(CAST) MANUAL

Calculating an Adequate System Tool

DEVELOPED BY:

Brandn Green, PhD

Rob Lyerla, PhD

Donna Stroup, PhD

Kristal Jones, PhD

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BEFORE YOU BEGIN

CAST was created as a method for evaluating the capacity of the substance abuse care system within a defined geographic area. CAST provides users with both a risk assessment of county-level social and community determinants of substance abuse, and an assessment of local service need across the continuum of care. Most often, CAST has been used to estimate need for a county as the geographic unit, but it could be used for smaller or larger areas, as long as data at those geographic levels is available or could be produced at that scale.

Background

CAST was developed by an interdisciplinary group of researchers at the Substance Abuse and Mental Health Services Administration (SAMHSA) Center for Behavioral Health Statistics and Quality (CBHSQ) (Green et al., 2016. Accessed here). Since this publication, CAST has been updated, and all subsequent development was undertaken by the authors of this manual.

This workbook provides CAST users with instructions on how to use CAST to produce estimates of your local service capacity and need. Technical appendices provide detailed overviews about the processes and methods of producing CAST. Technical assistance from the authors is available upon request and contact information is provided at the end of this document.

CAST uses social determinants of behavioral health and social disparities in behavioral health outcomes to provide insight into the chronic social conditions that may be contributing to behavioral health outcomes in your community. In section 4 of this handbook, definitions for these terms and suggestions on how to use CAST to identify important modifiable determinants and programmable disparities within your community behavioral health care system have been provided.

The CAST spreadsheet

Using CAST in Excel™

CAST currently is available as an Excel workbook, organized by sheets. As with other Excel worksheets, you can click on a tab to go to that sheet. CAST is primarily organized on three sheets – Data Input, Community Characteristics, and Capacity Calculator Output. The additional sheets provide the user with support materials and the numerical values used to calculate the Estimated Need Column on the Capacity Calculator sheet.

CAST 2.0 is composed of:
- Data Input Tab – County characteristics used to produce a risk level

- Community Characteristics Tab – The results of the risk level, estimated totals of the substance-using population of your community, and your estimated county alcohol/drug use hospitalization rate
- Capacity Calculator Tab – Estimated need for system components across the continuum of care
- Population, Frequency, Group Size, Usage, Definitions of Interventions Tabs - Technical documentation of the values used to produce estimates of component need in CAST

As the user, you are asked to enter information on both the Data Input Tab and Capacity Calculator Tab. Data for these two types of inputs are either freely available from secondary data sources or must be gathered as primary data in and about the geographic area of the CAST evaluation. This handbook includes potential sources for secondary data and suggestions on how to collect or access primary data.

CAST can be used to:
- Assess the presence of chronic social and community conditions that are likely to increase the risk of hospitalization for substance abuse in your community
- Observe the gaps and potential redundancies in the substance abuse care system of your community
- Generate estimates of need that can help to inform community or organizational planning efforts

To produce these outcomes, you will need to provide:
- Secondary data from publically available data sources
- Primary data about the number of local substance abuse care system components that is collected by a CAST user or technical assistance provider

Secondary Data Sources

Throughout this guide, users are provided with links to the websites where data were publicly available at the time of the writing of this handbook. Potential data sources are provided for estimating 24 of 30 CAST system components. As data availability varies widely across states for many of these components, please view these as suggestions and possible sources of information. It is recommended that you verify the estimates for system components with local key informants. For additional support with finding data sources for CAST estimates, you may also contact the developers of CAST for technical assistance with this task.

Data Input

Overview

As a community capacity calculator, CAST calculations are based upon the total population of the community, as well as a set of indicators that have been identified in both the academic literature and in our data analysis to correlate with adverse substance use outcomes within communities. Details about the technical approach can be found in the Technical Appendix B.

For all estimates, data sources have been provided. As the user, you are asked to input the percentage or total value for each variable. The CAST tool will then use these values to produce a risk assessment for the likelihood that your community is more likely to have higher hospitalization rates than the national average for substance use disorders.

Secondary data is data that has been gathered by someone other than you, the user of the data. The Community Characteristics tab of CAST relies upon secondary data that has been collected by the federal government, including the US Census, the American Community Survey, and the Substance Abuse and Mental Health Services Administration. Each secondary data source is publically available over the internet. For each data type, a link has been provided to the current web address, but please note that these links might change over time. Community is more likely to have a higher hospitalization rate for drug or alcohol related causes than the national average.

User Input Instructions:

Create a table where you can execute the adjustments and calculations necessary to convert data accessed through the provided websites to rates or percentages. Most often, the data source will provide you with the percentage, therefore, you do not need to calculate these proportions on your own.

After you have completed the data collection and processing tasks, insert the totals into the correct cell on the Data Input Tab. CAST will calculate the risk level for your county based upon the values you place in the cells. The risk level for county characteristics are combined and presented as a general measure of risk for your community on the capacity calculator tab.

Using CAST – Inserting Demographic Data

Figure 1.1 – County Characteristics as depicted in the CAST spreadsheet

CAST: Behavioral Health Service Capacity Calculator		
County Characteristics	**Data Entry**	**Risk Contribution**
Total Population		
% of adult population that is male		
% of population that is non-white		
% of county that is rural		
High school drop out rate		
Veteran population		
Percent of households with income below $35,000		
Percent of population with a college degree		
Percent of population that is widowed or divorced		
Percent of the population that is uninsured		
Association rate per 100,000 people		
County designated as a high incidence drug trafficking area		
Alcohol outlet density rate per 100,000 people		
Violent crime rate per 100,000 people		
Percent of population with access to physical activity		
Percent of the population that is age 18 or below		

Section Summary

Identifying social and community indicators of substance abuse for your community can enable you to work across sectors in your community to engage in community-wide planning and resource allocation efforts. Improving educational outcomes, for example, may be a more powerful tool for addressing alcohol abuse than building a new detox facility. CAST presents these elements together, providing you with a foundation for imagining strategies for addressing chronic conditions, rather than only responding to acute crises.

CAST also provides users with an estimate of the county hospitalization rate for drug/alcohol induced disorders on the Community Characteristics tab. This estimate provides users with a method for depicting how intentional changes in the county characteristics may lessen the burden on the local hospital system. The methodology for development of these estimates and a technical overview of their interpretation is provided in Appendix C.

Figure 1.2 – Data Sources for County Characteristics:

Individual Demographics	*Data Source*
Gender (Percent of adult population that is male)	US Census
Age (Percent of population 18-65)	US Census
Race (Percent of population non-white (including Hispanic))	American Community Survey (ACS) (5-yr estimates)
Social Determinants in CAST	
High school drop out rate (sum less than 9th and 9th to 12th no diploma)	ACS (5-year estimates)
Veteran population (count)	ACS (5-year estimates)
Percent of households with income below $35,000 (sum all low-income categories)	ACS (5-year estimates)
Percent of population with a college degree	ACS (5-year estimates)
Percent of population widowed or divorced	ACS (5-year estimates)
Percent uninsured	US Census Small Area Health Insurance Estimates
Community Determinants in CAST	
Rate of associations per 100,000 people	US Census (NAICS codes 813)
Alcohol outlet density rate per 100,000 people	CDC
High Intensity Drug Trafficking Area designation	National HIDTA Assistance Center
Violent crime rate per 100,000 people	County Health Rankings
Percent of population with access to physical activity	County Health Rankings
Percent of population living in rural area	US Census

Community Characteristics

SUBSTANCE USE, ABUSE, AND TREATMENT SEEKING

Overview

The five most commonly misused or abused substances according to the National Survey on Drug Use and Health (NSDUH) are included in CAST calculations. All five have been included as CAST is designed to support the development of a comprehensive substance abuse care system. It has not been designed explicitly to enable planning or to support expansion of services for treating individuals with a particular addiction.

The default usage rates included in CAST are national estimates from the 2016 NSDUH. Should other data be available that is more specific to your community than NSDUH can provide, those data should be used. NSDUH data are updated regularly to reflect yearly changes in national trends. It is recommended that you use the sub-regional estimates produced by SAMHSA and that you adjust the usage rates to reflect the region within which your county is located. These can be accessed on the SAMHSA data access site.

Using CAST – Adjusting substance usage rates
Figure 2.1 – Substance Using Population

Total Population of County	Usage rates	Total Estimated # of users in county	Maximum estimate of users in county needing treatment	Total estimated # of users in county with use disorders
Alcohol	24.2%	0	0	0
Marijuana	13.9%	0	0	0
Cocaine	1.9%	0	0	0
Opioid Misuse (Heroin and opioid pain relievers)	4.4%	0	0	0
Pain Reliever and prescription psychotherapeutics	6.9%	0	0	0
Totals		0	0	0

Data Sources: [National Survey on Drug Use and Health](#)

User Input Instructions:

These cells can be modified to include the most current NSDUH estimates. At the time of publication of this manual, 2016 data was available and was utilized.

If you are using this tool after 2017, visit the SAMHSA website to access the NSDUH national estimates of usage for the key substances. These can be accessed at the [SAMHSA website](#).

> **For Alcohol:** Use the variable of past month, Heavy Alcohol Use.
> **For Cannabis:** Use the variable of use, past year.
> **For Cocaine:** Use the variable of use, past year.
> **For Opioid Misuse (Heroin and opioid pain relievers):** Use the variable of use, past year.
> **For Pain Reliever and prescription psychotherapeutics:** Use the variable of use, past year.

With updated usage rates in column B, the corresponding cells in columns C, D and E will auto populate based upon the total population and estimates of users needing treatment and users with use disorders from NSDUH 2016 estimates.

