recovery Capital framework** (Cloud and Granfield 2008; Cano et al. 2017; Laudet and White 2008; Groshkova et al. 2012; Sánchez et al. 2019), point to the same general approach to sustainable, community-based recovery. Namely, leverage both the formal and informal systems of care that exist within a community to systematically reintegrate people in recovery into social and civic life (e.g. employment, family, church, volunteerism, active living). It is informal resources that represent the bridge from short-term, resource intensive clinical care to sustainable, long-run recovery.

ROSC also suggests that a **comprehensive continuum of care model,** rather than just an acute model of care, should be deployed if we want to increase the opportunity for successful recovery and decrease the economic and health burden to families and the state. Because most individuals will engage in the process of recovery within the communities where they live, the long-term support for individuals in recovery might be most beneficial when presented within the local community. In this way, the ROSC model satisfies the requirement for providing the long-term support to those in recovery by leveraging the community resources and systems of care *that already exist* within the community (Ashford et al., 2019).

Drawing on an analogy that aligns with Iowa's history of agriculture, communities are the soil in which substance use and related health and social problems grow or fail to grow, and in which the mitigation of substance use problems thrive or fail. Understanding which communities have the right soil composition to facilitate organic (readily available and not contingent on resources external to the community) and sustainable growth is critical to statewide SUD recovery efforts.

Figure 2. Recovery Oriented Systems of Care Framework



Identifying Recovery Resources in Iowa

Based on our review of the literature, we identified a number of clinical and non-clinical community-based resources that have been shown to positively impact SUD recovery. There is wide agreement, for example, that being close to a hospital or health clinic is good for SUD recovery. In particular, medication assisted treatment (e.g. suboxone, methadone) is perhaps the most critical clinical support necessary to prevent relapse among those with **opioid use disorder** (OUD). Ready access to treatment services, including both inpatient and outpatient services, regular participation in a peer support group such as Alcoholics Anonymous, Narcotics Anonymous, or Self-Management and Recovery Training also enhances recovery prospects. An emerging consensus among recovery science scholars is that recovery coaches and peer mentors, especially those with lived SUD experience, offer people in recovery invaluable emotional, social, and cultural support that lengthens recovery duration and empowers individuals to build the resilience needed to sustain their recovery. More broadly, the literature suggests that generalized, formal care

Table 3. Recovery-oriented System of Care Resources

Resources	*Number of Community Resources*
Hospital	123
Rural Health Clinic	146
VA Hospital or Clinic	19
Mental & Behavioral Health Center	210
SUD or Gambling Treatment Center	100
MAT Site	107
Sober Living Housing	45
Drug Drop-off Site	312
Mutual Aid Meeting	2,536
Peer Support Provider	138
SUD Recovery Coach	35
Childcare Provider	4,291
College or University	57
Workforce Development Office	27
Church	5520
Library	572
Public Park	1,486
Total Number of Resources	**15,724**

NOTES: These are important features of a community-based, recovery-oriented system of care.

provided by doctors, clinicians, and other certified health professionals is invaluable to SUD recovery. Equally important are the formal and informal systems of care that are specific to people with particular substance use histories, and the many other behavioral health risks arising from harmful chemical use.

Our review of the literature, especially the emerging consensus around the Recovery Capital framework and Recovery Ready Ecological Model, suggest that non-clinical community resources are also important. For example, workforce development and continuous training for service providers plays a critical role in helping those with a substance use disorder get back on their feet and move toward financial independence. Churches offer a ready-made community that, under the right conditions, provide people who use drugs a welcoming and supportive environment for recovery. Importantly, churches and other voluntarist, service-oriented non-profits offer those in recovery a sense of purpose and meaningful life that is absent from much of the clinical care toolkit, and yet essential to sustainable recovery. Communities that offer their residents easy and plentiful access to nature (e.g. parks, walkable communities) and affordable access to cultural content such as books, movies, lectures (e.g. libraries), and community activities such as farmers markets, festivals, and parades provide people in recovery with multiple pathways to rejoin the community as active and welcomed members. Notably, each of these resources is either very low cost or free, making them especially appealing resources because of their ability to be accessed by all members of the community. Communities that offer many of these kinds of resources to their residents are well equipped to build the positive, recovery-oriented culture critical to Recover Community Center success.

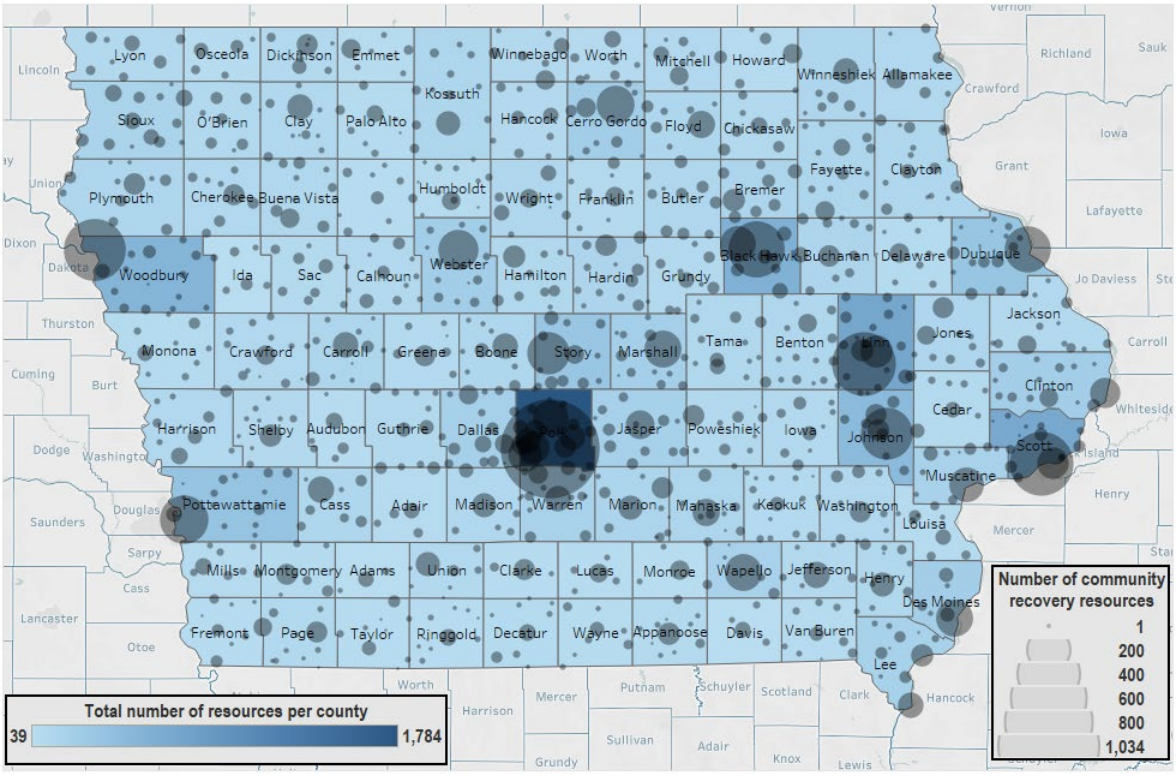
We organized two data discovery workshops with substance use experts in Iowa, including a workshop with recovery programming leaders at the Bureau of Substance Abuse, and another with members of the Linkage to Care Advisory Board, a diverse group of Iowans' with expertise and interest in minimizing the harms of SUD on Iowa's families and communities. These workshops allowed our team to discuss SUD recovery, present the ROSC model, and solicit feedback concerning the kinds of community infrastructure that should be considered when thinking about where to locate Recovery Community Centers in Iowa.

We also interviewed directors of Recovery Community Centers throughout the country to learn how best to establish RCCs in Iowa (Dorius, Dorius, Talbert, Van Selous, Jahic, Bahe, & Young, 2020). Throughout these interviews, we watched for stories and suggestions that would preference some types of resources over others and for particular places that might be particularly well suited for RCC development.

Drawing on feedback received from workshop participants, national leaders, the academic literature, and our own expertise and insights, our research team developed a list of 17 community resources that are widely understood to support and enhance SUD recovery (see Table 2). We then located, acquired, and cleaned this extensive list of community-based recovery resources in Iowa. See Appendix for data collection details. Our team's efforts produced the names, addresses, and geolocation information for nearly 16,000 recovery resources throughout the state. We mapped these resources in several different ways. In the first step, we summed all of the recovery resources in each city and county in Iowa (e.g. all hospitals, plus all treatment centers, plus all colleges in each place), which we visualized in the data visualization program Tableau (version 2020.2.1). Figure 3 identifies counties and cities with especially large numbers of total recovery resources. Each county is shaded by their overall number of resources (the darker the shade the more resources), and circles represent the population size of communities within counties (the bigger the circle the more people). According to our data, Polk County has at least 1,784 existing recovery resources, with Des Moines laying claim to 1,034 of these resources. Woodbury County has at least 564 recovery resources, of which 405, or roughly 4 out of every 5 resources, is located in Sioux City. Audubon County has at least 59 total resources and Adams County has at least 39 total resources. This first step of analysis helped identify potential locations for Recovery Community Center engagement efforts, but lacked a more nuanced approach to evaluating communities based on the type and quality of their total resources.

Figure 3. Total number of recovery resources, by county and city

Hover of cities (gray marks) to see how many recovery resources are present in the community.



NOTES: Darker shaded counties have morerecovery resources than lightly colored counties. Greay marks show the locations of cities containing at least one recovery resources. Places with a large number of recovery resources have a more robust and resilient recovery system of care.

Designing an Equitable Recovery Ready Community Index

We then classified the recovery resources into four sub-indexes (breadth, depth, size, and strength) that make up the basis for our multi-dimensional Recovery Ready Community Index (RRCI).

