






**CSTE
DRUG OVERDOSE
SURVEILLANCE
WORKSHOP**

Exercise #1: “Snap Shot” Worksheet

Instructions: For each of the topics in the grid below, use a green dot to indicate a high level of knowledge and expertise (a.k.a., “crushing it”), a yellow dot to indicate moderate knowledge or expertise (a.k.a., “getting there”), or a red dot to indicate a low level of knowledge or expertise (a.k.a., “need help”). Use the space below where you place the dot to add context or comments, as needed. Please assess your overall knowledge and expertise, rather than opioid-specific knowledge and expertise.

Stakeholder Analysis and Mapping	Identifying Data Sources and Indicators	Accessing and Synthesizing Data from Multiple Sources
Conducting Data Analysis	Data Governance and Sharing	Transforming Data into Information
Data Visualization Tools and Techniques	Data Dissemination Tools and Techniques	Effective Communication with Key Stakeholders

KEY:

-  = “Crushing it”
-  = “Getting there”
-  = “Need help”

Setting the Stage:

A Brief Overview of the Opioid Crisis in America



Regional Spotlight



Action Plan for Opioid Surveillance



Example: Action Plan for Opioid Surveillance

Name of Jurisdiction:	<i>ABC Department of Public Health</i>
Date:	<i>03/15/19</i>
Team Members:	<i>J. Smith, K. Jones</i>

New stakeholders in our jurisdiction to engage in opioid surveillance include:		
Stakeholder	Contact (if known)	Who will follow-up and by when?
<i>State EMS Bureau</i>	<i>P. Clark</i>	<i>J. Smith will send email to P. Clark by 4/1/19; follow-up as needed by 4/15/19</i>
<i>State Board of Pharmacy</i>	<i>J. Rollins</i>	<i>K. Jones will have discussion with J. Rollins during pharmacy meeting scheduled on 4/1/19</i>
<i>Governor</i>	<i>B. Bland</i>	<i>J. Smith will schedule time to meet with Governor Bland at upcoming legislative breakfast meeting</i>

Currently, the most important data sources and indicators in our jurisdiction include:	
Data Source	Indicator
<i>Vital statistics / death certificates</i>	<i>Opioid-related deaths, by demographic subgroups</i>
<i>Coroner / Medical Examiner</i>	<ul style="list-style-type: none"> <i>Opioid-related deaths</i> <i>Comorbidities</i>
<i>EMS</i>	<i>Nonfatal overdoses</i>
<i>Hospital discharge dataset</i>	<i>Nonfatal overdoses</i>
<i>PDMP</i>	<i>Opioid prescribing</i>

Data sources and indicators to explore for future use include:		
Data Source	Indicator	Steps to move this forward
<i>All payer claims database</i>	<i>Individuals diagnosed with opioid misuse disorder</i>	<i>K. Jones will identify appropriate contact in state hospital association and arrange meeting by 4/15/19</i>

Analytic methods to apply or learn more about include:	
Analytic method	Steps to move this forward
<i>Explore claims-based predictors of opioid misuse and/or overdose</i>	<i>J. Smith will meet with data analytics team by 4/1/19</i>

Key data visualization strategies and tools to reach our stakeholders include:		
Stakeholder	Visualization Strategy	Visualization Tool
<i>Governor</i>	<i>Highlight areas with highest age-adjusted opioid overdose rates</i>	<i>Heat map of state</i>

Key data dissemination strategies and tools to reach our stakeholders include:		
Stakeholder	Dissemination Strategy	Dissemination Tool
<i>Governor</i>	<i>Provide state-level data on an annual basis to enhance awareness and inform decision making</i>	<i>Infographic containing a heat map to highlight areas with highest opioid overdose rates</i>

Strategies and tools to explore or learn more include:	
Strategy or Tool	Tasks to move this forward
<i>Dashboard (external and internal versions)</i>	<i>K. Jones and J. Smith will meet with IT team by 4/15/19 to assess feasibility of using Tableau to build opioid surveillance dashboard(s)</i>

This action plan and workshop will be shared with:	
Colleague, Partner or Other Stakeholder	Next steps to move this forward
<i>State Health Director (L. Brown)</i>	<i>J. Smith will schedule meeting with L. Brown to occur prior to 5/1/19</i>
<i>Director of State Behavioral Health Department (S. Shore)</i>	<i>K. Jones will have an initial discussion with S. Shore at opioid surveillance meeting scheduled for 5/5/19</i>

Additional tasks, ideas, and actions include:	
Task, Idea, or Action	Next steps to move this forward
<i>Meet with internal team to complete stakeholder analysis and mapping</i>	<i>J. Smith will add this activity to the team meeting scheduled for 4/20/19</i>
<i>Share storyboard with internal team and communications department</i>	<i>K. Jones will schedule a meeting with the communications team by 4/30/19</i>
<i>Share this action plan with internal team</i>	<i>J. Smith will distribute it and add it as a discussion to agenda for 3/30/19 meeting</i>

Assess the Stakeholder Landscape



Exercise #3a: Stakeholder Analysis Worksheet

Instructions: Refer to the reference document, entitled *Examples of Opioid Surveillance Stakeholders*, to review and consider the broad range of actual and potential stakeholders related to opioid surveillance. In the first column, list the opioid surveillance stakeholders that are most important to your own opioid surveillance efforts. In each of the next columns, answer the questions to enhance your understanding of each stakeholder.

Stakeholder <i>(List one stakeholder per row; an example is shown in first row)</i>	A. What are the opioid issues of most importance to this stakeholder?	B. Is the stakeholder a data provider, user, or both?	D. Do we have a point of contact within this stakeholder group? If so, who?	E. What are our next steps?
State Hospital Association	<i>Reducing opioid overdose encounters at hospitals across the state</i>	<i>Mainly a data provider, but might be interested in using data too</i>	<i>Yes, we've worked with J. Smith through work we are doing on Project X.</i>	<i>S. Jones will contact J. Smith at the hospital association to arrange a call or meeting</i>

Exercise #3a: Stakeholder Analysis Worksheet

Stakeholder <i>(List one stakeholder per row; an example is shown in first row)</i>	A. What are the opioid issues of most importance to this stakeholder?	B. Is the stakeholder a data provider, user, or both?	D. Do we have a point of contact within this stakeholder group? If so, who?	E. What are our next steps?