Section Summary

Usage rates for substance use and abuse within the population have been estimated using the most current (2016) data from the NSDUH. If you are comfortable with data, it is suggested that the user modify the default values with those of the sub-state NSDUH estimates, as these are likely to be more reflective of your county than the national estimates.

COUNTY RISK LEVEL

Overview

The social and community determinants of behavioral health (entered on Tab 1 as county characteristics) have been used to demonstrate how behavioral health outcomes are shaped and influenced by the characteristics of the communities within which people live, work and play. Disparities in behavioral health outcomes, although distinctive from determinants, are also important patterns within populations that local health planning should seek to address and mitigate.

In CAST, social determinants and behavioral health disparities are treated equally, and combined to produce a county risk level. The risk level reveals how your community compares to the national median rate for hospitalization due to drug/alcohol diagnosis.

Using CAST – Interpreting the risk level

County Risk Level	
Total Risk Score	4

There are three risk levels:

a. Low risk (green) – The aggregated and calculated risk score for your community is equal to or lower than the national median for hospitalization due to drug/alcohol diagnosis.

b. Medium risk (yellow) – The aggregated and calculated risk score for your community is between 0–25% above that of the national median for hospitalization due to drug/alcohol diagnosis. This suggests that you may want to examine the indicators listed on the Community Characteristics Tab to see if you can work to address any of the social characteristics that are contributing to the overall risk score.

c. High risk (red) – The aggregated and calculated risk score for your community is more than 25% above that of the national median for hospitalization due to drug/alcohol diagnosis. Consider undertaking a full analysis of the indicators, comparing your proportions and rates to those of the reference values (national averages). Work to identify local partnerships and coordination efforts to address the potentially chronic social and community determinants or disparities in your community.

Section Summary

Addressing social determinants and remediating disparities in health outcomes is complicated, long-term work. CAST provides a mathematical estimate of how much you can expect both your risk level and your hospitalization rate to decrease by addressing these county-level characteristics.

COUNTY HOSPITALIZATION RATE

Overview

The estimated annual county hospitalization rate for drug/alcohol diagnosis is calculated based on the values of the social and community indicators that you entered on the Data Input (Tab 1) tab. This calculation is made based on the regression models developed using secondary data, and detailed in Appendix B. Two estimates are provided here as part of your Community Characteristics: the hospitalization rate per 100,000 people, and an estimate of the total number of individuals who are hospitalized annually, which is calculated using the hospitalization rate and the total population of your county.

County Hospitalization Rate	
Rate of individuals who will be hospitalized with drug/alcohol per 100,000 residents	44.5
Number of individuals who will be hospitalized with drug/alcohol diagnosis in a given year	0.0

Community Characteristics Section Summary

After a full literature review and mathematical review process, the county indicators of behavioral health that have been included in CAST reflect a thorough analysis of the social and community determinants of behavioral health at the county-level. These indicators are used in separate ways to produce both a county risk level and estimate of county hospitalization for alcohol/drug diagnoses. The data sources and the statistical approaches utilized for this analysis, as well as the limitations this approach, are presented in the technical appendix.

For users who are interested in addressing social determinants and remediated disparities, the risk score and hospitalization estimate provide quantitative modeling of the impact that you might expect to see through addressing these factors. You can change the levels used in the social determinants on Tab 1 to see how those changes would impact your risk level and hospitalization rate.

Capacity Calculator

Data gathering of both primary and secondary data is necessary for identifying the current capacity of your local community to provide care across the continuum of care as depicted in CAST. Data collection strategy varies by component. For some components, federally collected surveys provide a starting point for comprehensive data collection. For other components, community-based data collection is the only process for gathering the information.

The effectiveness and accuracy of data collection in your community is largely dependent upon your use of networks of professionals to create an inventory, or list, of non-duplicating efforts for each component type. You are encouraged to use snowball sampling techniques. Snowball sampling is a qualitative research method for asking interviewee one, "who else should I talk to about this topic?" This will allow you to use one contact to identify additional contacts, simply by asking people who else you should contact or talk to for trying to find out the information you are seeking.

For each component in CAST, the following section provides the user with a definition of the data item, the units of data collection, and a set of recommendations for identifying the totals for each component. One caveat, the secondary data sources suggested for the CAST components are limited and vary in precision and comprehensiveness of data coverage. All component estimates should be reviewed by local key informants who would be knowledgeable about the local substance use care system.

> **It is <u>very</u> important that the units of measurement that you use follow the CAST guidance documentation presented there.
> If not, the calculations undertaken by CAST will be in accurate.**

After completing the data collection for each component, place the total for the given component in the Observed Community Totals cell in the Observed Component Total column. Upon doing so, CAST will subtract the Adjusted Community Need (which is the total component need as estimated by CAST from county population characteristics) from the observed community need to provide you with the estimated need for your community.

Using CAST – Inserting Observed Community Totals

Figure 2.1 – Capacity Calculator Output Tab

Calculations of County Need for Behavioral Health Care Services					
Components	Maximum Community Need	Program Usage Rate	Adjusted community need	Observed Community Totals	Estimated Need
Promotion					
Social Marketing Advertisements	0	85%	0		0
Media Advocacy Events	0	30%	0		0
Community Coalitions	0	100%	0		0
Prevention					
School-based prevention programs	0	93%	0		0
Community-based prevention programs	0	12%	0		0
Housing Voucher programs	0	42%	0		0
Needle Exchange	0	60%	0		0
Prescription Drug Disposal Events/Locations	0	60%	0		0
Referal					
Adult Treatment Drug Courts	0	50%	0		0
Youth Treatment Drug Court	0	50%	0		0
Primary Care Doctors w/ SA training	0	10%	0		0
Social Workers	0	87%	0		0
MH Awareness Trained Police	0	100%	0		0
Treatment					
Inpatient					
Detoxification	0	1%	0		0
24-hour/Intensive Day treatment	0	2%	0		0
Short-term (30 days or fewer)	0	2%	0		0
Long-term (more than 30 days)	0	6%	0		0
Outpatient					
Detoxification	0	1%	0		0
Counselors, Psychiatrist or Psychotherapist	0	35%	0		0
Office based opiate substitution	0	25%	0		0
Recovery Support					
Religious or spiritual advisors	0	1%	0		0
12-step groups	0	40%	0		0
Transportation	0	14%	0		0
Employment support	0	5%	0		0
Educational support	0	14%	0		0
Parenting education	0	7%	0		0
Housing Assistance	0	7%	0		0
Insurance Assistance	0	90%	0		0

PROMOTION

Overview

Behavioral health promotion efforts are intended to raise awareness about specific substance use concerns, provide universal outreach to your community, and facilitate the intentional coordination of population health promotion efforts by community coalitions.

Collecting data about these types of efforts is one of the more difficult data collection tasks in CAST. It is difficult because the scope of activities is broad and can be undertaken by a diverse set of organizational actors. In addition to the data gathering suggestions identified with each type of promotion activity, use the National Survey of Substance Abuse Treatment Services (N-SSATS) directory of substance abuse treatment providers and search for treatment providers who engage in outreach to persons in the community. By contacting the treatment providers and learning about their outreach programs, you can produce a more complete inventory of activities.

Data Collection Strategies for each component

Social Marketing Advertisements

Definition: intentional, informational campaigns that use advertising theories to alert community members of a substance use problem and/or treatment program.

Units of data collection: Single advertisements

Potential data sources:

- Contact prevention specialist at the Prevention Resource Center, if available, or those who work for your state-level Behavioral Health/Substance Abuse agency. Ask them about any systematic social marketing efforts related to substance use in your community.
- Use the National Survey of Substance Abuse Treatment Services (N-SSATS) directory of substance abuse treatment providers and search for treatment providers who engage in outreach to persons in the community. By contacting the treatment providers and learning about their outreach programs, you can produce a more complete inventory of activities.
- One challenge with social marketing advertisements is the unit of data collection. Keep in mind that CAST is producing an estimate for a single advertisement, viewed 3 times, by 5000 residents. Different advertisement methods will reach different numbers of individuals. Of the estimates in CAST, this estimate has the broadest confidence interval. That is, the most variation and the least amount of precision.

Media Advocacy Events

Definition: Social organizing effort with a specific, community change agenda related to behavioral health or management of substance use. Garnering local news attention to move forward the cause is a key consideration. In contrast to advertisements, advocacy is associated with in-person gatherings to raise awareness about a potential problem in the community.

Units of data collection: Single events

Potential data sources:
- Contact prevention specialist at the Prevention Resource Center, if available, or those who work for your state-level Behavioral Health/Substance Abuse agency. Ask them about any advocacy campaigns related to substance use in your community.
- Identify the local newspapers and websites that provide community calendars. Review 3 months of community calendars, identifying events that meet the definition for advocacy events. Multiply this total by 4 to produce an estimate of yearly activity for advocacy in your community.
- Identify the 10 non-profit organizations that engage in social mobilization around substance use disorders and/or access to treatment. Contact leaders at these organizations and ask them to identify outreach efforts or events undertaken by their organization in the past year.

Community Coalitions

Definition: Any intentional collective of local organizational leaders, be they political, non-profit, or business organizations, receiving and allocating grant funding to limit substance use, abuse, and/or dependence.

Units of data collection: Single coalitions

Potential data sources:
- Reach out to the Prevention Resource Center or prevention office at your state substance abuse or behavioral health division. Ask them to identify coalitions in your community who receive funding to engage in substance use prevention planning.
- Identify the five most relevant private foundations and community foundations that serve your community. Ask individuals at these organizations if they know of or support community coalitions to limit substance use, abuse and/or dependence.
- Contact your county public health office. Ask them about coalitions active in your community.