Breadth of Recovery Resources. Breadth of recovery resources was measured by counting the number of different types of recovery resources in each county and community. With 17 categories of recovery resources, this index ranged from 0-17. A town with a score of zero indicates that we were unable to locate any of the resources and infrastructure listed in Table 3 (e.g. no hospitals nor parks nor treatment centers). Cities with a score of 17 have one or more of each of the recovery resource categories for which we had data. Six cities, including Sioux City, Mason City, Fort Dodge, Dubuque, Iowa City, and Des Moines, had at least one instance of each of the 17 recovery resources we measured.

The importance of measuring resource breadth was documented in the scientific literature and was a consistent theme in conversations with experts, who noted that providing multiple pathways to recovery is critical to successful, sustainable recovery. The reason for this is because the recovery process is a personal journey, inextricably interwoven with a person's own, distinctive biography. Places with a wealth of recovery support resources are better able to meet the diverse and unique needs of their recovery population. Put differently, RCCs in resource rich communities can better serve their members by providing access to a wider variety of resources. This ensures that each RCC member has the particular resources they need, when they need them, as they progress through their personal recovery journey (See Figure 4, panel a).

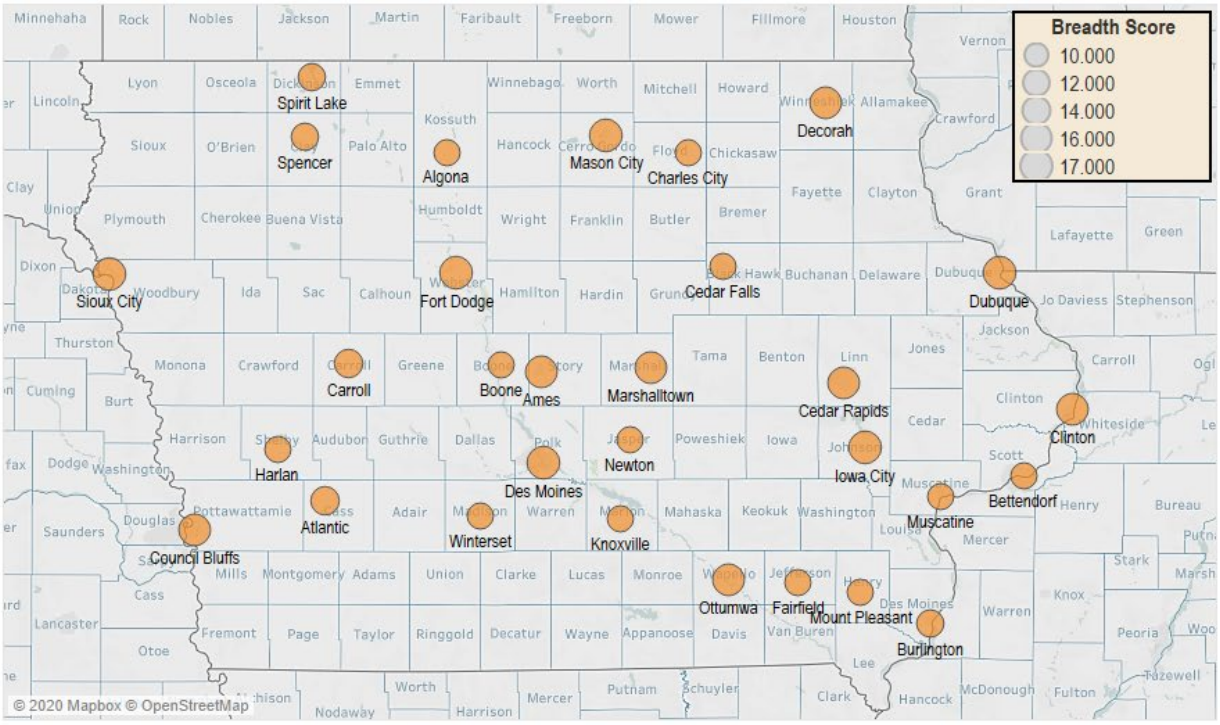
Depth of Recovery Resources. Depth of recovery resources was measured by first counting the total number of resources in each category and then ranking cities accordingly. This produced 17 rankings—one for each resource—ranging from 1 (the top ranked city for that particular resource) to *n* (the lowest ranked city for that particular resource, which conceptually can be as high as the number of cities in Iowa, but in practice is usually lower because of ties and missing data). We then averaged the 17 individual rankings to create an overall ranking for each city or county. Cities and counties with a large number of resources in each category received a low average ranking (e.g., if you were a top-ten ranked city on each of the indicators, your average score would be 10 or less). Cities with fewer resources, especially those who faced resource scarcity over multiple categories, received a higher average ranking (e.g., if a community was ranked 50th or higher on every category, their average score would be at least 50). Des Moines had the most favorable ranking on this index with a score of 6, meaning that Des Moines' average ranking across all 17 resources was six, followed by Ames (16) and Dubuque (29).

The goal of the measure was to identify communities with diverse stocks of each resource to help facilitate long-run, sustainable recovery. When individuals need medical support, for example, communities with a larger number of clinics and hospitals may be able to provide more rapid, customizable, and culturally-appropriate care. When communities have a variety of options for each resource category, people can engage resources that make sense for their personal recovery journey, such as those that match their transportation options (e.g., one is easier to reach by bus or by foot), those are conducive to work or childcare schedules (e.g., open early, late, or on weekends), and those that align better with their personal needs and wants (e.g., faith-based versus secular; peer support for alcohol versus opioids, et cetera).

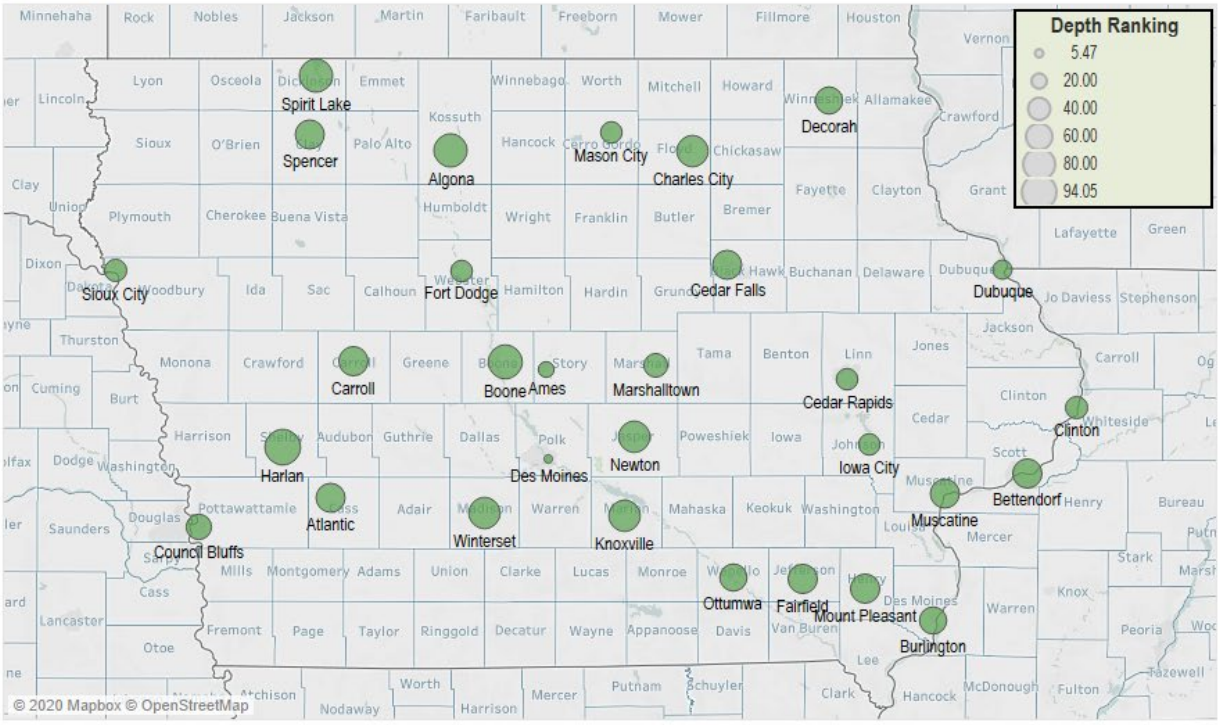
Size of Recovery Culture. Size of local recovery culture was estimated as the total number of weekly substance use disorder recovery meetings per week in each city/county. Places with many weekly meetings were inferred to be places with a large recovery culture. According to our data, Des Moines

Figure 4. Stocks of Recovery Resources

(a) Breadth of Recovery Resources



(b) Depth of Recovery Resources



In Support of Health Equity

A unique contribution of this grant effort was the creation of the first known national registry of Recovery Community Centers (RCC) and Recovery Community Organizations (RCO). We spatially mapped the national registry data and visualized the locations of every RCC in the United States to better understand where RCCs were founded overall and whether this pattern differed in states with similar demographic or regional characteristics as Iowa. A significant geographic pattern emerged: *virtually all successful RCCs were founded in very large cities, and only a limited number of instances could be identified where RCCs were founded in smaller towns*. Because the majority of Iowa towns are small and midsized (U.S. Census Bureau, City Estimates Program, 2019), and nothing in our review of the literature or conversations with local and national experts suggested small towns would not also be good hosts for RCCs, we strove to create a recovery ready community measure that did not unduly preference large cities over smaller ones. The IDPH principle of **health equity** is a driving force behind efforts to limit place-based bias from community decision criteria whenever possible**.** With health equity in mind, we population-weighted the strength scores to reflect the average number of recovery meetings per person, per community, so they are comparable across towns and cities of all sizes, thus reducing the likelihood that we will undercount the value of small towns as potential hosts for Recovery Community Centers.

***Equity in Action**: Prior to adjustment, only 7 of the 30 communities identified as 'Recovery Ready' had populations of less than 15,000. After adjustment, 13 of the 30 communities selected were small towns.*

hosts about 213 weekly meetings, followed by Sioux City with 140 weekly meetings, and Cedar Rapids with 109 weekly meetings, ranking these towns in the top three, respectively, for size of recovery culture.