Exercise #3a: Stakeholder Analysis Worksheet

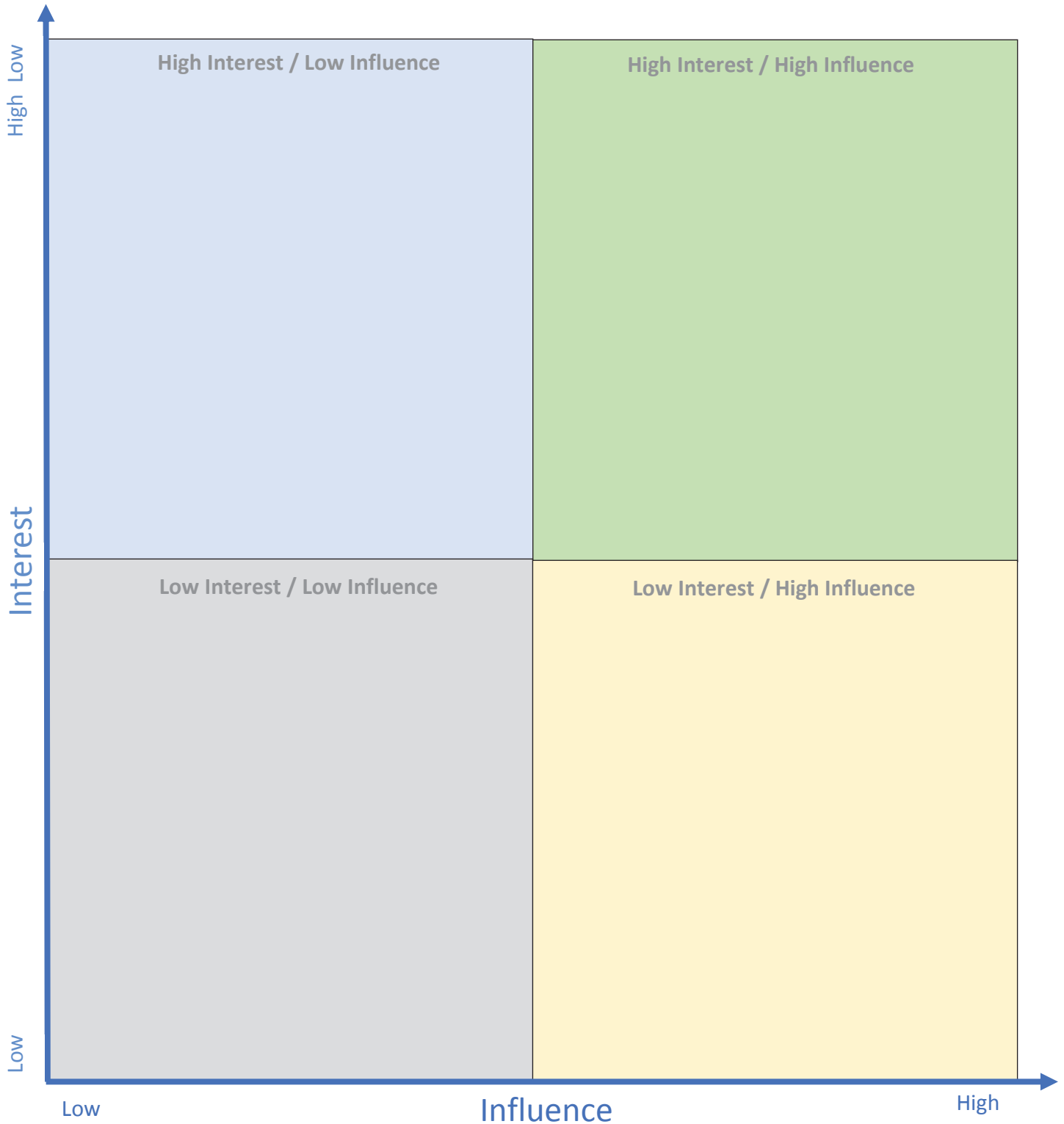
Stakeholder <i>(List one stakeholder per row; an example is shown in first row)</i>	A. What are the opioid issues of most importance to this stakeholder?	B. Is the stakeholder a data provider, user, or both?	D. Do we have a point of contact within this stakeholder group? If so, who?	E. What are our next steps?

Exercise #3a: Stakeholder Analysis Worksheet

Stakeholder <i>(List one stakeholder per row; an example is shown in first row)</i>	A. What are the opioid issues of most importance to this stakeholder?	B. Is the stakeholder a data provider, user, or both?	D. Do we have a point of contact within this stakeholder group? If so, who?	E. What are our next steps?

Exercise #3b: Stakeholder Mapping Matrix

Instructions: Refer to the reference document, entitled *Examples of Opioid Surveillance Stakeholders*, to review and consider the broad range of actual and potential stakeholders related to opioid surveillance. Assess each based on their level of interest and level of influence. Level of interest indicates how readily they could be engaged at an appropriate level in your opioid surveillance efforts, and level of influence indicates the formal or informal power they have to influence your opioid surveillance efforts either positively or negatively. Add each stakeholder to the Stakeholder Mapping Matrix shown below.



Lunch and Presentation



















Assess the Data Landscape















Exercise #4: Data Inventory Worksheet

















Instructions: Refer to the reference document, entitled *Opioid Data Source Inventory*, to obtain more information about potential data sources related to opioid surveillance. For each of the data sources listed in Column A, use Column B to indicate your current access to and interest in accessing the data source. For any data source where you indicated that you are using it, working on it, or stuck, use Column C to briefly describe how you could improve or accelerate your use of the data source and use Column D to outline your next steps.

A. Data Source	B. Describe your current access to and interest in using this data source?	C. How could your use of this data source be improved or accelerated?	D. What are your next steps?
Death certificate data	<input checked="" type="radio"/> Using it  <input type="radio"/> Working on it  <input type="radio"/> Stuck  <input type="radio"/> Not now 		
Coroner or medical examiner data	<input checked="" type="radio"/> Using it  <input type="radio"/> Working on it  <input type="radio"/> Stuck  <input type="radio"/> Not now 		
Emergency departments and/or hospital discharge data	<input checked="" type="radio"/> Using it  <input type="radio"/> Working on it  <input type="radio"/> Stuck  <input type="radio"/> Not now 		
Police data	<input checked="" type="radio"/> Using it  <input type="radio"/> Working on it  <input type="radio"/> Stuck  <input type="radio"/> Not now 		

















Exercise #4: Data Inventory Worksheet

A. Data Source	B. Describe your current access to and interest in using this data source?	C. How could your use of this data source be improved or accelerated?	D. What are your next steps?
911 call data	<input checked="" type="radio"/> Using it  <input type="radio"/> Working on it  <input type="radio"/> Stuck  <input type="radio"/> Not now 		
Emergency medical service (EMS) data	<input checked="" type="radio"/> Using it  <input type="radio"/> Working on it  <input type="radio"/> Stuck  <input type="radio"/> Not now 		
Syndromic surveillance data (via NSSP/Biosense)	<input checked="" type="radio"/> Using it  <input type="radio"/> Working on it  <input type="radio"/> Stuck  <input type="radio"/> Not now 		
Drug Enforcement Administration (DEA) Automation of Reports and Consolidated Orders System (ARCOS)	<input checked="" type="radio"/> Using it  <input type="radio"/> Working on it  <input type="radio"/> Stuck  <input type="radio"/> Not now 		

















Exercise #4: Data Inventory Worksheet

A. Data Source	B. Describe your current access to and interest in using this data source?	C. How could your use of this data source be improved or accelerated?	D. What are your next steps?
National Survey of Drug Use and Health (NSDUH)	<input checked="" type="radio"/> Using it  <input type="radio"/> Working on it  <input type="radio"/> Stuck  <input type="radio"/> Not now 		
National HIV Risk Behavior Survey (NHBS)	<input checked="" type="radio"/> Using it  <input type="radio"/> Working on it  <input type="radio"/> Stuck  <input type="radio"/> Not now 		
Behavioral Risk Factor Surveillance System (BRFSS)	<input checked="" type="radio"/> Using it  <input type="radio"/> Working on it  <input type="radio"/> Stuck  <input type="radio"/> Not now 		
Youth Risk Behavior Survey (YRBS)	<input checked="" type="radio"/> Using it  <input type="radio"/> Working on it  <input type="radio"/> Stuck  <input type="radio"/> Not now 		