PREVENTION

Overview

Prevention programs are early-intervention strategies intended to reduce the impact of substance use disorders. Prevention programs are organized around the three population defining strategies of Universal, Selective, and Indicated programs.

Universal programs include environmental prevention strategies and programs which aim to provide information to all individuals.

Selective programs target subgroups of the community that are known to have specific risks for increased likelihood to engage in substance abuse.

Indicated programs are intended for individuals who have demonstrated early signs of substance use problems.

Because prevention programs can be provided by a broad range of organizational actors, data collection for these activities is dependent upon primary data collection through contacting local organizations associated with prevention programming. The preference is to identify the use of evidence-based programs that are being provided in schools, the community and in the workplace. Assistance with identifying an evidence-based program can be found at the National Registry of Evidence-Based Programs and Practices.

Data Collection Strategies for each component

School-Based Prevention Programs

Definition: Evidence-based, universal, selective or indicated substance use prevention or mental health promotion programs delivered within a school setting for children age 12+.
Units of data collection: Evidence-based programs being implemented within schools.

Potential data sources:
- Based upon the programs identified by key contacts, select those that are evidence-based and focused on universal prevention or mental health promotion. They will either be delivered through a classroom setting or as a program for the entire school. As CAST is based upon individuals from age 12+, only collect information from middle schools and high schools.
- To collect information, contact the schools and ask them to provide an inventory of substance

use prevention or mental health promotion programs. Upon the completion of the list, review the programs and calculate the hours spent on prevention programming. Insert this total in the appropriate CAST cell. CAST is estimating the number of programs that should be provided in your community for universal, school-based substance use prevention and mental health promotion programs based upon an average program delivery length of ten hours.

- Identify prevention programs within your community by contacting the prevention specialist through your state Prevention Resource Center. There may also be a local or regional contact, and it is recommended to start with the regional contact, then move onto state contacts if necessary.

Community-Based Prevention Programs

Definition: Evidence-based, universal, selective or indicated substance use prevention or mental health promotion programs intended for community members delivered by non-profit or social service agencies.

Units of data collection: Evidence-based programs being implemented within community settings.

Potential data sources:

- Based upon the programs identified by key contacts, select those that are evidence-based and focused on substance use disorder prevention or mental health promotion. They will either be delivered by an organization or county health agency, likely through public meetings. As CAST population estimates stop at age 65, only collect information for programs that are targeted to non-seniors.
- To collect information, contact the non-profits, faith-based organizations and community agencies you have identified as your key community organizations and ask them to provide an inventory of community-based substance use prevention or mental health promotion programs. Upon the completion of the list, insert the total number of programs into CAST. CAST provides a program estimate, with the assumed length of 5 hrs. per program, of programs that should be provided for community-based substance use prevention and mental health promotion programs.
- Identify prevention programs within your community by contacting the prevention specialist through your state Prevention Resource Center. There may also be a local or regional contact, start with the regional contact, then move onto state contacts if necessary.

Housing Voucher Programs

Definition:Voucher programs, including those managed by public housing agencies, used to enable low-income residents a higher degree of neighborhood mobility.

Units of data collection: Individual vouchers

Potential data sources:

- Housing vouchers vary in type. For this data item, the goal is to determine the prevalence of all types of housing vouchers that could be provided to those under the age of 65.
- Vouchers are administered by public housing agencies (PHAs). If the local PHA is unable to provide you with values for CAST, contact the HUD Office nearest to your community.
- There may be a county health report or secondary data source that provides an inventory or summary of housing voucher programs. Be sure to keep a copy of this report as a data source and reference.

Needle Exchanges

Definition: A social service that allows injecting drug users to obtain hypodermic needles and associated paraphernalia at little or no cost.

Units of data collection: Needle exchange locations

Potential data sources:

- The North American Syringe Exchange Network or the Harm Reduction Coalition directories have a basic inventory of needle and syringe programs by state.
- Contact pharmacies directly to identify if there are additional resources in your community not listed on the directory.
- Ask members of the key community informants to review the list gathered from the Syringe exchange network and harm reduction coalition. It is very likely that the needle exchanges in your community are not included in these network inventories.

Prescription Drug Disposal Events

Definition: Locations for the collection of drugs by officials at permanent return programs.

Units of data collection: Drug disposal locations

Potential data sources:
- Contact social workers, pharmacists, law enforcement, and county health departments are the mostly likely sources of knowledge about prescription drug disposal locations.
- The National Association of Boards of Pharmacy locator may also be of assistance.
- Ask members of the key community informants to review the list. It is very likely that the prescription drug disposal locations in your community are not included in these network inventories.

REFERRAL

Overview

CAST expands the SAMHSA defined Continuum of Care to include the referral system. Knowing how individuals are accessing or being directed to treatment can assist you as you plan for an integrated system of care. The referral system as defined in CAST is one that links individuals to treatment, be it voluntarily or involuntarily. If this analysis reveals that you have a very high number of individuals being directed to treatment through involuntary pathways (Drug Courts), it may signify a need to address those pathways as being a high priority.

If you have made contacts with the state department of behavioral health or substance abuse services, you may ask them for access to the de-identified Treatment Episode Dataset (TEDS) for your state. By selecting for your community, you can learn how individuals who are entering the treatment system funded through SAMHSA block grants are being sent to treatment. Other data strategies outlined are for using nationally aggregated web-based tools for identifying local capacity and for doing supplemental community-based data collection.

Data Collection Strategies for Each Component

Adult Treatment Drug Courts

Definition: Provision of substance abuse treatment in combination with collaborative case management and supervision. Do not include mental health courts unless they provide specific services to individuals with co-occurring disorders.

Units of data collection: Courts

Potential data sources:

- Use the National Association of Drug Court Professionals drug court locator as a start.
- Examine the SAMHSA and DOJ funding allocations for your state and how it has been allocated for treatment drug courts as a second option.
- Contact your local magistrate or investigate the drug court capacity of your community courthouse website. Your state may also have an inventory of drug courts view the state court website or court magistrate system.

Juvenile Treatment Drug Courts

Definition: Provision of substance abuse treatment in combination with collaborative case management and supervision as an alternative to incarceration for juveniles.

Units of data collection: Courts

Potential data sources:

- Use the National Association of Drug Court Professionals drug court locator as a start.
- Examine the SAMHSA and OJJDP funding allocations for your state and how it has been allocated for treatment drug courts as a second option.
- Contact your local magistrate or investigate the juvenile drug court capacity of your county courthouse website. Your state may also have an inventory of drug courts view the state court website or court magistrate system.

Primary Care Doctors with Substance Abuse Training

Definition: Primary care doctors who have received or attended training in substance abuse recognition and are willing to engage in brief interventions.

Units of data collection: Individual doctors

Potential data sources:

- American Society of Addiction Medicine has a membership directory of physicians who have either been certified by ASAM and who have had a year of clinical experience in treating substance use disorder. This can be searched by zip code. Search for all zip codes in your county.

As with other data elements in CAST, using snowball sampling may be an effective strategy for identifying primary care doctors and verifying the estimates produced through secondary sources. It can be time intensive, but by asking one physician you find via a web-based locator tool if they know of colleagues in your community with similar skill sets and training, you may find many more that are not reported in that national registries.

Social Workers

Definition: Social workers who have received education or training related to the identification of substance abuse and/or mental health disorders.

Units of data collection: Individual social workers

Potential data sources:

- Your state Department of Labor will have a licensing mechanism for social workers. Using the database available to the public, you will be able to produce a reasonable estimate of social workers in your area.
- Use the National Association of Social Workers, find a social worker locator. Select social workers in your county with a Substance abuse or mental health focus.
- Or use the occupational employment statistics to determine the number of social workers in your county. Multiply this total by (x% of social workers have received some specialty training on SA. Modify this amount by that percentage.) This data source organizes content by metro statistical area. If your county is a metro statistical area, this will be very accurate. If your county is part of a metro statistical area, it will produce an over count and should not be used as the data source for this component.

Mental Health Awareness Trained Police

Definition: Police officers serving a community who have received additional education and training on how to recognize and respond to mental health needs.

Units of data collection: Individual police officers

Potential data sources:

Law enforcement jurisdictions overlap between county, state and federal officers. For this data item, focus on city or county level law enforcement.

- Identify the appropriate contact person at each agency. Contact them and ask about trainings that have been provided during the past year related to mental health and/or substance use disorders. Ask about the estimated attendance at the trainings.

TREATMENT

Overview

Entering treatment is often an important step toward recovery. Treatment service types vary widely, and CAST does not offer tools for assessing the quality of care being provided within your community. The use of CAST is intended to provide insight about the amount of treatment access, and type of treatment access, members of your community are being offered.

Much of the information on treatment components can be identified through the use of data sets collected by SAMHSA. One note, these datasets are elective and may underrepresent the level of care available in your community. After using N-SSATS to produce estimates, be sure to check with local key informants to identify additional, essential local treatment providers. One of the limitations is that N-SSATS does not include solo practitioners.

It is also important to note that you may select a geography beyond the boundaries of your community for treatment access. Do so thoughtfully and be sure that this decision reflects the travel patterns of your community.

Data Collection Strategies for Each Component

Inpatient Detoxification

Definition: 24-hour per day medical acute care services in hospital or residential setting for safe withdraw and transition to ongoing treatment. Count both hospital and free-standing residential based detox locations.

Units of data collection: Facilities providing Detoxification

Potential data sources:
- The SAMHSA treatment locator is annually updated with facility responses to the National Survey on Substance Abuse Treatment Services (N-SSATS) and National Mental Health Services Survey (N-MHSS).
- Calling local law enforcement, county health departments, and emergency rooms may provide you with additional local information as acquired through the snowball sampling technique.