One of the most valuable things we learned from our interviews with recovery community leaders in other states was the importance of the local recovery culture. Places where people with SUD were welcomed to participate in civic life, where SUD stigma was challenged, and where the recovery population had a habit of coming together to share their experiences, support each other, and collaborate on finding resources to rebuild lives often badly damaged by SUD, were described as being well-positioned for Recovery Community Centers. To identify which types of peer support meetings we should assess, we relied on our literature review of support meetings types, scoured recovery-oriented message boards and online discussion forums that discussed relevant terms and websites, and conducted an extensive internet search to identify a wide range of SUD oriented peer support groups in Iowa. We then used web scraping techniques to pull information from all identified support group meeting websites and create a dataset of key features including times, dates, and locations of every mutual aid and peer support meeting in Iowa.

Data Limitation: Assessing the size of recovery culture produces two important limitations. First, our assessment of culture does not tell us anything specific about the size of the recovery population accessing the resources. For example, public records provide details on the number of meetings available but they do not indicate the size of the meeting groups. It is possible that some places have many of meetings, but

only a small number of participants. Thus, we cannot directly infer size of recovery population but we can draw inferences about the intensity (engagement) of the recovery community. Second, when we measure of size of local recovery culture this way, it advantages larger towns and cities because places with a larger number of residents should, all else equal, have a larger number of weekly peer support meetings and places with fewer residents should have, by the same logic, a smaller number of weekly meetings. This measure does not identify the relative strength of these resources, such as communities that have more meetings than expected, given the size of town. We address this limitation with the measure of strength.

Strength (Vibrancy) of Recovery Culture. The strength of the recovery community is measured as the difference between the observed number of weekly meetings and the number of meetings expected, based upon the total population of each town. This number was expressed as a percentage difference between observed and predicted number of weekly peer support meetings. According to this measure, the town of Harlan has 515 percent more weekly meetings than expected. Sioux City had 175 percent more weekly meetings than expected, and Des Moines had 6 percent *fewer* weekly meetings than expected, given the size of its population. By combining our measures of size and strength of local recovery culture, we are able to treat small and large towns with greater equity, keeping with IDPH's mission to deliver health services equitably to the people and communities of Iowa.

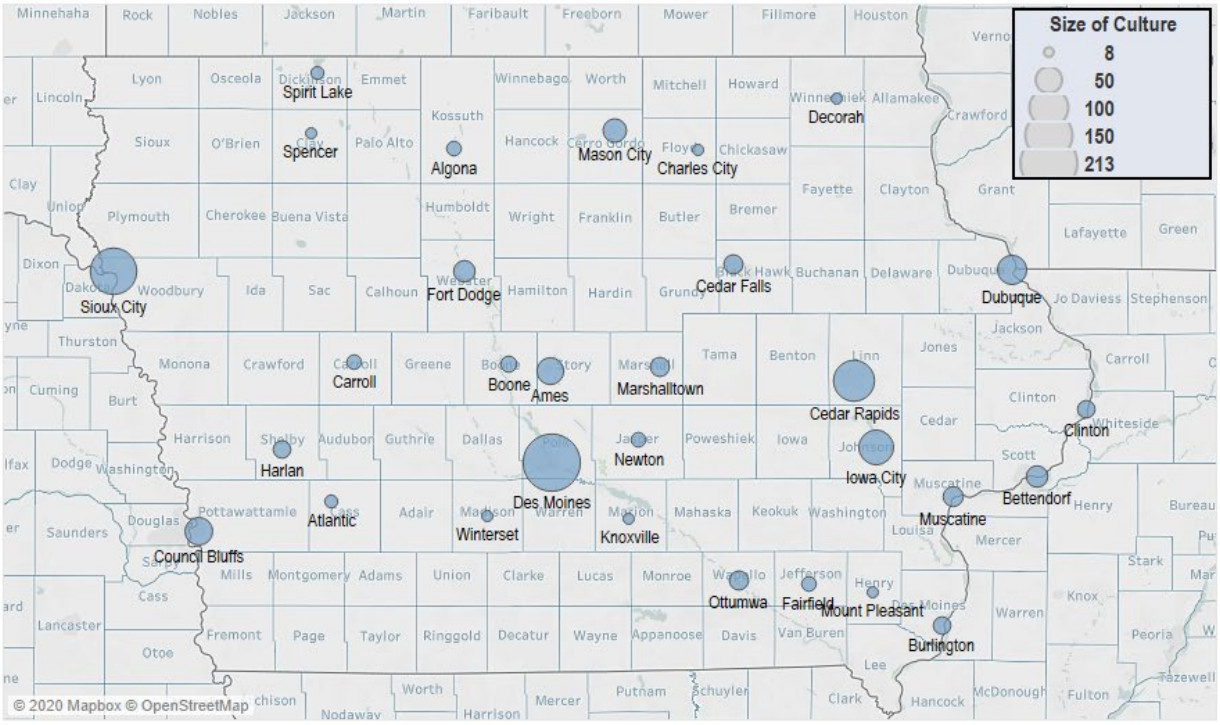
Recovery Ready Community Index. Once we had constructed each of the four, recovery ready sub-indexes, we created a summary measure, which we refer to as the Recovery Ready Community Index, or RRCI. This index is the simple average of each town's ranking across the four sub-indexes, including breadth and depth of local recovery resources and size and strength of local recovery culture.[2] A town that scored highly on all four indexes received a high RRCI score, while a place that scored low on many or all four indexes received a low RRCI score. We report results of this work in Table 3, which lists the top 30 'recovery-ready' communities in Iowa and details their scores on each of the sub-indexes, their RRCI score, and their total population size. Sioux City, Mason City, Fort Dodge, Dubuque, and Ames fill out the top five recovery ready communities in Iowa, according to our measure. We also created maps of each of the four subcomponents of the RRCI to allow for visualization of how each of the 30 target communities differ in the breadth and depth of their recovery resources\infrastructure and also in the size and strength score on the index. Algona, for example, is a ranked 27th on the RRCI, but because it only has 9 of 17 possible recovery resources, it received a lower breadth of recovery score (and a smaller circle on Figure 5 panel a). Algona has a large number of weekly peer support meetings, relative to its population size, which is why the circle for Algona is quite large in Figure 5 panel b.

A strength of this index is that it captures a number of important and theoretically sound dimensions of substance use recovery in a relatively direct way with a single number and it does so in a way that does not disadvantage small towns. In fact, by our measure, 13 of the top 30 recovery ready communities in Iowa have populations of less than 15,000 residents. Based on our analysis, we suggest that IDPH could target any or all of these towns for RCC engagement. More broadly, we believe that the recovery population living in these places represent a valuable, and perhaps untapped resource in the community. By organizing the SUD recovery populations in these town around an RCC, host communities would have a simply way to coordinate and collaborate with the recovery population on substance use prevention, treatment, and recovery initiative

[2] Some indexes were reverse coded so all highly ranked communities were scored favorable on each sub-index.

Figure 5. Recovery Culture

(a) Size of Recovery Culture



(b) Strength of Recovery Culture

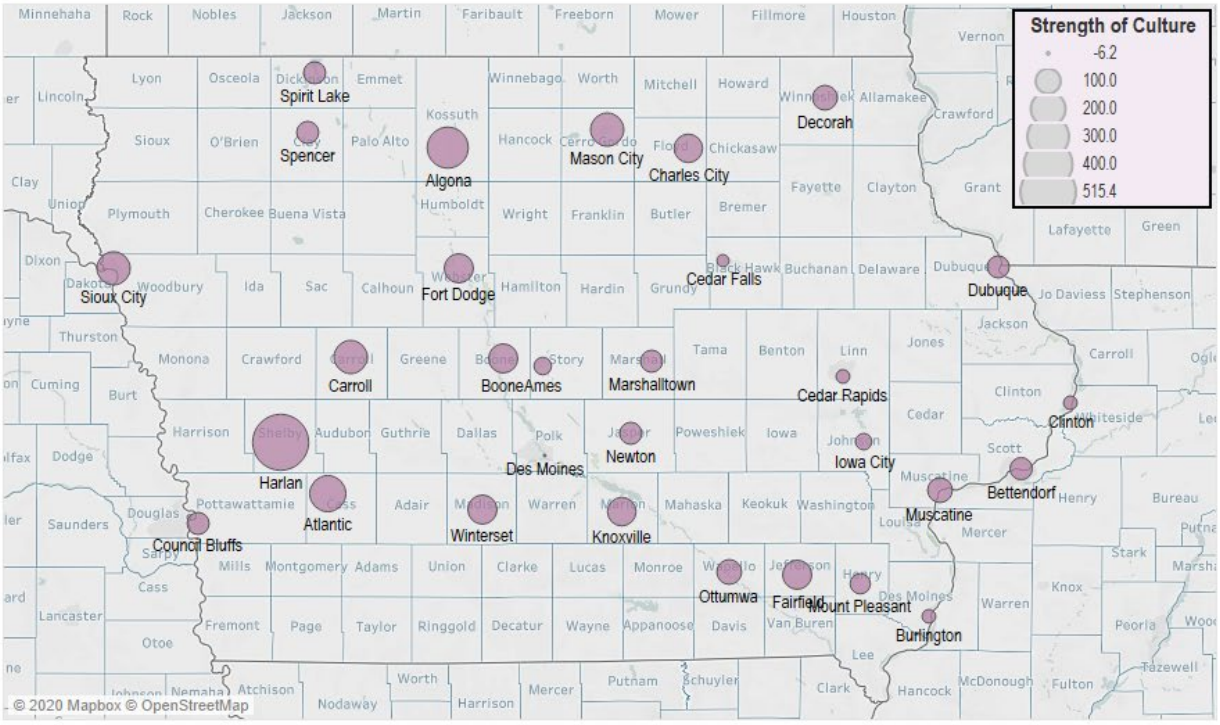


Table 4. Ranking Communities on the Recovery Ready Community Index (RRCI)