Exercise #4: Data Inventory Worksheet

A. Data Source	B. Describe your current access to and interest in using this data source?	C. How could your use of this data source be improved or accelerated?	D. What are your next steps?
Prescription Drug Monitoring Program (PDMP) data	<input checked="" type="radio"/> Using it  <input type="radio"/> Working on it  <input type="radio"/> Stuck  <input type="radio"/> Not now 		
Claims data from All Payer Claims Database (APCD) or Medicare	<input checked="" type="radio"/> Using it  <input type="radio"/> Working on it  <input type="radio"/> Stuck  <input type="radio"/> Not now 		
Clinical and pharmacy data from Electronic Health Record, health information exchange, or claims data	<input checked="" type="radio"/> Using it  <input type="radio"/> Working on it  <input type="radio"/> Stuck  <input type="radio"/> Not now 		
Treatment Episode Data Set (TEDS)	<input checked="" type="radio"/> Using it  <input type="radio"/> Working on it  <input type="radio"/> Stuck  <input type="radio"/> Not now 		

Exercise #4: Data Inventory Worksheet

A. Data Source	B. Describe your current access to and interest in using this data source?	C. How could your use of this data source be improved or accelerated?	D. What are your next steps?
State Unintentional Drug Overdose Reporting System (SUDORS)	<input checked="" type="radio"/> Using it  <input type="radio"/> Working on it  <input type="radio"/> Stuck  <input type="radio"/> Not now 		
American Association of Poison Control Center's National Poison Data System (NPDS)	<input checked="" type="radio"/> Using it  <input type="radio"/> Working on it  <input type="radio"/> Stuck  <input type="radio"/> Not now 		
<i>Other, specify:</i>	<input checked="" type="radio"/> Using it  <input type="radio"/> Working on it  <input type="radio"/> Stuck  <input type="radio"/> Not now 		
<i>Other, specify:</i>	<input checked="" type="radio"/> Using it  <input type="radio"/> Working on it  <input type="radio"/> Stuck  <input type="radio"/> Not now 		

Exercise #4: Data Inventory Worksheet

A. Data Source	B. Describe your current access to and interest in using this data source?	C. How could your use of this data source be improved or accelerated?	D. What are your next steps?
<i>Other, specify:</i>	<input type="radio"/> Using it  <input type="radio"/> Working on it  <input type="radio"/> Stuck  <input type="radio"/> Not now 		
<i>Other, specify:</i>	<input type="radio"/> Using it  <input type="radio"/> Working on it  <input type="radio"/> Stuck  <input type="radio"/> Not now 		
<i>Other, specify:</i>	<input type="radio"/> Using it  <input type="radio"/> Working on it  <input type="radio"/> Stuck  <input type="radio"/> Not now 		
<i>Other, specify:</i>	<input type="radio"/> Using it  <input type="radio"/> Working on it  <input type="radio"/> Stuck  <input type="radio"/> Not now 		

**Access and Analyze Data
and Indicators**



Exercise #5: Governance and Analytic Planning Worksheet

Instructions: As a group, we will work together on a Medicaid-related example to complete the first row of this worksheet. On your own or with your team, refer to your Data Inventory Worksheet (completed as Exercise #4) to identify at least one other data source that is important to your jurisdiction’s opioid surveillance plan. For each of the data sources you identify, complete columns B through F.

A. Data Source	B. Governance Questions	C. DUA Needed? (Yes/No)	D. Variables of Interest to Us	E. Indicators/Measures of Interest to Us	F. Analytic Approach
<p>Example: Medicaid Claims</p>	<ul style="list-style-type: none"> ▪ Does Medicaid need to review results? ▪ What small cell restrictions apply? ▪ Does Medicaid want to be listed as a source? 	<p>Yes</p>	<ul style="list-style-type: none"> ▪ Encounter data ▪ Member age ▪ Member location ▪ Gender ▪ Race and ethnicity ▪ Diagnosis codes 	<ul style="list-style-type: none"> ▪ Prevalence of opioid overdose among members ▪ Count of opioid overdose ED visits ▪ Average overdose events per member 	<ul style="list-style-type: none"> ▪ Identify opioid overdose events ▪ Count events and unique patients ▪ Express event rate and prevalence rate ▪ Calculate mean

Exercise #5: Governance and Analytic Planning Worksheet

A. Data Source	B. Governance Questions	C. DUA Needed? (Yes/No)	D. Variables of Interest	E. Indicators/Measures of Interest	F. Analytic Approach






Transform and Visualize Data



Exercise #6. Storyboarding for Data Visualization

Instructions: Using blank flipcharts or a whiteboard as a canvas, create a storyboard with your team by doing the following:

- (1) Review the data tables provided to you during the workshop; take note of the data points or observations of most interest to you and/or your stakeholders;
- (2) From all the data points or observations, select five and record one on each of the five **green** post-it notes;
- (3) From the five observations, select the two that currently matter most to you and/or your stakeholders: record one on each of the **yellow** post-it notes;
- (4) For each of the two observations on yellow post-it notes, identify two stakeholders with whom you'd like to share that data or observation: note one stakeholder on each of the **orange** post-it notes;
- (5) For each stakeholder, identify the key message that you would like to share about the observations: record one key message on each of the **purple** post-it notes;
- (6) For each of the key messages, identify up to two visualization strategies (i.e., bar chart, scatterplot, heat map) that are best per stakeholder and message; record a strategy on each of the **blue** post-it notes to complete your storyboard.

<p>1. What do you observe?</p>	
<p>2. Which observations matter most now?</p>	
<p>3. Which stakeholders do you want to communicate with now?</p>	
<p>4. What is the message to each stakeholder, for each observation?</p>	
<p>5. Which visualization strategies are best for that stakeholder and message?</p>	

Use and Disseminate Data



Exercise #7: Data Dissemination Planning Worksheet

Instructions: Refer to the Stakeholder Analysis worksheet that you completed on the first day of the workshop. In the first column, list the opioid surveillance stakeholders that are most important to your own opioid surveillance efforts. In each of the next columns, answer the questions designed to assist you in developing a plan to disseminate important information, findings, and/or results to your key stakeholders.

A. To which specific stakeholders will we disseminate information? (List one stakeholder per row; an example is shown in first row)	B. What information will be shared?	C. In what format(s) will the information be shared?	D. How frequently will information be shared?	E. How will we obtain guidance or feedback about the information shared?	G. What are our next steps?
EXAMPLE: Governor	a) Number and rate of opioid overdoses per year b) Ways in which opioid surveillance data are being used by public health agency	Opioid Surveillance Report	Annually	Request in-person meeting with Governor and/or health staffers to occur within 30-days of sending report to Governor's office	S. Jones will send the report to the Governor's office on January 15, 2019 and follow-up by phone on January 20, 2019 to request an in-person meeting.

Exercise #7: Data Dissemination Planning Worksheet

A. To which specific stakeholders will we disseminate information? <i>(List one stakeholder per row; an example is shown in first row)</i>	B. What information will be shared?	C. In what format(s) will the information be shared?	D. How frequently will information be shared?	E. How will we obtain guidance or feedback about the information shared?	G. What are our next steps?

Exercise #7: Data Dissemination Planning Worksheet

A. To which specific stakeholders will we disseminate information? <i>(List one stakeholder per row; an example is shown in first row)</i>	B. What information will be shared?	C. In what format(s) will the information be shared?	D. How frequently will information be shared?	E. How will we obtain guidance or feedback about the information shared?	G. What are our next steps?