Ambulatory/Intensive Day Treatment

Definition: A non-residential, psychiatric care program, lasting two or more hours per day for 3 or more days per week.

Units of data collection: Facilities providing ambulatory/intensive day treatment

Potential data sources:
- The SAMHSA treatment locator is annually updated with facility responses to the National Survey on Substance Abuse Treatment Services (N-SSATS) and National Mental Health Services Survey (N-MHSS).
- Calling local law enforcement, county health departments, key local substance abuse prevention organizations, and hospitals may provide you with additional local information as acquired through the snowball sampling technique.

Short-term Rehabilitation (30 days or fewer)

Definition: Less than 30 days of non-acute care in a setting with treatment services for alcohol and other drug abuse and dependency.

Units of data collection: Facilities providing short-term rehabilitation services

Potential data sources:
- The SAMHSA treatment locator is annually updated with facility responses to the National Survey on Substance Abuse Treatment Services (N-SSATS) and National Mental Health Services Survey (N-MHSS) to produce the National Directory of Drug and Alcohol Abuse Treatment Facilities.
- Calling local law enforcement, county health departments, key local substance abuse prevention organizations, and hospitals may provide you with additional local information as acquired through the snowball sampling technique.

Long-term Rehabilitation (More than 30 days)

Definition: More than 30 days of non-acute care in a setting with treatment services for alcohol and other drug abuse and dependency; this may include transitional living arrangements such as halfway houses.

Units of data collection: Facilities providing Treatment program locations

Potential data sources:
- The SAMHSA treatment locator is annually updated with facility responses to the National Survey on Substance Abuse Treatment Services (N-SSATS) and National Mental Health Services Survey (N-MHSS).
- Calling local law enforcement, county health departments, key local substance abuse prevention organizations, and hospitals may provide you with additional local information as acquired through the snowball sampling technique.

Outpatient Detoxification

Definition: A period of medical treatment during which a person is helped to overcome physical and psychological dependence on alcohol occurring in an outpatient setting.

Units of data collection: Facilities providing ambulatory-detoxification

Potential data sources:

- SAMHSA's treatment locator is annually updated with facility responses to the National Survey on Substance Abuse Treatment Services (N-SSATS) and National Mental Health Services Survey (N-MHSS).
- ·Calling local law enforcement, county health departments, key local substance abuse prevention organizations, and hospitals may provide you with additional local information as acquired through the snowball sampling technique

Counselors

Definition: Substance abuse and behavioral disorder counselors and mental health counselors as defined by the Bureau of Labor Statistics.

Units of data collection: Individual providers credentialed as counselors

Potential data sources:

The Bureau of Labor Statistics collects regular data about the occupational employment and wage estimates for the country.

- Using the occupational employment statistics determine the number of Substance Abuse and Behavioral Disorder Counselors (Code 21-1011) and mental health counselors (code 21-1014) in your county. This will work if your county is a metro statistical area.
- If your county is part of a metro statistical area, use your state department of labor Occupations data. Include both Substance abuse counselors and mental health counselors.

Psychiatrists

Definition: Physicians who diagnose, treat, and help prevent disorders of the mind, as defined by the Bureau of Labor Statistics.

Units of data collection: Individual providers credentialed as psychiatrists

Potential data sources:

The Bureau of Labor Statistics collects regular data about the occupational employment and wage estimates for the country.

- Using the occupational employment statistics determine the number of Psychiatrists (code 29-1066) in your county.
- If your county is part of a metro statistical area, use your state department of labor occupations data. Depending on the size of your county, this data may not be available due to confidentiality concerns.

Office-based Opiate Substitution

Definition: Medical providers of opiate substitution therapies such as methadone, buprenorphine and/or naltrexone.

Units of data collection: Facilities or offices that provide this treatment

Potential data sources:

- The SAMHSA medication-assisted treatment (MAT) for substance use disorder locator provides listing of MAT providers for MAT by state.
- Calling local law enforcement, county health departments, key local substance abuse prevention organizations, and hospitals may provide you with additional local information as acquired through the snowball sampling technique.
- Be careful to not double-count providers.

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RECOVERY

Overview

Relapse among those who have received treatment is a major concern for local community substance use care systems. Knowing the nature of your community recovery support network can help you to understand how and if resources may need to be allocated to supporting those in recovery, thereby reducing risk of relapse. If you have used the TEDS dataset to understand relapse or the frequency of treatment utilization by members of your community, you may have an additional data item to help you understand the nature of repeat utilization of services by community members.

Data collection suggestions for recovery supports are a mixture of secondary data sources collected by SAMHSA, website location aggregation sites, and local snowball sampling. All data collection efforts are likely to be necessary, as recovery supports can be provided by a broad range of organizations and individuals.

Data Collection Strategies for Each Component

Religious or Spiritual Advisors Specialized in Substance Use

Definition: Religious professionals providing substance abuse therapy and counseling.

Units of data collection: Individual professionals

Potential data sources:

Identifying individuals who have this training can be difficult.

- One strategy is to find a religious or spiritual advisor who has completed pastoral care training or is a certified counselor. The American Association of Pastoral Counselors is a membership agency, not a licensing agency, and provides a voluntary directory for pastoral counselors that allows for geographic searches.
- Most communities will also have a local pastoral council, interfaith council, or other type of coordinated committee of religious leaders. This may be a place to begin the snowball sampling.

12-step Groups

Definition: Brief, structured, and manual-driven approaches to treatment.

Units of data collection: Groups

Potential data sources:
- State level AA groups maintain find a meeting directories on their websites.
- SAMHSA provides an inventory of self-help group organizations across a broad range of substances in the behavioral health treatment services locator.

CAST estimates that a group meeting will serve 30 individuals. This is a national average of self-help group meeting sizes. The estimation method suggested for meetings is to count the total number of meetings that are available over the course of a defined length of time (one week or one month depending upon your community), multiply the county total by the appropriate value to produce an estimate of meetings per year.

Transportation

Definition: Programs provided by treatment facilities or community center to aid recovering individual in accessing treatment.

Units of data collection: Bus or van trips

Potential data sources:

39% of substance abuse treatment facilities provide transportation assistance to treatment. Of these programs, assistance comes in the form of vans or public transportation tokens or passes. For this data item, units are trips to allow for estimation that includes vans, buses or public transportation tokens/passes.
- The SAMHSA N-SSATS National Directory of Drug and Alcohol Abuse Treatment Facilities includes detailed information about all services being provided by Treatment Facilities in each state. Search for Transportation Assistance.
- To be thorough, after counting the capacity for transportation services provided by treatment facilities, call five of them and ask if they are aware of non-profits or county support programs that provide transportation tokens or services to clients.

Employment Support

Definition: Programs explicitly aimed at assisting post-treatment, recovering, community members gain access to employment.

Units of data collection: Programs

Potential data sources:

- The SAMHSA N-SSATS National Directory of Drug and Alcohol Abuse Treatment Facilities includes detailed information about all services being provided by Treatment Facilities in each state. Search for Employment counseling.
- There may be employment support programs in your county as well. Reach out to social workers and the key informants to verify that the extent of employment support programming is accurately depicted.

Educational Support

Definition: Adult education programs aimed at helping recovering community members to achieve educational goals, i.e., programs providing high school equivalency diplomas.

Units of data collection: Testing centers/locations

Potential data sources:

- Your state department of education or public instruction will provide the most complete and full list of high school equivalency testing centers for your community. By contacting these centers, you can produce an estimate of how many classes are being provided.
- Class is defined as a classroom based program that meets regularly over the course of 20 weeks.

Parenting Education

Definition: Classes designed to educate adults who have completed treatment learn about the challenges children may face from the effects of substance use disorders in family settings.

Units of data collection: Classes

Potential data sources:

- The SAMHSA N-SSATS National Directory of Drug and Alcohol Abuse Treatment Facilities includes detailed information about all services being provided by Treatment Facilities in each state. Search for Family Counseling.
- You may also reach out directly to organizations in your community that provide child care or services to individuals who are low income.

Housing Assistance

Definition: Programs aimed at finding housing for individuals in recovery. They may or may not include a specific treatment component.

Units of data collection: Programs

Potential data sources:

- The SAMHSA N-SSATS National Directory of Drug and Alcohol Abuse Treatment Facilities includes detailed information about all services being provided by Treatment Facilities in each state. Search for both Housing Services & Transitional Housing or halfway house.

Insurance Assistance

Definition: Insurance assistance and support available to individuals in recovery.

Units of data collection: Individual professionals

Potential data sources:

This data item is focused on the staff capacity or volunteer capacity in your community to provide enrollment support services to individuals who may qualify for insurance under the Affordable Care Act. Capacity to support Medicaid enrollment should also be included in collection for this data item. Private insurance agents, unless they provide enrollment support for ACA, should not be included.

- Healthcare.gov provides a search directory.
- For Medicaid enrollment support services, contact your county division of social services office and identify the capacity they have for providing assistance to individuals looking to enroll in Medicaid.

Interpreting CAST Estimates

CAST is designed to support local decision making about resource allocation across the substance use care continuum. Social and community determinants of adverse behavioral health outcomes are used to determine risk level and hospitalization rate estimates to provide you and your community partners with insights about how these determinants might be impacting hospitalization patterns in your community. You may want to reflect on your community characteristics and develop strategic thinking and plans about how best to address these conditions at the community level.

Fundamentally, CAST provides research-based estimates that can help guide decision making within organizations and communities. Your priorities should direct how you interpret the results produced by CAST.

In this section of the CAST guide, general guidance and advice is provided on how best to interpret the results produced through the input of data as outlined in Sections 1-3.