		Recovery Infrastructure		Mutual Aid and Support Culture			
Target	*City*	*Breadth Score*	*Depth Ranking*	*Size of Culture Score*	*Strength (Vibrancy) of Culture Score*	*Recovery Ready Community Score*	*Total Population (2010)*
		Number of different resources	*Average ranking across 17 resource categories*	*Number of weekly meetings*	*Percentage diff of observed over predicted # of meetings*	*Ranges from 1-1000*	
Primary	Sioux City	17	37	140	175	11.8	82,651
	Mason City	17	34	36	167	13.5	26,931
	Fort Dodge	17	32	30	142	14.7	23,888
	Dubuque	17	28	56	68	17.8	57,882
	Ames	16	19	47	42	22.1	66,258
	Iowa City	17	36	78	37	25.1	75,130
	Ottumwa	16	55	24	93	25.9	24,368
	Council Bluffs	15	48	50	65	26.0	62,166
	Marshalltown	15	42	23	70	26.3	26,666
	Cedar Rapids	16	34	109	23	26.8	133,562
Secondary	Atlantic	13	59	12	208	27.7	6,526
	Carroll	13	68	15	167	29.6	9,833
	Decorah	15	56	9	84	32.9	7,576
	Clinton	15	38	19	23	33.5	25,093
	Muscatine	11	60	26	94	33.5	23,631
	Fairfield	11	63	15	135	34.7	10,425
	Bettendorf	11	65	31	74	36.0	36,543
	Harlan	11	94	20	515	37.8	4,766
	Boone	11	85	17	144	38.9	12,384
	Spencer	12	63	10	64	39.5	10,952
Tertiary	Burlington	12	54	18	23	40.1	24,713
	Knoxville	11	74	10	126	40.3	7,168
	Charles City	11	75	10	121	40.8	7,307
	Winterset	11	73	8	132	41.4	5,383
	Spirit Lake	12	81	11	72	42.2	5,155
	Newton	11	70	14	68	42.5	15,182
	Algona	10	79	13	271	43.0	5,397
	Cedar Falls	11	60	24	17	44.9	40,536
	Des Moines	17	5	213	-6	46.0	214,237
	Mount Pleasant	11	64	8	60	46.4	8,668

NOTES: Breadth of Recovery Infrastructure ranks communities according to the number of different kinds of recovery resources in each town (e.g. hospital, mental health facility). Depth of Recovery Infrastructure is the average ranking of each community across each of 16 different types of recovery resources (e.g. ranked by the number of hospitals, number of treatment centers, and number of libraries). Mutual Aid and Support Culture ranks cities by the relative strength, or vibrancy, of the local peer support community by measuring comparing the number of meetings in the community to the number of people living there. Places with a relatively high number of weekly support meetings relative to the size of their town score higher on the strength measure.

Future and Further Uses of the RRCI

The RRCI is by no means an exhaustive list of community resources that effect health and wellbeing. Ours was a cross-sectional index, meaning that we captured the state of recovery-oriented community infrastructure at one point in time (Summer 2020). Some of the infrastructure we measured is relatively unstable and subject to frequent change. Peer support meetings change, with new meetings appearing and others closing up. Time, dates and locations also change. Hospitals open, close, and relocate and communities add new libraries, close old ones, and develop new parks, gardens, and natural areas. We recommend that future work on the RRCI focus on automating the collection, cleaning, and construction of the RRCI to ensure that it is always up-to date. This would also provide IDPH with a novel, data driven way to monitor changes in a community's capacity to meet the health and wellness needs of its members.

Furthermore, we anticipate that a RRCI database would be useful to inpatient treatment service providers, who could use these community-level indicators as part of their discharge consultation programs. At discharge, it might be helpful to consult clients on the kinds of communities that would best support their recovery journey, by pointing, for example, a person of faith to places with large stocks of churches and 12-step programs, or a veteran to a community with a VA hospital or clinic as well as other kinds of resources that would best meet their cultural, economic, and social needs. More to the point, we suggest that the RRCI enables a data-driven approach to discharge that maximizes the chances of sustained recovery following completion of SUD treatment.

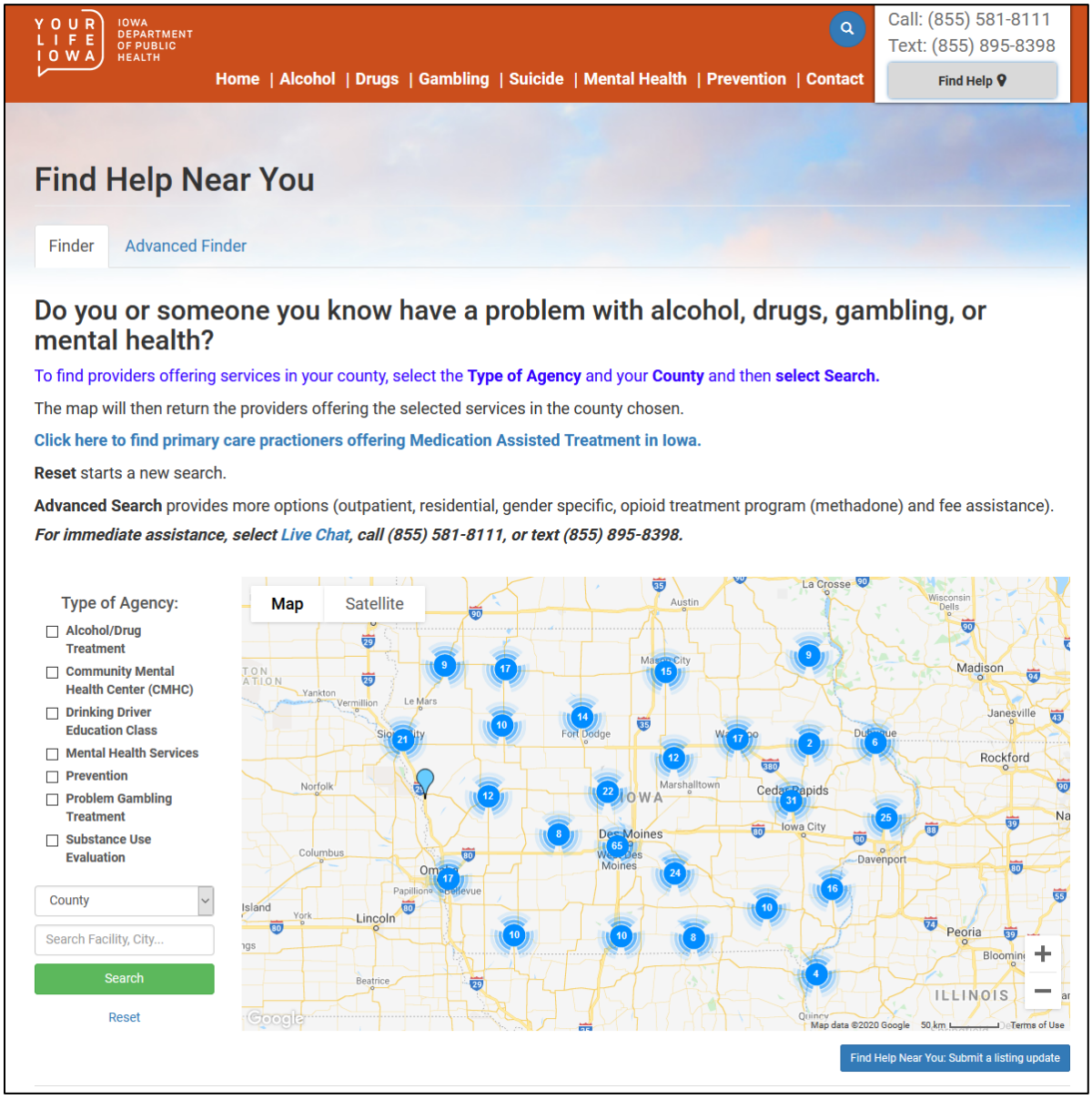
The RRCI is also useful for general community recovery monitoring, such as individual, family and community recovery from the social, economic, and health effects of COVID-19. In the case of COVID-19, consider the second order, negative health consequences that attend disease spread mitigation efforts. Adherence to best practices in the prevention and spread of COVID-19 calls for social distancing and withdrawal from extensive community engagement (festivals, religious services and events, sports meets, family gatherings). The accumulating evidence suggests that these prevention efforts are responsible for higher rates of loneliness, depression, and SUD in many communities throughout the country. The RRCI could be used to assess community capacity to respond to these negative physical and mental health effects. The RRCI could also be used to assess community resilience during disease outbreaks.