Exercise #7: Data Dissemination Planning Worksheet

A. To which specific stakeholders will we disseminate information? <i>(List one stakeholder per row; an example is shown in first row)</i>	B. What information will be shared?	C. In what format(s) will the information be shared?	D. How frequently will information be shared?	E. How will we obtain guidance or feedback about the information shared?	G. What are our next steps?

Putting It All Together:

Developing an Action Plan for Opioid Surveillance



Action Plan for Opioid Surveillance

Name of Jurisdiction:	
Date:	
Team Members:	

New stakeholders in our jurisdiction to engage in opioid surveillance include:		
Stakeholder	Contact (if known)	Who will follow-up and by when?

Currently, the most important data sources and indicators in our jurisdiction include:	
Data Source	Indicator

Data sources and indicators to explore for future use include:

Data Source	Indicator	Steps to move this forward

Analytic methods to apply or learn more about include:

Analytic method	Steps to move this forward

Key data visualization strategies and tools to reach our stakeholders include:

Stakeholder	Visualization Strategy	Visualization Tool

Key data dissemination strategies and tools to reach our stakeholders include:

Stakeholder	Dissemination Strategy	Dissemination Tool

Strategies and tools to explore or learn more include:

Strategy or Tool	Tasks to move this forward

This action plan and workshop will be shared with:

Colleague, Partner or Other Stakeholder	Next steps to move this forward

Additional tasks, ideas, and actions include:

Task, Idea, or Action	Next steps to move this forward

Reference Documents



GLOSSARY

Acute Pain – Pain that usually starts suddenly and has a known cause, like an injury or surgery. It normally gets better as your body heals and lasts less than three months.

Addiction – Combination of the physical dependence on, behavioral manifestations of, the use of, and subjective sense of need and craving for a psychoactive substance, leading to compulsive use of the substance either for its positive effects or to avoid negative effects associated with abstinence from that substance.

Benzodiazepines – Sometimes called “benzos,” these are sedatives often used to treat anxiety, insomnia, and other conditions. Combining benzodiazepines with opioids increases a person’s risk of overdose and death.

Buprenorphine – An opioid medication used to treat opioid addiction in the privacy of the physician’s office. This is a partial opioid agonist (a drug that binds to and activates a given receptor, but only has partial efficacy) for treatment that relieves drug cravings without producing the “high” or dangerous side effects of other opioids.

Chronic pain – Pain that lasts 3 months or more and can be caused by a disease or condition, injury, medical treatment, inflammation, or even an unknown reason.

Drug – A chemical compound or substance that can alter the structure and function of the body. Psychoactive drugs affect the function of the brain.

Drug misuse – The use of prescription drugs without a prescription or in a manner other than as directed by a doctor, including use without a prescription of one’s own; use in greater amounts, more often, or longer than told to take a drug; or use in any other way not directed by a doctor.

Drug abuse or addiction – Dependence on a legal or illegal drug or medication. See Opioid use disorder.

Fentanyl – Pharmaceutical fentanyl is a synthetic opioid pain medication, approved for treating severe pain, typically advanced cancer pain. It is 50 to 100 times more potent than morphine. However, illegally made fentanyl is sold through illegal drug markets for

its heroin-like effect, and it is often mixed with heroin and/or cocaine as a combination product.

Harm Reduction – In the context of alcohol and other drugs, harm reduction refers to policies or programs that focus directly on reducing the harm resulting from the use of alcohol or other drugs, both to the individual and the larger community. The term is used particularly for policies or programs that aim to reduce the harm without necessarily requiring abstinence. Some harm reduction strategies designed to achieve safer drug use may, however, precede subsequent efforts to achieve total abstinence. Examples of harm reduction include needle/syringe exchanges to reduce rates of needle-sharing among injecting drug users.

Heroin – An illegal, highly addictive opioid drug processed from morphine.

Illicit drugs – The non-medical use of a variety of drugs that are prohibited by law. These drugs can include: amphetamine- type stimulants, marijuana/cannabis, cocaine, heroin and other opioids, synthetic drugs, and MDMA (ecstasy).

Medication-assisted treatment (MAT) – Treatment for opioid use disorder combining the use of medications (methadone, buprenorphine, or naltrexone) with counseling and behavioral therapies.

Methadone – The most frequently used opioid agonist medication. Methadone is a synthetic analgesic opioid that is similar to morphine in its effects but longer acting. It is used as a substitute drug in the treatment of morphine and heroin addiction.

Morphine – A strong opioid medicine, the gold standard for treatment of moderate to severe pain. Morphine is considered an essential medicine by the World Health Organization in its injectable, tablet, and oral solution formulations. Oral solution mixed from morphine powder is the cheapest formulation.

Morphine milligram equivalents (MME) – The amount of milligrams of morphine an opioid dose is equal to when prescribed. This is how to calculate the total amount of opioids, accounting for differences in opioid drug type and strength.

Naloxone – A prescription drug that can reverse the effects of opioid overdose and can be life-saving if administered in time. The drug is sold under the brand name Narcan or Evzio.

Nonmedical use – Taking drugs, whether obtained by prescription or otherwise, not in the way, for the reasons, or during the time period prescribed. Or the use of prescription drugs by a person for whom the drug was not prescribed.

Non-opioid therapy – Methods of managing chronic pain that do not involve opioids. These methods can include, but are not limited to, acetaminophen (Tylenol[®]) or ibuprofen (Advil[®]), cognitive behavioral therapy, physical therapy and exercise, medications for depression or for seizures, or interventional therapies (injections).

Non-pharmacologic therapy – Treatments that do not involve medications, including physical treatments (e.g., exercise therapy, weight loss) and behavioral treatments (e.g., cognitive behavioral therapy).

Opiate – One of a group of alkaloids derived from the opium poppy with the ability to induce analgesia (the inability to feel pain), euphoria and, in higher doses, stupor, coma, and respiratory depression. The term opiate excludes synthetic opioids.

Opioid – Natural or synthetic chemicals that interact with opioid receptors on nerve cells in the body and brain and reduce the intensity of pain signals and feelings of pain. This class of drugs includes the illegal drug heroin, synthetic opioids such as fentanyl, and pain medications available legally by prescription, such as oxycodone, hydrocodone, codeine, morphine, and many others. Opioid pain medications are generally safe when taken for a short time and as prescribed by a doctor, but because they produce euphoria in addition to pain relief, they can be misused.

Opioid use disorder – A problematic pattern of opioid use that causes significant impairment or distress. A diagnosis is based on specific clinical criteria such as unsuccessful efforts to cut down or control use, or use resulting in social problems and a failure to fulfill obligations at work, school, or home, among other criteria. Opioid use disorder has also been referred to as “**opioid abuse or dependence**” or “**opioid addiction.**”

Overdose – Injury to the body (poisoning) that happens when a drug is taken in excessive amounts. An overdose can be fatal or nonfatal.

Physical dependence – Adaptation to a drug that produces symptoms of withdrawal when the drug is stopped.

Prescription opioids – Also referred to as “opioid analgesics,” these are medications that have been used to treat moderate to severe pain in some patients. Categories of opioids for mortality data include:

Natural opioid analgesics, including morphine and codeine;

Semi-synthetic opioid analgesics, including drugs such as oxycodone, hydrocodone, hydromorphone, and oxymorphone;

Methadone, a synthetic opioid;

Synthetic opioid analgesics other than methadone, including drugs such as tramadol and fentanyl.