SOCIAL DETERMINANTS AND DISPARITIES

Overview
Social determinants are characteristics of the social environment that have been shown to correlate with higher levels of substance use or abuse. Social disparities are differential health outcomes within a community among different racial, ethnic, or socio-economic classes.

The risk level and hospitalization rate show users of CAST an estimate of the impact that the social determinants and disparities of their county (entered on Tab 1) have on these two characteristics of their community. These social determinants and disparities have also been found to have a relationship with substance abuse outcomes within communities. The direction of the relationship between the determinant and hospitalization rate for drug/alcohol diagnosis can be found in Appendix B.

If you want to determine how addressing a social or community indicator by working to get your community below the threshold could adjust resource allocation, substance abuse behavior, and treatment system need, you can adjust the values for each county characteristics on the Data Input tab to see how the totals on the risk level and estimated rate of hospitalization will be changed.

Carefully reviewing the Community Characteristics results can help you to create short and long- term plans for addressing chronic conditions that tend to lead to greater levels of substance abuse within counties.

Interpretation

CAST provides the user with national medians rates and proportions as benchmarks for social and community indicators. This method inherently suggests targets, or goals, that a community may try to achieve, so that the association between the indicator and the adverse substance use outcomes may be decreased. If, for example, your high school drop-out rate is 20%, and the CAST benchmark is 15%, it suggests that decreasing your drop-out rate below 15% will also decrease the number of individuals in your community engaging in substance abuse or adverse use.

Some of the indicators are not changeable, and should not be interpreted as being mutable. For example, if your county is rural or has a higher proportion of non-white residents, these are assets and key characteristics of the population you are trying to serve. For these indicators, we suggest that you engage in further analysis to determine where possible sources of the disparities based on these characteristics may be originating. Qualitative research has been paired with CAST in multiple locations as a method for examining possible disparities and to identify potential solutions. A case study of how CAST was paired with qualitative research is presented in Appendix C.

Summary

Research about the social determinants of health has expanded our understanding of how to address disparities in access that are connected to race, gender, and income. CAST includes a set of indicators that reflect disparities for at-risk groups who may be present in your community, and characteristics of counties that have demonstrated an association with higher levels of substance abuse at the community level.

As one part of the CAST planning process, you should review the results of the Community Characteristics tab and identify which indicators you want to address as part of preventive, community-level planning to decrease adverse substance use outcomes for your residents.

ESTIMATED COMPONENT NEEDS

Overview

The primary output of CAST is the totals of estimated component needs. In these values, the CAST tool provides the estimated difference between your current community care system and an ideal community care system for your population. The adjustments made to the estimated component needs by the risk score is the method used to make CAST component need estimates reflective of your particular community.

Two modifications take place to produce the estimated component needs

1. The maximum community need estimate is adjusted to reflect the expected usage rate from a general population. In the maximum community need, CAST estimates the number of services required to serve every person with need in your community. However, the research literature clearly demonstrates that 100% attendance for any substance use care activity is unrealistic. The program usage rate reduces the maximum community need by a proportion of the population that are estimated to want to use the program or component. This process produces the adjusted community need.

2. The adjusted community need is compared with the observed community totals for the second modification. In this calculation, CAST simply subtracts the units of the component that the user has inserted in the Observed Community Totals Column.

It is essential that the units of measurement are consistent with those outlined in this guide, as the calculation will be inaccurate if the units of measurement in columns D & E of the Capacity Calculator sheet are not the same units. The precision of the estimated need is dependent upon the completeness of the data collection effort necessary for the observed community totals.

Interpretation

Interpretation for one single component is straight-forward. For example, if CAST estimates that you have −10 (negative 10) school-based prevention programs, it suggests you are 10 units below the ideal service delivery for school-based prevention programs. Therefore, you may want to consider adding a school-based prevention program. The distribution of and the locations of these programs are best decided with information that can help you decided between school locations. Careful organization during the data collection process can help you to preserve nuance and detail, like knowing which schools have which types of programs, that can inform the interpretation process.

Ideally the estimated community totals will be discussed in reference to each other. The logic of CAST is

that the entirety of the care system has an impact on population-level outcomes. Funding sources and allocation varies considerably across the continuum of care. When resources are fungible, it may make sense to reallocate them to address gaps while reducing redundancies or over-resourced areas. To stick with the prevention programs as another example, if CAST estimates that you have +15 school based prevention programs but -9 community-based prevention programs, it suggests some value in reallocating the funding and staff time away from additional school-based programs to community-based programs.

It is likely that your CAST estimated need outputs will highlight some components that are under or over resourced. CAST estimates are intended as a guide to facilitate conversations by community members and key decision makers in your substance abuse care system.

CAST is designed to be used across systems, both formal and informal, by local actors tasked with considering the entire community and care across systems.

PLANNING BASED UPON RESULTS

CAST is designed to assist with short and long-term planning for improving the behavioral health of your community. Social and community indicators listed on the Community Characteristics tab provide you with validated benchmarks to pursue. By addressing these upstream factors that are adversely impacting members of your community, you are likely to see changes in the demand placed on the substance use care system.

The estimated need totals produced for each component are numerical reference points that you and your community coalition can use to discuss local priorities, current resource allocation, and how best to address gaps and reduce redundancies. In an area with insufficient resources, over investment in one area is an unnecessary inefficiency that may be able to be addressed through community-based processes and facilitation.

After completing the CAST assessment and engaging in a deliberative process that best reflects the needs of your community or organization, a formal written plan that includes strategies for addressing gaps/reducing redundancies, monitoring progress, and tracking changes to outcomes is advised. In addition, consider how to link CAST to community health assessments or community-level planning efforts being undertaken by education, law enforcement, social services, political offices, and local faith communities.

Contact Information:

All questions, comments and requests for technical assistance for CAST and the CAST methodology can be directed to Brandn Green, PhD via email: brandng@gmail.com. Or by telephone at 814.360.6874.

Technical Appendices:

APPENDIX A: METHODOLOGY FOR CREATING CAST AND CAST 2.0

This appendix provides a brief history of the creation process for CAST across multiple steps.

Step 1: A systematic review of the literature on prevention, promotion, referral, treatment and recovery programs, interventions and medical professionals as related to behavioral health was completed. The literature review process was used to identify the components necessary for an adequate comprehensive substance abuse system, the dosage rates, the use rates, and the treatment group sizes for each of the selected components.

Step 2: A systematic review of the literature on the social determinants of behavioral health was undertaken. In total, 143 articles were reviewed. Sixty-three possible indicators were identified, and of these, 18 met the review criteria for inclusion in the initial CAST tool.

Step 3: CAST was piloted in multiple sites and locations. A case study and summary of one location (Chester County, PA) has been included in this handbook as an example of the pilot process. In addition to Chester County, the CAST instrument was piloted in Chicago and Newago County, MI. Feedback from the three pilots was incorporated for revisions to the CAST spreadsheet, specifically the list of the key components.

Step 4: CAST 2.0 was updated and revised based upon insight gained through the pilot projects. In addition, review and feedback was provided by experts in the field. Feedback was incorporated into the updated statistical processes used for estimating the risk level and the listing of a reduced set of components.

Step 5: A revised and finalized CAST 2.0 was disseminated, along with the CAST handbook. Future development of the tool is planned and will likely result in the eventual updating of CAST 2.0.

APPENDIX B: STATISTICAL ANALYSIS FOR CAST 2.0

This appendix provides detailed information about the methodologies used to calculate both the risk score (level) and estimated hospitalization rate values presented on Tab 2 of the CAST tool.

We provide here a step-by-step explanation of: 1) the data sources considered and variables selected for determinants and outcomes in CAST models, 2) the statistical approaches used to specify and select models that describe the relationships between the selected determinants and outcomes, and 3) the applications of the CAST models to both a risk score calculation (summarized as a risk level) and the estimation of a community's hospitalization rate.

All data management and analysis was conducted in R , and the packages used for each type of analysis are noted as the analysis is discussed below.

Data Sources and Data Selection

Demographic, social and community determinants were identified for possible inclusion in CAST based on a systematic review of the literature, and were narrowed down based on which data is attainable through publicly available data sources. Those available determinants provide the starting point for all CAST analysis and are listed in Table 1.2 in the main text, along with their measurement units and any calculations used to transform the data from raw measures to those used in the CAST models. All data used in the CAST modeling efforts are measured at the county scale. Data sources for each variable used in the modeling discussed in this appendix are provided in Table 4.

Once the determinants for which data is available were identified, the first step toward using a subset of them as variables in multivariate regressions models was to conduct a variance inflation factor (VIF) test . The VIF determines which variables have high multi-collinearity with other variables in a multivariate model, by assessing the amount that each variable is inflated by its inclusion in a model with covariates, as compared to a null model where it has no collinearity with any other covariate. Table 2 presents the VIF scores of all determinants.

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[1] R Core Team (2017). R: A language and environment for statistical computing. R Foundation for Statistical Computing, Vienna, Austria. URL https://www.R-project.org/.

[2] R package 'car' used. Citation: Fox, J. and Weisberg, S. (2011). An {R} Companion to Applied Regression, Second Edition. Thousand Oaks CA: Sage. URL: http://socserv.socsci.mcmaster.ca/jfox/Books/Companion and https://cran.r-project.org/web/packages/car/index.html.

[3] O'Brien, R.M. (2007). A caution regarding rules of thumb for variance inflation factors. Quality & Quantity, 41: 673-690.