Using Data to Connect People to Local Recovery Resources

Public-facing, Peer-support Meetings Finder Prototype

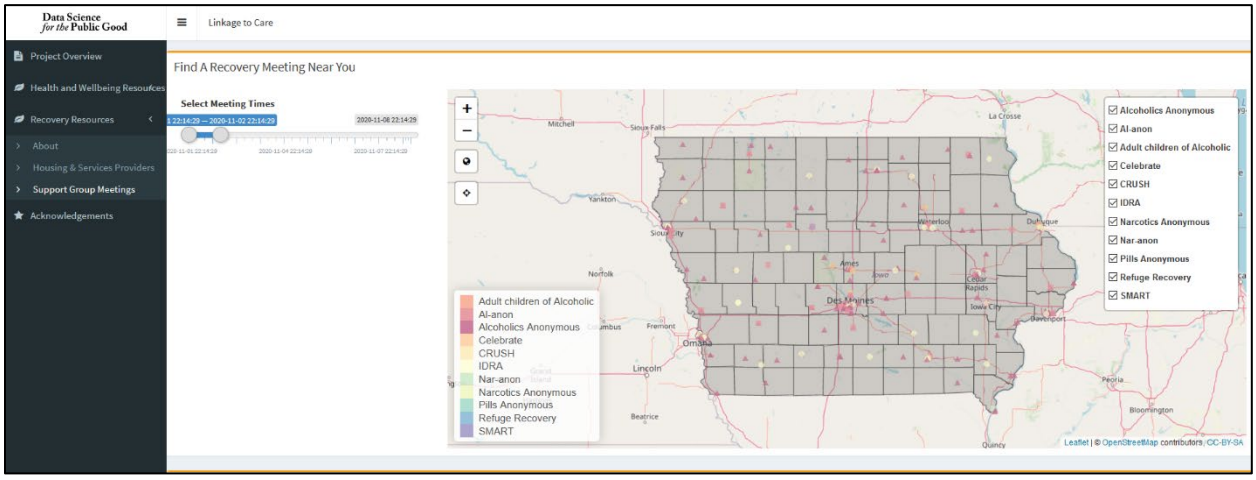
For ten weeks in the summer of 2020, a small team of data science fellows and interns worked under the supervision of Doctors Shawn Dorius (PI), Cass Dorius (coPI), and Heike Hoffman (Professor of Statistics at Iowa State University) to develop a prototype data dashboard to project the systems of care recovery data to the SUD community over a public facing webpage. The motivation for this work is yourlifeiowa.org/finder, which is a page on the YourLifeIowa website that helps people find resources to help them manage or treat problems with alcohol, drugs, gambling, or mental health (see Figure 6). This is a great resource and a central clearing house for people seeking a range of services and providers. Members of our team noticed, however, that the site currently identifies few services for people in recovery. Motivated by the opportunity to strengthen YourLifeIowa and support its goal of using data to connect people in recovery with the services and resources they need to sustain their recovery, our team built a web-based, recovery-oriented interactive data dashboard. Our hope is that the resources we identified and the dashboard we prototyped can be mapped onto YourLifeIowa so that people in recovery have additional ways to find recovery resources near where they live in Iowa.

Figure 6. YourLifeIowa.org Resource Finder



One of the especially strong contributions of our prototype dashboard (https://dspg-isu.shinyapps.io/rosc/) is how it displays mutual aid and peer support meetings. Because we collected information on the time, date, location, and type of peer support meetings in Iowa, we created an interactive tool that lets users select a meeting type (AA, NA, SMART Recovery), a meeting time, and a meeting day. With these criteria selected, our interactive dashboard displayed in Figure 7 projects the contact information, including location, of every meeting that aligns with the user's selection criteria. In keeping with the YourLifeIowa goal to centralize substance use information, our prototype brings together information on peer support meetings for 11 different organizations hosting substance use oriented meetings in Iowa.

Figure 7. Peer Support Meetings Dashboard Prototype



Data-to-Action Next Steps

Because of the fluid and dynamic nature of peer support meetings (e.g. meeting times and locations changing with some regularity, and new meetings emerging), we suggest that IDPH support the development of a dynamic, real-time data pipeline to ensure that peer support meetings data is always up-to-date. Another advantage of a real-time, computationally-driven data pipeline for peer support meetings is that it provides higher quality and more accurate information. In our work with the meetings data, we found a non-trivial number of errors in the names of cities. While this may seem insignificant, consider someone in recovery who is at risk of relapse and needing a meeting near them, now. What if their search turned up no results because the town they searched for was misspelled on the Narcotics Anonymous or Refuge Recovery website? By pulling time, date, and location data from each peer support provider in Iowa into a centralized data pipeline, we have the ability to develop automated tools to clean the data and correct for known errors like misspelled city names using probabilistic matching algorithms. The data pipeline we propose would correct for several different errors in the data, and the tool has the capacity to help more people find the support they need, and more quickly, than using current approaches.

APPENDIX

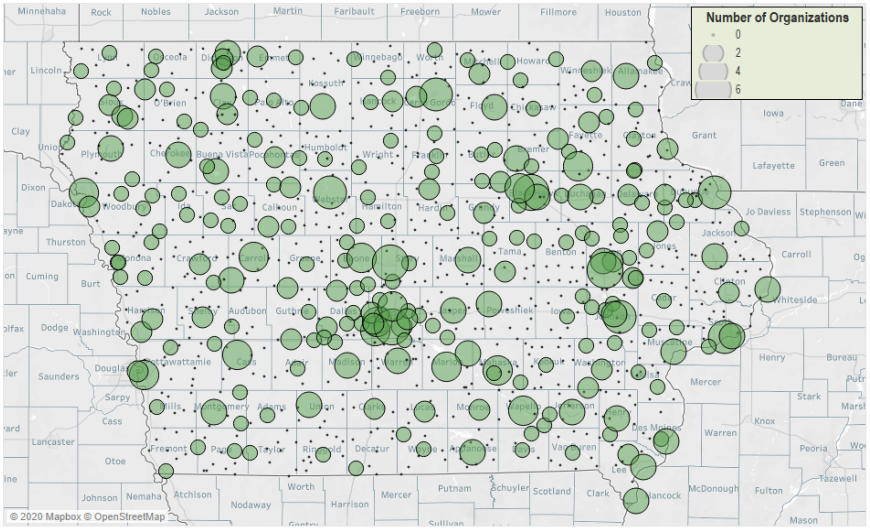
A. Supplemental Analysis of Mutual Aid and Peer Support Data

In the pages that follow, we provide static presentations of dynamic data dashboards that our team created to convey information about peer support meetings in Iowa. Our analysis found that the peer support landscape in Iowa is dominated by 12-step organizations. While we encourage an 'all-paths to recovery' framework that 'meets people where they are', the data we collected and analyzed, coupled with focus group data collected by the HIPWUD board, suggests a significant opportunity to improve recovery and minimize relapse by greater diversification of mutual aid meeting organizations in Iowa. Metropolitan and micropolitan places, and also towns that include a college or university are likely to have especially large unmet need for alternatives to 12-step mutual aid organizations.

Figure A1. Figure1A. Substance use peer support *organizations* operating in Iowa's towns and cities

Number of peer support *organizations* per city

Note: Hover mouse over a city to learn more



How to interpret these data: Circles repesent the cities of Iowa in which at least one peer support group organization holds weekly meetings. Dots identify cities with no peer group organizations (e.g. AA, NA, SMART).Size of circles correspond to the number of unique peer support group organizations operating in a given town or city.

Cities ranked by # of organizations

Note: Click and drag to select cities

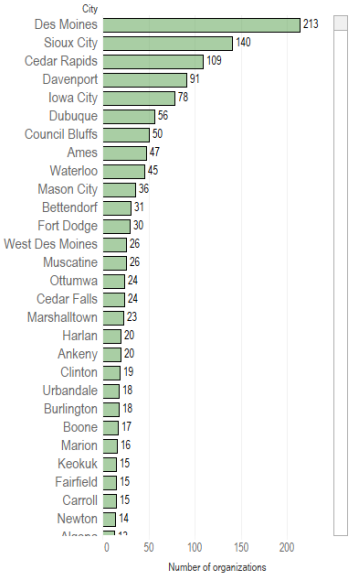
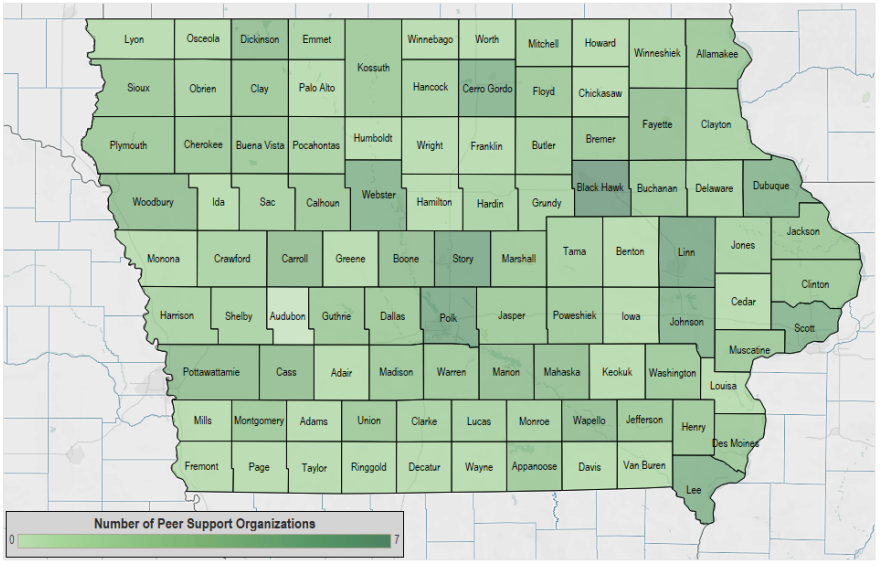


Figure A2. Substance use peer support organizations operating in Iowa's counties

Total number of peer support organizations per county

Note: Hover mouse over a county to learn more



How to interpret these data: The darker the color, the large the number of peer support organizations operating in each county.