Prescription drug monitoring programs (PDMPs) – State-run electronic databases that track controlled substance prescriptions. PDMPs help providers identify patients at risk of opioid misuse, abuse and/or overdose due to overlapping prescriptions, high dosages, or co-prescribing of opioids with benzodiazepines.

Tolerance – Reduced response to a drug with repeated use.

Source: Adapted from the CDC (<https://www.cdc.gov/drugoverdose/opioids/terms.html>) and the Global Health Education and Learning Incubator at Harvard University (<https://bit.ly/2PCoOMj>).

General Background Material on Drug Overdose

Key DUIP/NCHS Publications on Drug Overdose and Opioid Prescribing

- 2018 Surveillance_Report on Drug Related Risks and Outcomes
- CDC Guideline for Prescribing Opioids for Chronic Pain
- MMWR overview of drug overdose deaths or recent NCHS reports
 - Drug and Opioid-Involved Overdose Deaths — United States, 2013–2017 (MMWR)
 - Overdose Deaths Involving Opioids, Cocaine, and Psychostimulants — United States, 2015–2016 (MMWR)
 - Drugs Most Frequently Involved in Drug Overdose Deaths: United States, 2011–2016
 - Increases in Drug and Opioid-Involved Overdose Deaths — United States, 2010–2015 (MMWR)
 - Increases in Drug and Opioid Overdose Deaths — United States, 2000–2014 (MMWR)
 - Drug Overdose Deaths in the United States, 1999–2015
 - Drugs Most Frequently Involved in Drug Overdose Deaths: United States, 2010–2014
- Opioid prescribing rates and/or overdose deaths related to opioid pain relievers
 - Vital Signs: Opioid Prescribing (2017)
 - Vital Signs: Opioid Painkiller Prescribing (2014)
 - Vital Signs: Prescription Painkiller Overdoses (2013) (Focus on women)
 - Vital Signs: Prescription Painkiller Overdoses (2012)
 - Vital Signs: Prescription Painkiller Overdoses in the US (2011)
 - MMWRs on overdose deaths related to methadone
 - Methadone Prescribing and Overdose and the Association with Medicaid Preferred Drug List Policies — United States, 2007–2014
 - Risk for Overdose from Methadone Used for Pain Relief — United States, 1999–2010

Recent Background on Heroin, Fentanyl and Fentanyl Analogs

- Heroin
 - Vital Signs: Today's Heroin Epidemic (2015)
 - Relationship between Nonmedical Prescription-Opioid Use and Heroin Use
 - Drug-poisoning Deaths Involving Heroin: United States, 2000–2013
- Fentanyl
 - Health advisories issued by CDC related to fentanyl
 - Increases in Fentanyl Drug Confiscations and Fentanyl-related Overdose Fatalities (10/2015)
 - Influx of Fentanyl-laced Counterfeit Pills and Toxic Fentanyl-related Compounds Further Increases Risk of Fentanyl-related Overdose and Fatalities (8/2016)
 - Rising Numbers of Deaths Involving Fentanyl and Fentanyl Analogs, Including Carfentanil, and Increased Usage and Mixing with Non-opioids (7/2018)
 - Fentanyl overdoses
 - Deaths Involving Fentanyl, Fentanyl Analogs, and U-47700 — 10 States, July–December 2016 (Used SUDORS data)
 - Fentanyl Law Enforcement Submissions and Increases in Synthetic Opioid-Involved Overdose Deaths — 27 States, 2013–2014
 - Notes from the Field: Overdose Deaths with Carfentanil and Other Fentanyl Analogs Detected — 10 States, July 2016–June 2017 (Used SUDORS data)
- Overlap of Heroin/Fentanyl Overdoses and Supply
 - Trends in Deaths Involving Heroin and Synthetic Opioids Excluding Methadone, and Law Enforcement Drug Product Reports, by Census Region — United States, 2006–2015

- Supply of illicit and prescription opioids
 - Notes from the Field: Fentanyl Drug Submissions — United States, 2010–2017
 - 2018 National Drug Threat Assessment : Most current drug threat assessment released by DEA.
 - 2017 National Drug Threat Assessment (2017):
 - Supply of fentanyl 2012-2015 by state: Web pages tracking growth in fentanyl law enforcement submission by state from 2013 to 2015
 - Counterfeit Prescription Pills Containing Fentanyls: A Global Threat (2016)
 - Special report on increased supply of illicitly-made fentanyl using NFLIS data (2016)
 - DEA special laboratory and research testing: Emerging threat reports (Ongoing): The DEA special laboratory provides quarterly updates on fentanyl analogs it is has detected in the drug products tested at their laboratory as well as annual summaries. Although DEA tests only a small sample of drug products, these reports are valuable in detecting new drug products or widening of emerging threats Data is only available at the national level.
 - NFLIS Annual Report 2017
 - The report contains a chart listing the most commonly found fentanyl analogs or fentanyl-related drug products tested and reported to NFLIS in 2016 (p. 11). Specifically, furanyl fentanyl (2,273), acetyl fentanyl (1,669), and 3-methylfentanyl (427) as well as other synthetic opioids illicitly manufactured such as U-47700 (553). More information on carfentanil (not listed, but linked to major outbreaks of overdose deaths) is provided in the 2017 National Drug Threat Assessment section.
- State reports on outbreaks involving fentanyl overdose deaths
 - Massachusetts
 - Characteristics of Fentanyl Overdose — Massachusetts, 2014–2016 (MMWR publication)
 - Massachusetts Epi-Aid report, *available upon request*
 - Ohio
 - Increases in Fentanyl-Related Overdose Deaths — Florida and Ohio, 2013–2015 (MMWR publication on Epi-Aid in Ohio and similar investigation in Florida)
 - Undetermined risk factors for fentanyl-related overdose deaths — Ohio, 2015 (EpiAid 2016-003): Trip Report – Epi2: SUDORS interface used to collect medical examiner and coroner data.
 - Overdose Deaths Related to Fentanyl and Its Analogs — Ohio, January–February 2017
 - California:
 - Counterfeit Norco Poisoning Outbreak — San Francisco Bay Area, California, March 25–April 5, 2016
 - Connecticut:
 - Multiple Fentanyl Overdoses — New Haven, Connecticut, June 23, 2016
 - Georgia:
 - Notes from the Field: Counterfeit Percocet–Related Overdose Cluster — Georgia, June 2017
 - New Hampshire:
 - HotSpot Report - The New Hampshire HotSpot study was conducted in 2016 in response to a sharp increase in illicit fentanyl-related overdose deaths. These deaths climbed from 145 in 2014 to 362 in 2016 and constituted a public health emergency. The study was conducted in 2 phases.
 - New York City
 - Increase in drug overdoses deaths linked to increased presence of fentanyl in New York City
 - Presence of fentanyl in cocaine contributing to increase in drug overdose deaths: People who use cocaine recreationally at exceptionally high risk of overdose (June, 2017)
 - West Virginia:
 - Opioid Overdose Outbreak — West Virginia, August 2016 (MMWR Publication)

- Other Enhanced State Opioid Overdose Surveillance, ESOOS, Publications
 - Vital Signs: Trends in Emergency Department Visits for Suspected Opioid Overdoses — United States, July 2016–September 2017
 - Opportunities to Prevent Overdose Deaths Involving Prescription and Illicit Opioids, 11 States, July 2016–June 2017