In addition to identifying publicly available data and arriving at a set of determinants of substance use disorders, we also explored several possible outcome variables as proxies for true measures of substance use disorders at the county level. Throughout the early stages of data analysis and modeling, we considered as outcome variables heavy alcohol drinking , rates of death from drug and/or alcohol-induced causes, and rates of hospitalization from alcohol and/or substance-induced disorders. All CAST models were initially run using several different outcome variables, to assess whether these outcome variables and the relationships to the independent variables violated the assumptions of linearity necessary for multivariate linear regression (details on how we tested these models in the following section). Table 3 presents details about the outcome variables that were selected for final use in the CAST models.

All independent (determinant) and dependent (outcome) variables were identified at the county scale. All independent variables are available for all 50 states within the United States, although some specific counties have missing data on specific variables due to non-reporting, extremely low populations (making rate calculations misleading) or other data reporting challenges.

The selected dependent variable, drug and/or alcohol-induced disorders, from the HCUP hospitalization data is available at the county level for the following 31 states: Arizona, Arkansas, California, Florida, Hawaii, Illinois, Indiana, Iowa, Kentucky, Louisiana, Maine, Maryland, Massachusetts, Michigan, Minnesota, Nevada, New Jersey, North Carolina, North Dakota, Oklahoma, Oregon, Pennsylvania, Rhode Island, South Carolina, Tennessee, Texas, Utah, Washington, West Virginia, Wisconsin and Wyoming. Within states, there are some counties not reporting drug and/or alcohol-induced disorder hospitalization rates due to low numbers of hospitals reporting, low absolute number of discharges, or because of high levels of missing data. The total sample size for all models is therefore 1,117.

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[4] Data on reported rates of Heavy Alcohol Drinking from the BRFSS as derived by the Institute for Health Metrics and Evaluation:

[5] Data from the Centers for Disease Control and Prevention WONDER databases, from the Detailed Mortality, Underlying Cause of Death tables, Drug/Alcohol-Induced Deaths.

[6] Data from the Agency for Healthcare Research and Quality (AHRQ), Healthcare Cost and Utilization Project (HCUP).

Table 1. Determinants and the data sources used for CAST modeling

Variable	*Data Source*
Gender – Percent of adult population that is male	US Census (2010) – Table SF1-QT-P1
Race – Percent of population that is non-white	American Communities Survey (2015 5-yr) – Table CP05
High school drop out rate	American Communities Survey (2015 5-yr) – Table S1501
Veteran population	American Communities Survey (2015 5-yr) – Table S2101
Prevalence of household poverty	American Communities Survey (2015 5-yr) – Table B19001
Education level	American Communities Survey (2015 5-yr) – Table S1501
Loss of spouse stress level	American Communities Survey (2015 5-yr) – Table B99124 and B99122, Population numbers from Table B01003
Prevalence of health insurance	American Communities Survey (2015 5-yr) – Table S2702
Presence of social associations	County Business Patterns, US Census (2015) – Table CB1500A11 (NAICS code 813), Population numbers from American Communities Survey Table B01003
Alcohol outlet density	US Census – Small Business Area Estimates
High Intensity Drug Trafficking Area	National HIDTA Assistance Center (2017 designations)
Violent crime level	County Health Rankings (2017) from Uniform Crime Reporting – FBI (2012-2014)
Exercise and physical activity level(2012-2014)	County Health Rankings (2017) from ArcGIS Business Analyst (2010 and 2014)
Rurality	US Census 2010 – Table SF1-P2
Hospitalization rate for drug/alcohol-induced disorders	Health Care Utilization Project State Inpatient Databases (2013) – Major Diagnostic Code 20
National hospitalization rate for drug/alcohol-induced disorders	Health Care Utilization Project (2013) Nationwide Inpatient Sample – Major Diagnostic Code 20

Table 2. Determinants, measurement unit, and notes on calculations

Variable	Measurement Unit	Notes
Disparities		
Gender	Percent of adult population that is male	
Race	Percent of population non–white (including Hispanic)	
Determinants		
High school drop out rate	Percent of adult population without a high school diploma	Sum of 'less than 9th' and '9th to 12th no diploma' education categories
Veteran population	Count	
Prevalence of household poverty	Percent of households with income below $35,000	Sum of all low–income categories through '$30,000 to $34,999'
Education level	Percent of population with a college degree	
Death of spouse stress level	Percent of population widowed or divorced in the past year	Sum of number of widowed and number of divorced individuals, divided by total population over the age of 15, multiplied by 100
Prevalence of health insurance	Percent of individuals uninsured	
Presence of social associations	Rate of associations per 100,000 people	Number of associations divided by total population over the age of 15, multiplied by 100,000
Alcohol outlet density	Rate per 100,000 people	
Violent crime level	Rate per 100,000 people	
Exercise and physical activity level	Percent of population with access to physical activity	
Rurality	Percent of population in rural area	

Table 3. VIF scores for variables with publicly available data

Determinant	VIF Score
Gender	1.382
Race	3.332
Drop out rate	3.402
Veterans	1.538
Under $35,000 income	2.669
College degree	3.348
Uninsured	1.955
Widowed/Divorced	1.187
Association density	1.336
Alcohol outlet density	1.542
Violent crime rate	1.928
Exercise access	2.484
Percent rural	3.232

Table 4. Outcome variables for substance use disorders

Variable	Measurement Unit	Notes
Hospitalization rate for drug and/or alcohol-induced disorders	Hospitalization rate per 100,000 people	Major Diagnostic Category 20 ("Alcohol/drug use and alcohol/ drug induced organic mental disorders" for 2013
Relative hospitalization rate for drug and/or alcohol-induced disorders	0=at or below national median 1=above national median	National rate from the HCUP National Inpatient Sample (NIS) estimated at 129.3 for 2013

Statistical Methods to Specify and Select Models

Once a full set of determinants and possible outcome variables was selected, we ran multiple multivariate regression models and logistic regression models to identify the models that best fit the data and that could provide meaningful information to communities and organizations using CAST.

The first set of models tested were multivariate linear regression models . We began by including the full set of determinants (listed in Table 2) and using each of several different possible outcome variables (as overviewed above). Before assessing model fit or explanatory power, we reviewed each model to identify those that did not violate any of the key assumptions of linear regression. First, we tested all independent variables for skew and kurtosis , and found that only the variable for 'Number of veterans in a county' had non-normal skew and kurtosis. However, the inclusion or exclusion of this variable in all subsequent models did not change the model fit or explanatory power, and so for conceptual reasons we chose to leave this variable in all models. Second, we assessed all residual plots of all unstandardized (with raw dependent variable) multivariate linear regression models, and we tested all of the models for normality using the Jarque-Bera test for normality , which is robust for large samples and appropriate for the relatively normal distributions of all variables in the models. We found that all unstandardized multivariate linear regressions violated the assumption of normality due to the distribution of the dependent variable.

After identifying the violations in the unstandardized models, we then used a Box Cox transformation to normalize the dependent variable. Box Cox transformations use a parametric power adjustment to normalize data, and can identify a lambda value as an exponent for transformation that is specific to the data being normalized. All of the Box Cox lambda values within the likelihood distribution for all models were tested and the normality of the models was again assessed using the methods outlined above.

[7] R package 'stats' used. Citation: R Core Team (2017). R: A language and environment for statistical computing. R Foundation for Statistical Computing, Vienna, Austria. URL https://www.R-project.org/.

[8] R package 'stats' used. Citation: R Core Team (2017). R: A language and environment for statistical computing. R Foundation for Statistical Computing, Vienna, Austria. URL https://www.R-project.org/.

[9] R package 'fBasics' used. Citation: Diethelm Wuertz, Tobias Setz and Yohan Chalabi (2017). fBasics: Rmetrics - Markets and Basic Statistics. R package version 3042.89. https://CRAN.R-project.org/package=fBasics.

[10] Thadewald, T. and Buning, H. (2007). Jarque-Bera test and its competitors for testing normality – A power comparison. Journal of Applied Statistics 34: 87-105.

[11] R package 'MASS' used. Citation: Venables, W. N. & Ripley, B. D. (2002) Modern Applied Statistics with S. Fourth Edition. Springer, New York and https://cran.r-project.org/web/packages/MASS/index.html.

[12] Box, G. E. P. and Cox, D. R. (1964) An analysis of transformations (with discussion). Journal of the Royal Statistical Society B 26: 211-252.

After eliminating all models that could not be normalized to address the assumptions of linearity, we settled on modeling the relationships between the set of determinants identified in Table 2, and the outcome variable 'Drug and/or alcohol-induced hospitalization rate' identified in Table 3.

The model outputs for a full multivariate normalized linear model (including all determinants) as well as a parsimonious multivariate normalized linear model (including only the determinants whose partial correlation coefficients were significant) are presented in Table 5 below. The adjusted R2 term demonstrate that both models explain 13% of the variation in hospitalization rate. The AIC is 29 points lower for the full model as compared to the parsimonious model, suggesting that the full model is a better fit for the data. And finally, the Jarque-Bera test suggests that both models do not violate the assumptions of linearity necessary for linear regression.

In addition to conducting multivariate linear regression in order to develop a model that can estimate a county's hospitalization rate (the application of these models will be discussed in the following section), we also conducted multivariate logistic regression using the same set of determinants and the binary outcome variable of relative hospitalization rate (relative to the national median) as described in Table 3. Like the multivariate linear regression, for the multivariate logistic regression we tested both a full model and a parsimonious model (which included fewer determinants than the parsimonious model for the multivariate linear regression). The model outputs for both the full and parsimonious multivariate logistic regression models are presented in Table 5 below. There is no exact R2 for logistic regression models, and rather than report a pseudo-R2, we focus here on the AIC fit statistic. The AIC for the full model is 32 points lower than the value for the parsimonious model, suggesting that the full model is a better fit for the data than the parsimonious model.