Counties ranked by # of peer support organizations

Note: Click and drag to select counties

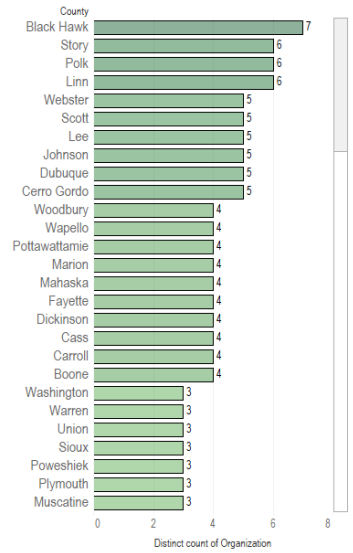
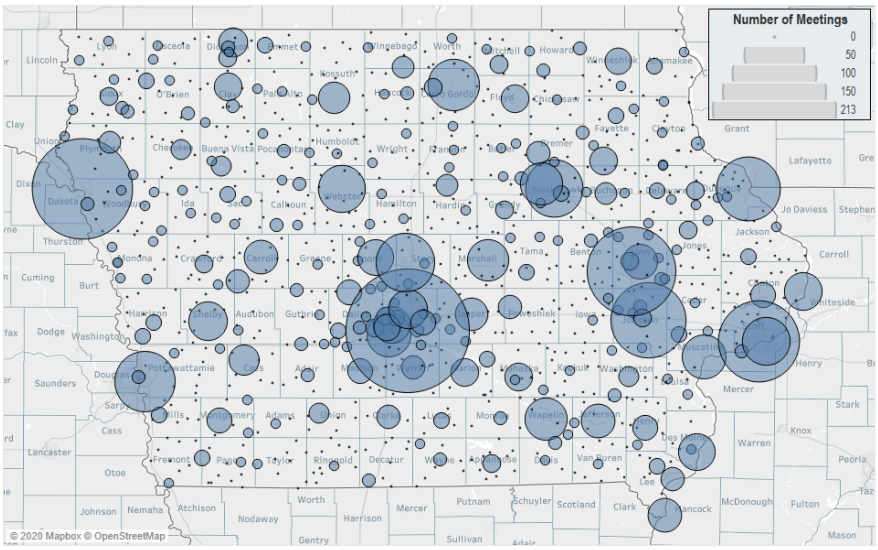


Figure A3. Substance use peer support *meetings* in Iowa's towns and cities

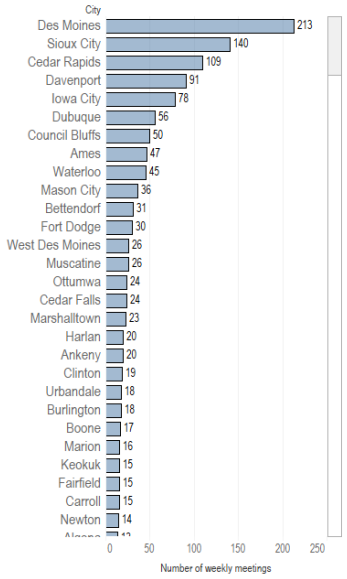
Total number of weekly meetings per city

Note: Hover mouse over a city to learn more



Cities ranked by # of weekly meetings

Note: Click and drag to select cities

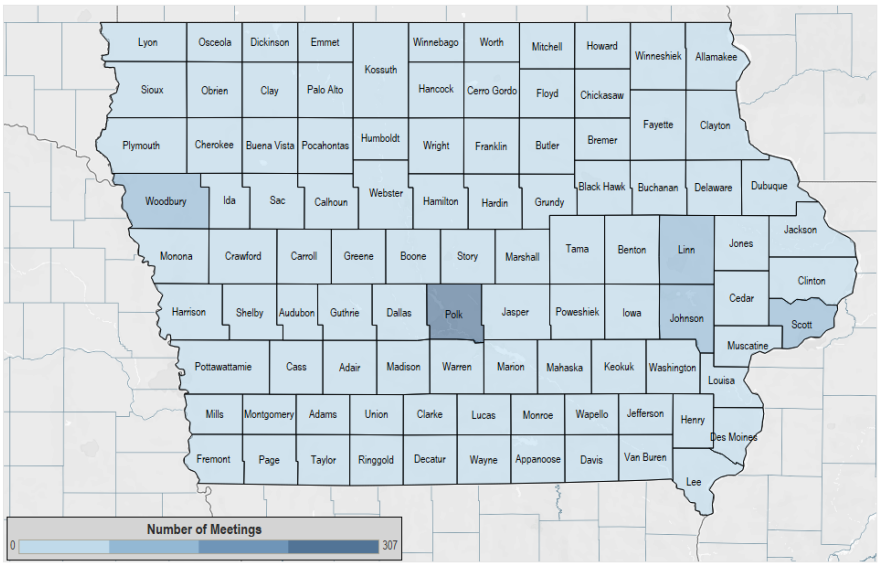


How to interpret these data: Circles repesent towns & cities in Iowa that host at least one weekly peer support meeting. Dots represent towns and cities with no listed weekly meetings. Size of circles correspond to the number of weekly substance use peer support meetings in the town or city.

Figure A4. Substance use peer support *meetings* in Iowa's counties

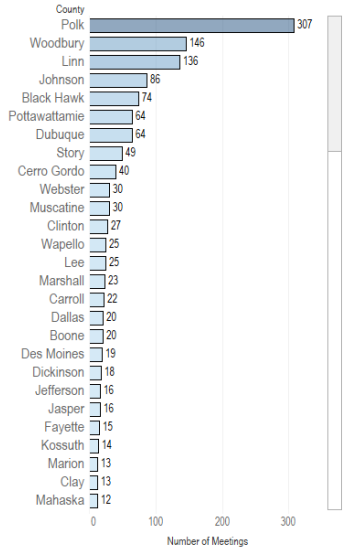
Total number of weekly meetings per county

Note: Hover mouse over a city to learn more



Counties ranked by # of weekly meetings

Note: Click and drag to select counties

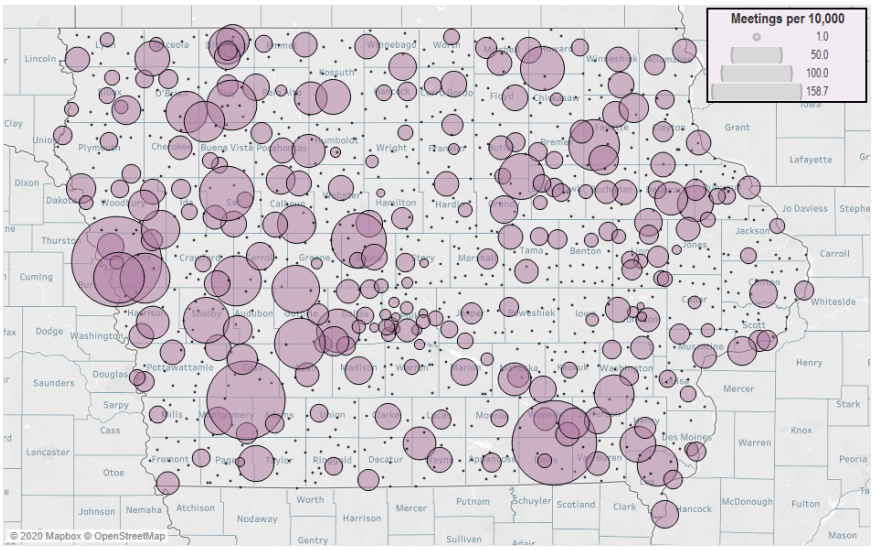


How to interpret these data: The darker the color, the large the number of weekly peer support group meetings available in the county.

Figure A5. Substance use peer support *meetings* per 10,000 residents of Iowa's towns and cities

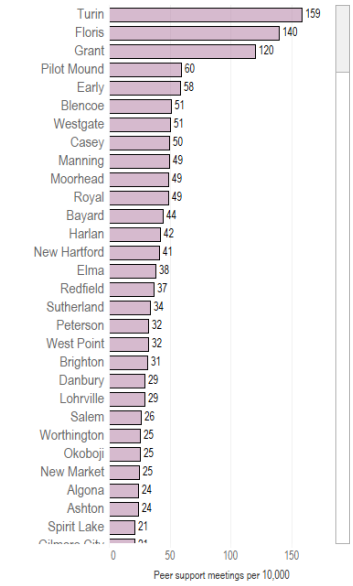
Number of weekly meetings

Note: Hover mouse over a city to learn more



Cities ranked

Note: Click and drag to select cities

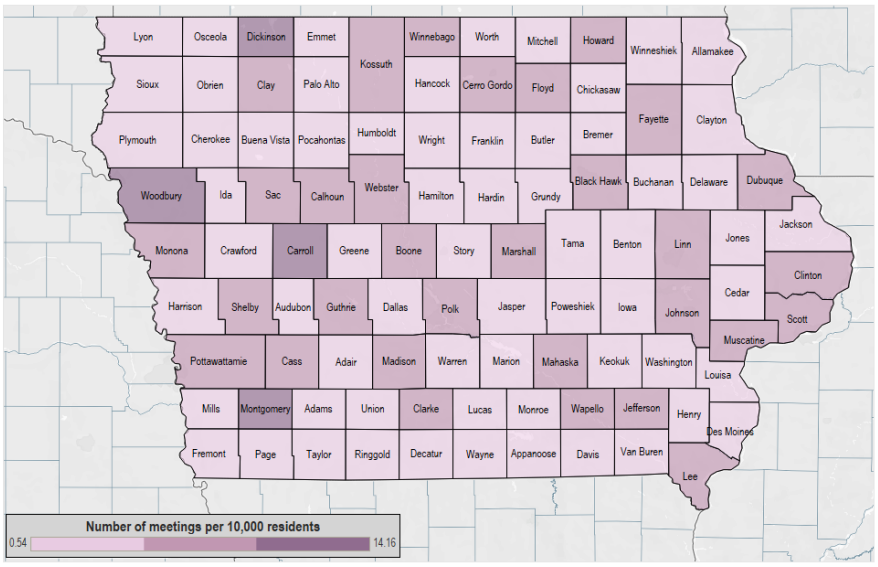


How to interpret these data: Circles repesent towns & cities in Iowa that host at least one weekly peer support meeting. Dots represent towns and cities with no listed weekly meetings. The larger the circle, the more weekly substance use peer support meetings per 10,000 residents.

Figure A6. Substance use peer support *meetings* per 10,000 residents of Iowa's counties

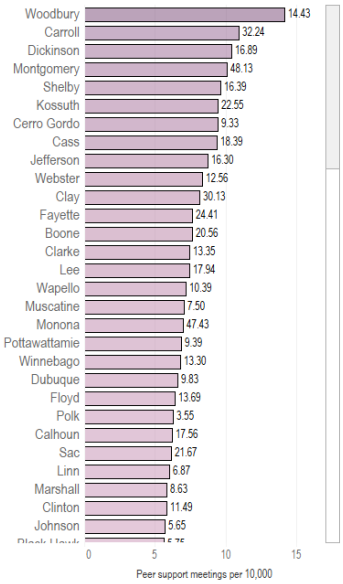
Number of weekly meetings per 10,000 residents

Note: Hover mouse over a city to learn more



Counties ranked

Note: Click and drag to select counties



How to interpret these data: The darker the color, the large the number of weekly peer support group meetings per 10,000 residents in the county.