List of State Drug Overdose Reports from 2015 to 2016 that also Capture Fentanyl Overdoses

State / Jurisdiction	Source
Connecticut	https://data.ct.gov/Health-and-Human-Services/Accidental-Drug-Related-Deaths-2012-June-2016/rybz-nyjw/data downloaded 2/19/2017 & http://www.courant.com/breaking-news/hc-ocme-overdose-numbers-0224-20170223-story.html
Delaware	http://dshs.delaware.gov/forensics/pdf/2016%20DFS%20Annual%20Report.pdf
Delaware	N/A
Florida	http://www.fdle.state.fl.us/cms/MEC/Publications-and-Forms/Documents/Drugs-in-Deceased-Persons/2015-Annual-Drug-Report.aspx & https://www.fdle.state.fl.us/cms/MEC/Publications-and-Forms/Documents/Drugs-in-Deceased-Persons/2014-Annual-Drug-Report-FINAL.aspx & http://myfloridalegal.com/webfiles.nsf/wf/jmee-9kklmn/\$file/drugsidentifiedinterimreport.pdf & http://frost.med.ufl.edu/frost/
Georgia / Atlanta metro	https://ndews.umd.edu/sites/ndews.umd.edu/files/u1424/atlanta_scs_drug_use_patterns_and_trends_2016.pdf
Kentucky	http://www.mc.uky.edu/kiprc/programs/kdopp/reports/2015-drug-overdose-deaths.pdf & https://odcp.ky.gov/Documents/2016%20ODCP%20Overdose%20Fatality%20Report%20Final.pdf
Maine	http://digitalcommons.library.umaine.edu/cgi/viewcontent.cgi?article=1734&context=mpr
Maryland	http://bha.dhmm.maryland.gov/OVERDOSE_PREVENTION/Documents/2015%20Annual%20Report_final.pdf & http://bha.dhmm.maryland.gov/OVERDOSE_PREVENTION/D12Documents/Quarterly%20report_2016_Q3_final.pdf
Massachusetts	http://www.mass.gov/eohhs/docs/dph/stop-addiction/current-statistics/data-brief-overdose-deaths-nov-2016-ma-residents.pdf & http://www.mass.gov/eohhs/docs/dph/quality/drugcontrol/county-level-pmp/data-brief-overdose-deaths-may-2016.pdf
New Hampshire	https://ndews.umd.edu/sites/ndews.umd.edu/files/pubs/newhampshirehotspotreportphase1final.pdf & https://www.dhhs.nh.gov/dcbcs/bdas/data.htm & https://www.dhhs.nh.gov/dcbcs/bdas/data.htm
New Jersey	http://www.nj.com/news/index.ssf/2017/09/all_1901_people_killed_by_opioids_in_nj_last_year_mapped.html & https://data.world/login?next=%2Fnjdotcom%2Fnj-statewide-overdose-deaths-1999-to-2016%2Ffile%2Fstate-ods-99-16.csv . http://www.nj.gov/oag/library/NJ-OSME-2015-Drug%20Deaths-Chart-by-County.pdf & https://www26.state.nj.us/doh-shad/indicator/view/PoisoningDth.AAtrend.html
New Mexico	https://nmhealth.org/data/view/report/1994/
New York City	https://ndews.umd.edu/sites/ndews.umd.edu/files/u1424/new_york_city_scs_drug_use_patterns_and_trends_2016.pdf
North Carolina	http://www.ocme.dhhs.nc.gov/annreport/docs/FentanylandHeroin-RelatedDeathsInNorthCarolina(2010-2016).pdf
Ohio	https://www.odh.ohio.gov/-/media/ODH/ASSETS/Files/health/injury-prevention/2015-Overdose-Data/2015-Ohio-Drug-Overdose-Data-Report-FINAL.pdf?la=en & http://publicapps.odh.ohio.gov/EDW/DataCatalog
Pennsylvania	https://www.dea.gov/divisions/phi/2016/phi071216_attach.pdf & https://www.dea.gov/divisions/phi/2015/phi111715_attach.pdf
Rhode Island	http://preventoverdoseri.org/overdose-deaths/ , Month to month information for more recent years is available at: http://www.health.ri.gov/data/drugoverdoses/
Vermont	http://healthvermont.gov/scorecard-opioids & http://han.vermont.gov/research/documents/databrief_drug_related_fatalities.pdf
Virginia	http://www.vdh.virginia.gov/content/uploads/sites/18/2016/04/Quarterly-Drug-Death-Report-FINAL_July-2016.pdf & http://www.vdh.virginia.gov/content/uploads/sites/18/2016/04/Fatal-Drug-Overdose-Quarterly-Report-1.pdf
Wayne County	https://ndews.umd.edu/sites/ndews.umd.edu/files/u1424/detroit_scs_drug_use_patterns_and_trends_2016.pdf
West Virginia	Fentanyl numbers came from personal communication with the West Virginia Department of Health. Total overdose deaths came from a report by the Appalachia HIDTA State of West Virginia: Joint Fentanyl Project Report (Law enforcement only and not for public release) -

NOTE: This table may not fully represent all states as it was designed to capture 2015 data east of the Mississippi River

Exercise #3: Understanding Your Stakeholders

Asking and answering some of the following questions can help you to better understand your stakeholders related to opioid surveillance.

Stakeholder	Questions
<p>State and Local Government Officials</p> <p><i>For example:</i></p> <ul style="list-style-type: none"> ▪ Coroner/Medical Examiner ▪ Governor ▪ State legislators ▪ State health officials/commissioners (elected) ▪ Mayor ▪ City council 	<ol style="list-style-type: none"> a. Who provides coroner or medical examiner services? b. Are coroners or medical examiners collecting and documenting any opioid related data? How? Is there an analytic resource for that data? c. Are there any opioid-focused efforts underway? If so, who is leading these efforts? d. Have any elected officials expressed an interest or been active in opioid related issues? e. Has a special opioid taskforce or group been appointed? If so, who is leading it?
<p>First Responders</p> <p><i>For example:</i></p> <ul style="list-style-type: none"> ▪ Police departments ▪ Fire departments ▪ Private ambulance services ▪ 911 dispatcher service providers ▪ Other emergency service providers 	<ol style="list-style-type: none"> a. Are there any opioid-focused efforts underway? If so, who is leading these efforts? b. Who provides EMS services? c. Is EMS collecting or tracking any opioid-related data? How? d. Is EMS monitoring opioid indicators like overdoses? e. Who provides law enforcement services? f. Does a law enforcement narcotic/opioid lead or team exist? g. Is law enforcement collecting or tracking any opioid-related data? How? Is there an analytic resource for that data? h. Who provides 911 services? i. Has 911 been engaged in any opioid specific projects? j. Does 911 regularly meet with EMS or law enforcement to discuss current issues? k. Is 911 collecting and documenting any opioid related data? How? Is there an analytic resource for that data?
<p>Criminal Justice</p> <p><i>For example:</i></p> <ul style="list-style-type: none"> ▪ Jails 	<ol style="list-style-type: none"> a. Who provides local criminal justice services (e.g., jail, prison, probation, drug court, parole services)? b. Are corrections institutions collecting or tracking any