Table 5. Final outputs and comparisons for multivariate linear and logistic regression models

Determinant [model component designation]	Full Linear Model [a]	Parsimonious Linear Model [a]	Full Logistic Model [b]	Parsimonious Logistic Model [b]
Gender [a]	5.55E-04		9.43E-03	
Race [b]	-5.91E-03***	-5.92E-03***	-2.17E-02**	-1.601E-2**
Drop out rate [c]	-8.02E-03	-7.099E-03	3.94E-03	
Veterans [d]	2.14E-06*	2.177E-06**	3.59E-06	
Under $35,000 income [e]	1.46E-02***	1.503E-02***	2.62E-02*	3.319E-02**
College degree [f]	9.05E-03**	9.88E-03***	2.81E-02*	3.652E-02***
Uninsured [g]	-1.84E-02***	-1.98E-02***	-5.90E-02**	-6.448E-02**
Widowed/Divorced [h]	-7.45E-03		-5.96E-02.	
Association density [i]	-1.72E-04		-1.56E-03	
HIDTA designation [j]	2.12E-03		2.09E-01	
Alcohol outlet density [k]	1.32E-01***	1.262E-01***	5.84E-01***	5.123E-01**
Violent crime rate [l]	5.65E-05		4.80E-04	
Exercise access [m]	1.23E-03		8.56E-03	
Percent rural [n]	7.72E-04		4.97E-03	
Adjusted R2	.129	.130		
AIC	1671	1700	1301	1338
Jarque-Bera test	5.2 (p=.07)	5.9 (p=.05)		

. sig. .1   * sig. .05   ** sig. .01   *** .001
[a]Lambda= -.02
[b]Link function=logit

Modeling to Estimate County Hospitalization Rate and Risk Level

On the Community Characteristics (Tab 2) tab of the CAST spreadsheet, we provide estimates of a county's annual hospitalization rate and the absolute number of individuals estimated to be hospitalized annually, as well as a risk level that depicts the likelihood that a county's hospitalization rate will be above the national median hospitalization rate for drug/alcohol diagnosis, which would suggest that the county might need to further assess the determinants and disparities present in their community to address possible increased SUD rates and care needs.

Estimated County Hospitalization Rate and Count

To calculate the estimated annual county hospitalization rate per 100,000 people, the full normalized multivariate regression model described in Table 5 was used. The formula for the estimate of hospitalization rate is built into the CAST spreadsheet, on the Community Characteristics (Tab 2) tab. The regression equation can be broken down into two parts. First, the outcome variable, hospitalization rate, was standardized so that the assumptions of normality were not violated within the model. Therefore, the estimates of hospitalization rate must be calculated to reverse the Box Cox transformation. The Box Cox transformation equation is equation [1] below.

$$Y' = (Y^{\wedge\lambda} - 1)/\lambda \qquad\qquad\qquad [1]$$

Where Y' = the normalized outcome variable (hospitalization rate)
Y = the raw (non-normalized) outcome variable
λ = Box Cox power transformation parameter

In the models used in CAST, $\lambda = -.02$. Because the normalized multivariate regression model produces an estimate for Y', we then have to transform that estimate back to a non-normalized estimate for Y (hospitalization rate). The reverse transformation equation is equation [2] below.

$$Y = (1/((Y'^{*}-.02)+1))^{\wedge(1/.02)} \qquad\qquad\qquad [2]$$

We use the results of the normalized multivariate regression model to estimate Y'. The full regression model is equation [3] below. All model components in equation [3] are designated by the letter that corresponds to the determinant as presented in Table 5 above.

$$Y' = 3.656 + .000555^*a − .00591^*b − .00802^*c + \quad [3]$$
$$.00000214^*d + .0146^*e + .00905^*f − .0184^*g −$$
$$.00745^*h − .000172^*i + .00212^*j + .132^*k + .0000565^*l +$$
$$.00123^*m + .000772^*n$$

The estimated annual hospitalization rate (Y) is calculated using equations [2] and [3], and is presented in the Community Characteristics section (Tab 2) of CAST. The estimated hospitalization rate is then further transformed based on county population (as entered on the Data Input (Tab 1)) to estimate the number of individuals (count) who will be hospitalized with drug/alcohol diagnosis in a given year. The hospitalization calculation is made using equation [4] below.

$$H = (Y/100,000)^*Population \quad [4]$$

Where H = Number of individuals hospitalized
        Y = Estimated rate of hospitalization

Estimated County Risk Level

The risk level characterization is based on the specific risk score for the county calculated using the Framingham methodology. The risk score estimates the likelihood (risk) that a county's hospitalization rate due to drug/alcohol diagnosis will be above the national median hospitalization rate. To create the risk score estimates, we used the full multivariate logistic regression equation presented in Table 5 above and in Table 5a step 1 below. We follow the Framingham risk score methodology as presented in Sullivan et al. (2004). In this section, we present and describe the steps to calculate the risk score and the risk level. We provide a summary of each step and the decisions that we made within each step below, and full detail on the methodology and each step can be found in Sullivan et al. (2004).

Step 1: *Estimate parameters of a multivariate model*
        As described above, we estimated a full and a parsimonious multivariate logistic
        regression model, and we chose to calculate the risk score using the full model because
        the AIC suggested a better fit than the parsimonious model.

Table 5a. Full multivariate logistic regression model

Intercept	-3.620
Gender [a]	9.43E-03
Race [b]	-2.17E-02**
Drop out rate [c]	3.94E-03
Veterans [d]	3.59E-06
Under $35,000 income [e]	2.62E-02*
College degree [f]	2.81E-02*
Uninsured [g]	-5.90E-02**
Widowed/Divorced [h]	-5.96E-02.
Association density [i]	-1.56E-03
HIDTA [j]	2.09E-01
Alcohol outlet density [k]	5.84E-01***
Violent crime rate [l]	4.80E-04
Exercise access [m]	8.56E-03
Percent rural [n]	4.97E-03

Step 2-6: *Calculations for risk score to assign points*

In Table 6 below, we present all calculations done to assign point values to the categories of risk factors (determinants) that are included in the model.

Step 2: *Organize risk factors into categories and determine reference values for each*

In this step, each risk factor (determinant) must be organized into meaningful categories

and a reference category that reflects the least risky value of the risk factor must be selected. Because we are interested in the risk that a county will have a hospitalization rate above the national median, we are interested as well in whether the county is above the national median for each of the risk factors. We therefore organized each risk factor into three categories: any value up to the national median for that risk factor (0-50% of the distribution), any value in the third quartile (50-75%) and any value in the fourth quartile (75%-100%).

The reference value for each category is the midpoint in that category. We follow Sullivan et al.'s (2004) suggestion to manage extreme outliers by using the 1st and 99th percentile as the lower and upper bounds for the respective low and high open-ended categories.

Step 3: *Determine the reference risk factor profile*
After organizing the risk factors into meaningful category, a reference category that reflects the lowest level of risk must be selected. Because we consider any value of a given risk factor that falls within the lower half of the distribution to be 'low risk,' we selected this category to be the referent category. The reference category and its value is the variable W_{iREF} in Table 6.

Step 4: *Determine how far each category is from the base category in regression units*
The next step is to calculate how far each reference category is from the base reference category in regression units for each risk factor. The equation to determine difference is equation [5] below.

$$\beta_i(W_{ij} - W_{iREF}) \qquad\qquad\qquad\qquad [5]$$

Where β_i = Partial regression coefficient for a given risk factor from the logistic regression model in Table 5a

W_{ij} = Reference value for a given category (j) of a given risk factor (i)

W_{iREF} = Reference value for the base category (REF) of a given risk factor (i)

Step 5: *Set a constant B*

In order to assign points, we have to define a constant for the point system, which creates a reference for the number of regression units that correspond to one point in the risk score. We follow the recommendation of Sullivan et al. (2004) in selecting as a constant a well-known risk factor. We therefore let B reflect the increase in risk associated with a 5% increase in poverty rate (as measured by the variable 'Percent of households with income under $35,000'). The calculation for B is presented in equation [6] below.

$$B=5(.0262)=.131 \qquad\qquad [6]$$

Where .0262 = Partial regression coefficient for a 1% increase in households with under $35,000 income

Step 6: *Determine points associated with each of the categories of risk factors*

Points are assigned to each category of each risk factor using the regression distance calculation from step 4 and the constant B chosen in step 5. The equation for points is equation [7] below.

$$\text{Points}_{ij} = \beta_i(W_{ij} - W_{iREF})/B$$

Table 6. Risk score calculations to assign points to each risk factor category

Determinant	Categories	Reference Value (W_{ij})	β_i (Partial Coefficient)	β_i ($W_{ij}-W_{iREF}$)	Points = β_i ($W_{ij}-W_{iREF}$)/B
Gender [a]	< 61 61–64 > 64	57 = W_{aREF} 62.5 70	9.43E–03	0 .0519 .122	0 0 1
Race [b]	< 16 16–35 > 35	9 = W_{bREF} 26 60	–2.17E–02	0 –.367 –1.107	0 0 0
Dropout Rate [c]	< 13 13–19 > 19	9 = W_{cREF} 16 27	3.94E–03	0 .0276 .0709	0 0 1
Veterans [d]	< 1890 1890–5246 > 5246	981 = W_{dREF} 3568 10,292	3.59E–06	0 .00929 .0334	0 0 0
Under $35,000 Income [e]	< 39 39–46 > 46	28 = W_{eREF} 43 54	2.62E–02	0 .393 .681	0 3 5
College Degree [f]	< 18 18–24 > 24	13 = W_{fREF} 21 38	2.81E–02	0 .225 .646	0 2 5
Uninsured [g]	< 12 12–15 > 15	8 = W_{gREF} 13.5 21	–5.90E–02	0 –.325 –.767	0 0 0
Widowed/ Divorced [h]	< 8 8–10 >10	5 = W_{hREF} 9 15	–5.96E–02	0 –.238 –.596	0 0 0
Association Density [i]	< 114 151–114 > 151	71 133 300 = W_{iREF}	–1.56E–03	.357 .261 0	3 2 0