B. Description of Methods

Data for this project was collected through a variety of methodologies beginning in January of 2020 and extending through September of that year. Data collection was completed by the *Public Science Collaborative*, as well as undergraduate student interns and graduate student fellows from Iowa State's *Data Science for the Public Good Young Scholars Program,* a 10-week applied data science program teaching students to explore community issues with data science techniques. Members from these teams collected data related to recovery housing, peer support recovery meetings, and the systems of care that support Iowans from the across the state. Additionally, data for this project was collected from Iowa's 99 counties and resulted in the collection of 15,724 resources currently available community resources available to Iowan's in recovery. The resulting dataset was used to complete an analysis of the current substance use recovery infrastructure across Iowa and to identify recovery ready communities.

Recovery Housing

Recovery housing data was collected from January 2020 through August 2020. The first round of data collection began by a member of the *Advancing Substance use in Recovery in Iowa Project* team from January 2020 to May 2020 with a series of Google searches to locate the existing substance use recovery housing infrastructure in the state. The terms *sober living, recovery service providers, sobriety housing, and recovery housing* were entered into search engines and resulted in the identification of third-party websites that cataloged substance use treatment, recovery, and housing throughout the state. These websites included alltreatment.com, womensoberhousing.com, transitionalhousing.org, and addicted.org. The information from these sites was collected manually and the name, address, phone number, website, email, and a brief summary of the services for each provider were documented. The home page of each recovery provider was also referenced when available. This led to the collection of 59 recovery houses across the state.

Appendix Table B1: Recovery Housing Websites

Domain name	*URL*
All Treatment	https://www.alltreatment.com/ia/accredited/
Transitional Housing	https://www.transitionalhousing.org/state/Iowa
Women's Sober Housing	https://www.womensoberhousing.com/state/iowa.html
Addicted.org	https://www.addicted.org/iowa-long-term-drug-rehab.html
Recovery.org	https://www.recovery.org/browse/Iowa/
Drug-Rehabs	https://www.drug-rehabs.org/Iowa-drug-rehab-alcohol-rehabs-program.htm

Graduate fellows and undergraduate interns from Iowa State's *Data Science for the Public Good Program* continued data collection from June 2020 to August 2020 by engaging in iterative discussions with public health experts and completing a literature review about the differences between substance use treatment and recovery. The team reviewed the list made by *The Advancing Substance use in Recovery in Iowa Project,* completed a new round of web searches using the previous search terms and located two additional websites, recovery.org and drug-rehabs.org. To obtain the data from the new websites, the team used a data science technique called web scraping, to extract data from an unstructured website and transform it into a structured dataset. Web scraping is an automated data collection process that implements a series of code and scripts to retrieve data from the website. The scripts for this project were written in R and Python. This project also utilized Selenium WebDriver to extract data from the

recovery.org and drug-rehab.org websites. Selenium is a portable open-source framework for web application testing. It features WebDriver, which is now a part of the W3C standard for all browsers. Selenium WebDriver loads the website into a software-driven browser and locates the web elements by their attributes, such as ID, class, and XPATH, and retrieves their information, including captions, texts, and hyperlinks. These data could then be stored in a structured format and joined with the original recovery housing dataset in R Studio (2020).

The team validated the recovery housing dataset by contacting the providers that did not have a public website. This step was crucial because each website of the recovery house was verified to determine if the provider was still open and providing recovery services. This step was also necessary to ensure that data collected from the third-party sites was accurate. The team also reviewed the dataset by hand and removed recovery housing providers that appeared to be duplicates, as evidenced by the same name and address. This new update removed 12 housing providers from the original list and added two unique providers. Data collection for these data were completed in August 2020 and led to the collection of a total of 46 recovery housing providers. Providers in the final list represented a variety of counties in Iowa, including Wright, Woodbury, Webster, Wapello, Story, Scott, Pottawattamie, Pocahontas, Polk, Linn, Johnson, Jasper, Humboldt, Hamilton, Dubuque, Clinton, Clarke, Cerro Gordo, Calhoun, Boone, and Black Hawk counties.

A strength of the recovery housing data is that the members of our team were able to validate the data by contacting providers and double checking the accuracy of contact information. We also completed two parallel data collection efforts across DSPG teams which verified that our sample of web sites had similar information, thus indicating that the search criteria is representative of a majority of the providers across the state. One complicating factor is that recovery houses may open or close frequently, and third-party sites may not be frequently updated. As a result, this resource may be subject to relatively frequent change and quickly fall out of date.

Peer Support Infrastructure

Data collection for the peer support infrastructure occurred from June 2020 to August 2020 and was carried out by undergraduate interns and graduate fellows in Iowa State's *Data Science for the Public Good* team and the grant core team. Data collection efforts for this dataset built on discussions with public health experts and literature reviews, and were also guided by feedback and input gathered from a Data Discovery workshop. This workshop was facilitated by Dorius and Dorius and in collaboration with the Iowa Department of Public Health to identify and evaluate current data available to the department. These steps informed the team's identification of search terms to frame data collection efforts for the peer support recovery infrastructure in Iowa. These team used the search terms *support groups, support meetings, and peer coaches* in search engines to identify the names of meetings and groups constituting the peer support infrastructure in Iowa. During this process, the team also referenced social media groups and blogs to identify additional types of peer support groups. These efforts allowed us to identify a variety of peer support meetings, including some of the more well-known recovery meetings such as *Alcoholics Anonymous, Narcotics Anonymous, and Celebrate Recovery*. New meetings identified by these processes included *Refuge Recovery, SMART, Al-Anon, Ala-Teen, CRUSH, Adult Children of Alcoholics, Nar-Anon, and Dual Recovery Anonymous*. These names were also entered into search engines and helped our team locate 10 websites containing Iowa specific information for peer support meetings across the state.

Appendix Table B2: Peer Support Meeting Websites

Domain name	*URL*
Alcoholics Anonymous:	https://www.aa-iowa.org/meetings/
Narcotics Anonymous:	https://www.na-iowa.org/meetings/
Adult Children of Alcoholics:	https://adultchildren.org/mtsearch
Al-Anon:	https://al-anon.org/al-anon-meetings/find-an-alateen-meeting/
Dual Recovery Anonymous:	http://draonline.qwknetllc.com/meetings_dra/usa/iowa.html
Nar-Anon:	https://www.nar-anon.org
SMART:	https://www.smartrecoverytest.org/local/full-meeting-list-download/
Celebrate Recovery:	https://locator.crgroups.info/
CRUSH:	https://www.facebook.com/crushofiowa/
Refuge Recovery:	https://refugerecovery.org/meetings?tsml-day=any&tsml-region=iowa
Pills Anonymous	https://www.pillsanonymous.org/meetings/find-a-meeting/

To obtain the information from the websites identified in Appendix Table B2, the web scraping extraction procedure described above was used to translate data from a website into a structured dataset. We extracted data from the Alcoholic Anonymous, Narcotics Anonymous, Nar-Anon, Celebrate, CRUSH, Refuge Recovery, and Dual Recovery websites noted in the table above. This variable also required data to be web scraped from tables and text for the Adult Children of Alcoholics website by parsing the raw text of PDF files. Parsing reads the text character by character to structure a dataset appropriately. Most of the text processing in this section was done heuristically, and no tools or pre-established algorithms were used except PyPDF package for eliciting the raw text from the PDF file. The Smart Recovery list was directly downloaded from the website referenced in Table 2. By utilizing these methods, the team created a series of datasets containing the meeting name, location, time, and address for each peer support meeting in Iowa. This data was then joined together using R Studio (2020). This final dataset included 1777 unique meetings, 1276 of which were Alcoholics Anonymous meetings, 268 of which were Narcotics Anonymous meetings, 9 Adult Children of Alcoholics meetings, 178 Al-Anon meetings, 29 Celebrate meetings, 2 Crush meetings, 5 SMART meetings, 5 Nar-Anon meetings, 3 Iowa Dual Recovery Anonymous meetings, 1 Refuge Recovery meeting, and 1 Pills Anonymous meeting.

Systems of Care

Student interns from Iowa State's *Data Science for the Public Good* team completed additional data collection aimed at identifying community recovery infrastructure described in the ROSC framework. To do this, interns and fellows conducted a series of web searches and Data Discovery workshops. The team searched for listings and datasets containing location information on hospitals, clinics, substance use treatment providers, and mental health providers, for example. The team again relied on web scraping procedures described above to extract useful data from the websites identified in Table B3. Data was also extracted from PDFs for Iowa Mental Health Providers and Licensed Substance Use and Problem Gambling Treatment Providers. And the data for the prescription take back sites were downloaded from the link in the table below. This resulted in one final dataset featuring the systems of care across Iowa.

Geocoding, Visualization, and Analytics

All of these data were joined together and geocoded using the Google Application Programing Interface (API) to assign the latitude and longitude to each of the providers in the dataset based on the address information obtained in our data collections. This information was loaded into Tableau (2020) and mapped into a series of dashboards to create the analytics and visualizations found in this report.