Exercise #3: Understanding Your Stakeholders

Stakeholder	Questions
<ul style="list-style-type: none"> ▪ Prisons ▪ Probation offices ▪ Drug courts ▪ Parole offices 	<p>opioid-related data? How? Is there an analytic resource for that data?</p> <p>c. How is opioid use disorder treatment being provided in jails and/or prisons?</p> <p>d. Is transition planning occurring to retain individuals in treatment upon release?</p> <p>e. Are there any opioid-focused efforts underway? If so, who is leading these efforts?</p>
<p>Education</p> <p><i>For example:</i></p> <ul style="list-style-type: none"> ▪ State Board of Education ▪ Independent School Districts ▪ K-12 schools (public, private, parochial) ▪ Colleges and universities 	<p>a. How many schools and school districts are operating in the community or jurisdiction?</p> <p>b. How many higher education institutions are operating in the community or jurisdiction?</p> <p>c. Are schools, school districts, or colleges/universities engaged in any opioid-focused efforts?</p> <p>d. Are campus police overseeing safety and law enforcement at local education institutions?</p> <p>e. Are there any opioid-focused efforts underway? If so, who is leading these efforts?</p>
<p>Health Care Professionals</p> <p><i>For example:</i></p> <ul style="list-style-type: none"> ▪ Physicians ▪ Dentists ▪ Nurse Practitioners ▪ Physician Assistants ▪ Pharmacists ▪ Veterinarians 	<p>a. Who are the primary inpatient treatment providers in your community or jurisdiction?</p> <p>b. Who are the primary outpatient treatment providers in your community or jurisdiction?</p> <p>c. How many methadone clinics are operational in your community or jurisdiction?</p> <p>d. Who provides treatment to the safety net population?</p> <p>e. Are there any opioid-focused efforts underway? If so, who is leading these efforts?</p>
<p>Public Health Organizations</p> <p><i>For example:</i></p> <ul style="list-style-type: none"> ▪ State health department ▪ Local health departments ▪ State health officials 	<p>a. Have any city or state agencies expressed an interest or been active in opioid related issues?</p> <p>b. Has a special opioid taskforce or group been appointed?</p> <p>c. Are other public health organizations engaged in opioid-focused efforts?</p> <p>d. What partnerships have other public health organizations</p>

Exercise #3: Understanding Your Stakeholders

Stakeholder	Questions
(non-elected)	<p>formed related to opioids?</p> <p>e. What opioid issues are other public health organizations focused on?</p>
<p>Health Care Systems, Health Plans, and Health Care Alliances</p> <p><i>For example:</i></p> <ul style="list-style-type: none"> ▪ Hospitals ▪ Provider organizations ▪ Addiction treatment centers (outpatient) ▪ Pain management clinics ▪ Health insurance companies ▪ Pharmacy benefit managers (PBMs) 	<p>a. Which emergency departments and hospitals in your community or jurisdiction provide care to safety net patients?</p> <p>b. Which community clinics operate and serve special populations, such as homeless or low-income populations?</p> <p>c. Who provides mental health services to safety net patients?</p> <p>d. Who are the sliding scale or indigent care providers?</p> <p>e. Is the Medicaid agency involved in any opioid-focused efforts?</p> <p>f. Is the Medicaid tracking or reporting on opioid prescribing patterns or OUD treatment participation?</p> <p>g. Who are the occupational health services providers?</p> <p>h. Which clinics provides STD and HIV screening and linkage to care and treatment?</p> <p>i. Does a health care alliance exist? If so, are participating health care institutions examining or tracking any opioid-related data and are they sharing any opioid-related data?</p> <p>j. Who are the primary health plans and insurance providers?</p> <p>k. Are there any opioid-focused efforts underway? If so, who is leading these efforts?</p>
<p>Health Data Aggregators</p> <p><i>For example:</i></p> <ul style="list-style-type: none"> ▪ Health information exchanges (HIEs) ▪ All payer claims database providers ▪ Prescription Drug Monitoring Program (PDMP) 	<p>a. Is a Health Information Exchange or All Payer Claim Database operational?</p> <p>b. Which organization houses the state hospital association and discharge datasets?</p> <p>c. Has opioid prescribing or overdose data been assembled? If so, has a report been published?</p> <p>d. Are there any opioid-focused efforts underway? If so, who is leading these efforts?</p>
Professional	<p>a. Are there any efforts underway to collect data related</p>

Exercise #3: Understanding Your Stakeholders

Stakeholder	Questions
<p>Associations</p> <p><i>For example:</i></p> <ul style="list-style-type: none"> ▪ Board of Medicine Board of Dentistry ▪ Board of Nursing ▪ Board of Pharmacy ▪ Medical Society ▪ Hospital Association 	<p>opioid use or misuse? If so, who is leading these efforts?</p> <p>b. Are there any other opioid-focused efforts underway? If so, who is leading these efforts?</p>
<p>Community Service Organizations</p> <p><i>For example:</i></p> <ul style="list-style-type: none"> ▪ Needle exchange programs ▪ Homeless shelters ▪ Food banks ▪ YMCAs/YWCAs ▪ United Way ▪ Red Cross ▪ Rotary Club 	<p>a. Who provides needle exchange services?</p> <p>b. Who provides services to homeless populations (e.g. shelters, soup kitchen, employment, identification)?</p> <p>c. Are drop in centers operating?</p> <p>d. Are community or recreation centers for youth or adults active (e.g. YMCA, Boys and Girls Club)?</p> <p>e. Are there any opioid-focused efforts underway? If so, who is leading these efforts?</p>
<p>Media</p> <p><i>For example:</i></p> <ul style="list-style-type: none"> ▪ Public radio station ▪ Public television station ▪ Newspapers 	<p>a. What are the large media outlets?</p> <p>b. Which reporters are reporting on opioids and what related topics have they focused on?</p> <p>c. Are there any opioid-focused efforts underway? If so, who is leading these efforts?</p>
<p>Business Community</p> <p><i>For example:</i></p> <ul style="list-style-type: none"> ▪ Private employers ▪ Business groups/associations ▪ Chamber of Commerce 	<p>a. Who are the large employers?</p> <p>b. Is a Chamber of Commerce or Rotary Club operating in your community or jurisdiction?</p> <p>c. Have any employers or employer organizations expressed an interest or been active in opioid related issues?</p> <p>d. Are there any opioid-focused efforts underway? If so, who is leading these efforts?</p>

Exercise #3: Examples of Opioid Surveillance Stakeholders

The following individuals and organizations are examples of actual or potential stakeholders in opioid surveillance efforts. This list is not exhaustive. Rather, it is intended only to serve as a starting point to begin identifying all the opioid surveillance stakeholders in a state or other jurisdiction.