Table 6 (cont.). Risk score calculations to assign points to each risk factor category

Determinant	Categories	Reference Value (W_{ij})	β_i (Partial Coefficient)	β_i ($W_{ij}-W_{iREF}$)	Points = β_i ($W_{ij}-W_{iREF}$)/B
HIDTA [j]	No Yes	0 = W_{jREF} 1	2.09E-01	0 -.209	0 0
Alcohol Outlet Density [k]	< 2.12 2.12–2.5 > 2.5	1.66 = W_{kREF} 2.31 3.75	5.84E-01	0 .380 1.221	0 3 9
Violent Crime Rate [l]	< 198 198–325 > 325	105 = W_{lREF} 262 605	4.80E-04	0 .0754 .24	0 1 2
Exercise Access [m]	< 62 62–77 > 77	32 = W_{mREF} 70 89	8.56E-03	0 .325 .488	0 3 4
Percent Rural [n]	< 60 60–88 > 88	31 = W_{nREF} 74 94	4.97E-03	0 .212 .313	0 2 3

Step 7: *Determine risk associated with point totals*

The final step in the risk score calculation is to determine the risk associated with each point total. We first calculate the theoretical range of point totals based on the point system in Table 6. In this model, the theoretical range is 0–33 points. We then calculate a risk estimate for each point total using the multiple logistic regression equation (the model presented in Table 5a). The equation to calculate the risk estimate for each point total is equation [7] below.

$$p = 1/(1 + \exp(-(\text{intercept} + \beta_a(W_{aREF}) + \beta_b(W_{bREF}) + \ldots \beta_n(W_{nREF}) + B(\text{point total})))) \qquad [7]$$

Table 7 then presents an estimate of risk for each point total that is possible in this model. The risk estimates can be considered as a percent likelihood that the 'event' will occur. In our model, the risk estimate is the percent likelihood that a county will have a hospitalization rate above the national median hospitalization rate for drug/alcohol diagnosis.

Table 7. Estimate of risk associated with each point total

Point Total	Estimate of Risk	Point Total	Estimate of Risk	Point Total	Estimate of Risk
0	.13	12	.41	24	.77
1	.14	13	.44	25	.79
2	.16	14	.48	26	.81
3	.18	15	.51	27	.83
4	.20	16	.54	28	.85
5	.22	17	.57	29	.87
6	.24	18	.61	30	.88
7	.27	19	.64	31	.89
8	.29	20	.67	32	.91
9	.32	21	.69	33	.92
10	.35	22	.72		
11	.38	23	.75		

In steps 6 and 7, we modified the Framingham risk score methodology slightly to align the statistical model and meaning associated with the risk level for the CAST tool. In all models presented in Table 5, there are several determinants that have an inverse (negative) relationship with hospitalization rate. These include race, uninsured rate, widowed/divorced rate, and high incidence drug trafficking area. Race (percent non-white population) and uninsured rate are negatively associated with hospitalization rate because they represent disparities rather than 'healthy' or non-risky conditions. That is, access to hospital care has been shown to be more limited for non-white populations and for those who lack insurance than for white and/or insured populations. We believe that a similar relationship exists for HIDTA counties, where drug trafficking activity might reflect a broader set of social determinants that limit access to hospitalization and SUD care. Finally, the negative relationship between widowed/divorced rate and hospitalization rate is less clear, but perhaps reflects a broader isolation of this population from self-care services.

The relationships for these four determinants are included in both full models presented in Table 5 and are included on the Data Input (Tab 1) tab to both help communities include these variables in conversation and to include them in the hospitalization rate calculations presented in the Community Characteristics (Tab 2) tab. However, we do not include assign these four determinants negative points in the risk score calculation and points assignment in Table 6 because we do not see them as protective factors that actually lower the risk of SUD needs in a community. Instead, they reflect disparities related to the outcome variable, hospitalization rate, that we have chosen to use as a proxy for broader SUD needs.

Finally, in the Community Characteristics (Tab 2) tab, we do not present the specific risk score to the user. Instead, we group risk scores into levels of low, moderate and high risk, which reflect the categories of risk scores presented in Table 8 below.

Table 8. Risk level categories

Risk Level	Point Total Range (Risk Score Range)
Low	0-9 (15-32)
Moderate	10-20 (35-67)
High	21-33 (69-92)

APPENDIX C: CASE STUDY OF USING CAST IN CHESTER COUNTY, PA

In this appendix, we provide a summary and case study of the use of CAST in one county for a FQHC. This appendix has been included with the intention of highlighting how a mixed-methods approach to CAST implementation can provide users with insights that complement the mathematical modeling of the local substance abuse care system.

Using the Calculating an Adequate System Tool (CAST) to supplement the Chester County Substance Abuse Care System Assessment

Brandn Green, PhD

Introduction

La Comunidad Hispana (LCH), a federally-qualified health center, sought out and won a Health Resources & Services Administration (HRSA) grant to help them integrate behavioral health with the physical health services in Southern Chester County, PA. As part of the grant requirement, they needed to complete a capacity assessment for service delivery in the county. From their experiences, they had observed for some time the difficulties that the populations they served had in obtaining substance abuse services. Moreover, their clients also reported concerns of adequacy of substance abuse services.

LCH reached out to an evaluator who had significant background in public health and access to care issues, Health Equity Associates (HEA), to characterize the substance abuse treatment delivery system in Chester County. LCH requested a multiple methods evaluation with key informant interviews of both county/agency leaders and those who receive SUD treatment services. LCH expressed an interest in obtaining many different and innovative data sources.

HEA discovered the CAST tool during its initial literature review for LCH and recommended that LCH authorize its use as part of the assessment. After approval for inclusion of CAST, staff for HEA contacted Dr. Green, the lead author of CAST.

[The CAST paper is open access and can be accessed on the Preventing Chronic Disease website].

CAST Background

CAST is intended to be used for reviewing the capacity of the substance abuse care system within a defined geographic area. CAST is an excel spreadsheet that incorporates known social and community determinants of substance abuse to calculate local service need. Most often, CAST has been used to estimate need for a county. CAST was developed by an interdisciplinary group of researchers at the Substance Abuse and Mental Health Services Administration (SAMHSA) Center for Behavioral Health Statistics and Quality (CBHSQ).

CAST can be used to:
- Assess the presence of chronic social and community conditions that increase the substance abuse in your community
- Observe the gaps and potential redundancies in the substance abuse care system of your community
- Generate estimates of need that can help to inform community or organizational planning efforts

Using CAST in Chester County

As part of a mixed-methods and team approach, Dr. Green was added to the project. He completed the CAST spreadsheet and provided interpretation of the results to HEA. In total, CAST requires users to input forty-five values, all but five of which can be identified via publically available secondary data sources. A draft of the CAST handbook which details the sources and process for data collection and input is available, as is technical assistance from Dr. Green, for communities looking to complete CAST for their geographic area.

CAST produces estimates of need for thirty elements of a county-level substance abuse care system. These estimates are numerical, as the output of CAST quantifies need or extra capacity.

The full Chester County assessment was completed over four months which included a six-week period for literature review and key informant tool development. The CAST data instrument took 3 weeks to complete. Additional time was spent interpreting the CAST results, engaging in discussion with key leaders about the implications of the CAST results, and confirming the accuracy of the results. Based upon the experience in Chester, the full mixed-methods process is estimated to be able to be completed in 3-5 months.

CAST was able to provide specific findings in Chester County, findings that were verified via the qualitative interviews and site reviews. One value of CAST is that the findings are specific and precise, enabling LCH and local health partners capacities to address service gaps by targeted expansion of services across the continuum of care.

Here are ten (10) key findings of the CAST tool for Chester County:
- Additional detox capacity is needed
- More longer term (> 30 day) treatment capacity is needed
- Increased number of counselors and therapists
- Increased number of social workers
- A needle exchange program tends to be available in areas similar to Chester County
- Increased housing, parenting and employment supports are indicated
- Increase training of primary care providers in substance abuse disorders
- Increased school and community-based prevention programs
- Increased numbers of Twelve Step programs
- Possible need for more youth and adult drug courts

Value and Limitations of CAST

The CAST tool provided leaders in Chester County with an objective basis for policy discussions at the county level. LCH staff also found it useful as a way to step back and think about how what they do interfaces with the SUD treatment system and their role as advocates for health equity. Moreover, the innovative linking of social and community determinants with the demands on the substance abuse care system enabled broader conversations within Chester County about the chronic conditions that may be contributing to the substance utilization patterns they are observing in their care system.

While the CAST tool provides an objective review of the projected and actual number of needed treatment and prevention modalities, it does not yet capture the quality of the existing modalities. A community may have a residential treatment facility but if it is not functioning appropriately, should it be counted as an existing provider? Communities interested in assessing their treatment systems should strongly consider review of facility inspection reports and information from those attempting to receive or those who receive services.

The mixed-methods approach used in Chester suggests a model for doing county-level substance use care system assessments that integrate qualitative data collection via key informants, quantitative modeling of the care system with CAST, and use of facility reports of quality of care, to produce localized, contextual, assessments that integrate the social and community conditions of a county. The final report was provided to La Communidad Hispana on 11/29/2017. Facilitated review of the report is ongoing, and the impacts and contributions of the CAST tool will be further investigated in follow-up from Dr. Green and colleagues.