Table B3. Systems of Care Data Elements, Descriptions, Sources, and Data Collection Methods

Feature Item	*Data Description*	*Data Source*	*Collection Method*	*Link*
Parks	Iowa Parks	MyCountyParks.com	Scraped	https://www.mycountyparks.com/County/Default.aspx
Child Care Providers	Iowa Childcare Providers	Iowa DHS	Downloaded	http://ccmis.dhs.state.ia.us/ClientPortal/ProviderLocator.aspx
Workforce Development Offices	IowaWorks Offices	Iowa Workforce Development	Scraped	https://www.iowaworkforcedevelopment.gov/contact
Hospitals	Iowa Hospitals	Various websites	Various	Various
VA Hospitals and Clinics	Veterans Affairs Hospitals and Clinics	US Department of Veterans Affairs	Scraped	https://www.va.gov/directory/guide/state.asp?STATE=IA&dnum=ALL
Colleges and Universities	Colleges and Universities	Wikipedia	Scraped	https://en.wikipedia.org/wiki/List_of_colleges_and_universities_in_Iowa
Rural Health Clinics	Rural Health Clinics	Iowa Association of Rural Health Clinics	Scraped	https://iarhc.org/find-a-rural-health-clinic?view=map
Drug Drop-off Site	Drug Drop Off Locations	Iowa Office of Drug Control Policy	Downloaded	https://iowa.maps.arcgis.com/apps/webappviewer/index.html?id=5377c6d482424157aa013cff0afdcd31
MAT Site	Medication Assisted Treatment Locations	IDPH	Scraped?	https://idph.iowa.gov/mat
Mental & Behavioral Health Center	Iowa Mental Health Providers	Iowa DHS	Read in PDF	https://dhs.iowa.gov/sites/default/files/MHDDAccreditedProviders_32.pdf?082320201508
Recovery Housing	Recovery and Sober Living Housing	AllTreatment.com TransitionalHousing.org WomenSoberHousing.com Addicted.org Recovery.org Drug-rehabs.org	Scraped	https://www.alltreatment.com/ia/accredited/ https://www.transitionalhousing.org/state/Iowa https://www.womensoberhousing.com/state/iowa.html https://www.addicted.org/iowa-long-term-drug-rehab.html https://www.recovery.org/browse/Iowa/ https://www.drug-rehabs.org/Iowa-drug-rehab-alcohol-rehabs-program.htm
SUD-Problem Gambling Treatment	Licensed Substance Use and Problem Gambling Treatment Providers	IDPH	Read in PDF	https://idph.iowa.gov/Portals/1/userfiles/166/Licensure/All%20Licensed%20Substance%20Use%20Disorder%20-%20Problem%20Gambling%20Program%27s%20List.pdf
Mutual Aid Recovery Meetings	AA, NA, and other meetings	AA-Iowa NA-Iowa AdultChildren.org Al-Anon.org DRAOnline Nar-Anon.org SmartRecoveryTest.org CRGroups Locator CRUSH Of Iowa Facebook Page RefugeRecovery.org PillsAnonymous.org	Meetings were Scaped (except for Smart recovery that was downloaded)	**Alcoholics Anonymous:** https://www.aa-iowa.org/meetings/ **Narcotics Anonymous:** https://www.na-iowa.org/meetings/ **Adult Children of Alcoholics:** https://adultchildren.org/mtsearch **Al-Anon:** https://al-anon.org/al-anon-meetings/find-an-alateen-meeting/ **Dual Recovery Anonymous**: http://draonline.qwknetllc.com/meetings_dra/usa/iowa.html **Nar-Anon:** https://www.nar-anon.org **SMART:** https://www.smartrecoverytest.org/local/full-meeting-list-download/ **Celebrate Recovery:** https://locator.crgroups.info/ **CRUSH**: https://www.facebook.com/crushofiowa/ **Refuge Recovery:** https://refugerecovery.org/meetings?tsml-day=any&tsml-region=iowa **Pills Anonymous:** https://www.pillsanonymous.org/meetings/find-a-meeting/
Peer Support Providers		Todd Lange, Recovery & Resiliency Coordinator within AmeriCorp	By Hand	none
Recovery Coaches		Kevin Gabbert, Opioid Initiatives Director Iowa Department of Public Health	By Hand	none
Churches	Iowa churches	USGS Geographic Names Information System	Downloaded	https://data.iowa.gov/Physical-Geography/Iowa-Church-Buildings/juvk-dad9
Libraries	Community libraries	Institute of Museum and Library Services - Public Libraries Survey	Downloaded	https://www.imls.gov/research-evaluation/data-collection/public-libraries-survey

C. Definitions of Recovery

Table C1. Definitions of Recovery

Source	Year	Definition
Substance Abuse and Mental Health Association (SAMHSA)	2011	"A process of self-directed change through which individuals improve their health and wellness, live self-directed lives, and strive to reach their full potential."
American Society of Addiction Medicine (ASAM)	2005	"A process of sustained action that addresses the biological, psychological, social, and spiritual disturbances inherent in addiction. Recovery aims to improve the quality of life by seeking balance and healing in all aspects of health and wellness, while addressing an individual's consistent pursuit of abstinence, impairment in behavioral control, dealing with cravings, recognizing problems in one's behavior and interpersonal relationships, and dealing more effectively with emotional responses."
Betty Ford Institute Consensus Panel	2007	"A voluntary maintained lifestyle characterized by sobriety, personal health, and citizenship."
Center for Substance Abuse Treatment (CSAT)	2005	"Recovery from alcohol and drug problems is a process of change through which an individual achieves abstinence and improved health, wellness and quality of life."
William L. White	2007	"Recovery is the experience through which individuals, families, and communities impacted by severe alcohol and other drug (AOD) problems utilize internal and external resources to voluntarily resolve these problems, heal the wounds inflicted by AOD related problems, actively manage their continued vulnerability to such problems, and develop a healthy, productive, and meaningful life."
The Recovery Science Research Collaborative (*RSRC*)	2018	"Recovery is an individualized, intentional, dynamic, and relational process involving sustained efforts to improve wellness."
Kelly and Hoeppner	2014	"Recovery is a dynamic process characterized by increasingly stable remission resulting in and supported by increased recovery capital and enhanced quality of life."
Recovery Research Institute Addiction	2017	Recovery science is inherently strengths-based, aimed at promoting wellness and a predilection of subjective experience. Recovery is "an individualized, intentional, dynamic, and relational process involving sustained efforts to improve wellness."
UK Drug Policy Commission	2008	"The process of recovery from problematic substance use is characterized by voluntarily sustained control over substance use which maximizes health and wellbeing and participation in the rights, roles, and responsibilities of society."

D. References

Ashford, R. D., Brown, A. M., Ryding, R. & Curtis, B. (2019). Building recovery ready communities: the recovery ready ecosystem model and community framework, Addiction Research & Theory. https://doi.org/10.1080/16066359.2019.1571191

Dorius, C., Dorius, S., Talbert, E., Van Selous, K., Jahic, I., Bahe, D., & Young, E. (2020). "A Recovery Community Guide for Public Health". Prepared for the Iowa Department of Public Health, Bureau of Substance Abuse.

Best, D., Irving, J., Collinson, B., Andersson, C., & Edwards, M. (2016). Recovery Networks and Community Connections: Identifying Connection Needs and Community Linkage Opportunities in Early Recovery Populations. *Alcoholism Treatment Quarterly, 35*(1), 2-15. doi:10.1080/07347324.2016.1256718

Cano, I., Best, D., Edwards, M., & Lehman, J. (2017). Recovery capital pathways: Modelling the components of recovery wellbeing. Drug and Alcohol Dependence, 181, 11–19. doi: 10.1016/j.drugalcdep.2017.09.002

Cloud, W., & Granfield, R. (2008). Conceptualizing Recovery Capital: Expansion of a Theoretical Construct. *Substance Use & Misuse*, *43*(12-13), 1971–1986. doi: 10.1080/10826080802289762

Groshkova, T., Best, D., & White, W. (2012). The Assessment of Recovery Capital: Properties and psychometrics of a measure of addiction recovery strengths. *Drug and Alcohol Review*, *32*(2), 187–194. doi: 10.1111/j.1465-3362.2012.00489.x

Grove-Paul, L., Overbay, B., & Kirkpatrick, T. (2020). Recovery Oriented Systems of Care: Building and sustaining a community based model that makes clinical sense [White paper]. Centerstone Research Institute. http://www.williamwhitepapers.com/pr/RM%20%26%20ROSC%20Implementation%20Centerstone%20of%20Indiana.pdf

Haberle, B. J., Conway, S., Valentine, P., Evans, A. C., White, W. L., & Davidson, L. (2014). The Recovery Community Center: A New Model for Volunteer Peer Support to Promote Recovery. *Journal of Groups in Addiction & Recovery*, *9*(3), 257–270. doi: 10.1080/1556035x.2014.940769

HIPWUD (2020). IHRC Focus Group Questions and Responses: HIPWUD.

Kelly, J. F., Fallah-Sohy, N., Vilsaint, C., Hoffman, L. A., Jason, L. A., Stout, R. L., Cristello, J. V., & Hoeppner, B. B. (2020). New kid on the block: An investigation of the physical, operational, personnel, and service characteristics of recovery community centers in the United States. *Journal of Substance Abuse Treatment*, *111*, 1–10. doi: 10.1016/j.jsat.2019.12.009

Laudet, A. B., & White, W. L. (2008). Recovery Capital as Prospective Predictor of Sustained Recovery, Life Satisfaction, and Stress Among Former Poly-Substance Users. *Substance Use & Misuse*, *43*(1), 27–54. doi: 10.1080/10826080701681473

Matto, H. C. (2004). Applying an Ecological Framework to Understanding Drug Addiction and Recovery. *Journal of Social Work Practice in the Addictions*, *4*(3), 5–22. doi: 10.1300/j160v04n03_02

Mckay, J. R. (2016). Making the hard work of recovery more attractive for those with substance use disorders. *Addiction*, *112*(5), 751–757. doi: 10.1111/add.13502

Sánchez, J., Sahker, E., & Arndt, S. (2020). The Assessment of Recovery Capital (ARC) predicts substance abuse treatment completion. *Addictive Behaviors*, *102*, 106189. doi: 10.1016/j.addbeh.2019.106189

U. S. Census Bureau, Population Division (2020). *Annual Estimates of the Resident Population for Incorporated Places in Iowa: April 1, 2010 to July 1, 2019 (SUB-IP-EST2019-ANNRES-19)*

White, W. L. (2007). Addiction recovery: Its definition and conceptual boundaries. *Journal of Substance Abuse Treatment*, *33*(3), 229–241. doi: 10.1016/j.jsat.2007.04.015