State and Local Government Officials

- Coroner/Medical Examiner
- Governor
- State legislators
- State health officials/commissioners (elected)
- Mayor
- City council

First Responders

- Police departments
- Fire departments
- Private ambulance services
- 911 dispatcher service providers
- Other emergency service providers

Criminal Justice

- Jails
- Prisons
- Probation offices
- Drug courts
- Parole offices

Education

- State Board of Education
- Independent School Districts
- K-12 schools (public, private, parochial)
- Colleges and universities

Health Care Professionals

- Physicians
- Dentists
- Nurse Practitioners
- Physician Assistants
- Pharmacists
- Veterinarians

Public Health Organizations

- State health department
- Local health departments
- State health officials (non-elected)

Health Care Systems, Health Plans, and Health Care Alliances

- Hospitals
- Provider organizations
- Addiction treatment centers (outpatient)
- Pain management clinics
- Health insurance companies
- Pharmacy benefit managers (PBMs)

Health Data Aggregators

- Health information exchanges (HIEs)
- All claims database providers
- Prescription Drug Monitoring Program (PDMP)

Professional Associations

- Board of Medicine Board of Dentistry
- Board of Nursing
- Board of Pharmacy
- Medical Society
- Hospital Association

Community Service Organizations

- Needle exchange programs
- Homeless shelters
- Food banks
- YMCAs/YWCAs
- United Way
- Red Cross
- Rotary Club

Media

- Public radio station
- Public television station
- Newspapers

Business Community

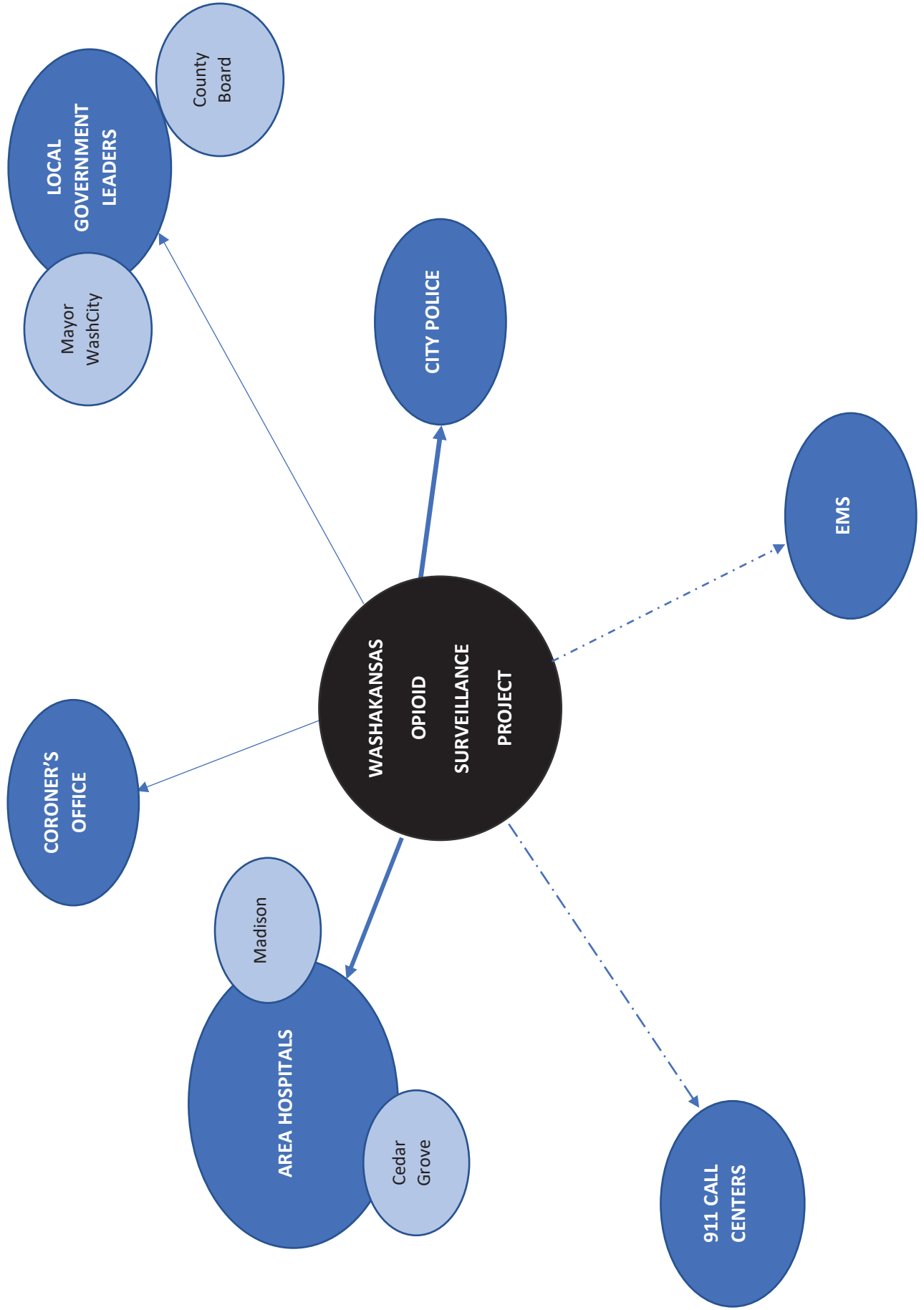
- Private employers
- Business groups/associations
- Chamber of Commerce

Exercise #3. Stakeholder Engagement Strategies

Instructions: Use your completed Stakeholder Mapping Matrix from the Exercise #3 and the stakeholder engagement strategies shown below to inform your communication planning and stakeholder engagement activities for each stakeholder category. For example, be well prepared for and engage a high influence/high interest stakeholder early to increase the likelihood of their support for your opioid surveillance efforts. For a high influence/low interest stakeholder, consider strategies and messages that could generate greater interest in your opioid surveillance efforts.



CHAPATI DIAGRAM: Stakeholder's proximity to center circle is how distant or close the working relationship is; size of circle is how important the stakeholder is; thickness of connecting line is how strong the working relationship is; broken/ dotted lines indicate poor communication patterns.



Opioid Data Source Inventory

This document summarizes data sources that are generally available and may contain useful opioid-related health information for public health practitioners, including strengths and limitations. The details of each data source may vary by jurisdiction.

Data Source <i>(Hyperlinks included when available and accessed by hovering mouse over linked term)</i>	Examples of Opioid Indicators	Strengths	Limitations
<p>Death Certificate Data: Assembled by state health department. Opioid-related deaths can be identified based on ICD-10 codes. Can be accessed through CDC WONDER.</p>	<ul style="list-style-type: none"> ▪ Opioid-related deaths ▪ Opioid-related death rate by demographic subgroup ▪ Age-adjusted opioid mortality rate 	<ul style="list-style-type: none"> ▪ National, state, and county estimates ▪ Structured systematic data collection ▪ Analysis of trends and comparisons by demographic subgroup and geography ▪ Substance specific mortality rates 	<ul style="list-style-type: none"> ▪ Small numbers produce unstable estimates ▪ Low sensitivity to changes over time ▪ Cannot measure opioid use and misuse ▪ Impacted by death with dignity laws ▪ Some ICD-10 codes group multiple opioids (e.g. fentanyl)
<p>Coroner or Medical Examiner Data: Collected at the city or county level. Detailed investigations of opioid deaths can provide valuable contextual information. There is a CDC-funded effort to improve the use of this data with death certificates to identify opioid-related deaths.</p>	<ul style="list-style-type: none"> ▪ Comorbid conditions ▪ Physical and psychosocial factors contributing to death 	<ul style="list-style-type: none"> ▪ Detailed documentation on investigation of physical and psychosocial contributing factors 	<ul style="list-style-type: none"> ▪ Investigation not carried out for all deaths ▪ Laws and regulations vary between states ▪ Not easily aggregated at state level ▪ Unstructured data collection
<p>Emergency Department and Hospital Discharge Datasets: Dataset of discharges assembled by state hospital association. Opioid-related discharges can be identified based on diagnosis codes.</p>	<ul style="list-style-type: none"> ▪ Nonfatal overdoses ▪ Non-overdose opioid-related discharges 	<ul style="list-style-type: none"> ▪ National, state, and county estimates ▪ Diagnosis codes support examination of opioid misuse, adverse events, dependence, and overdose ▪ Analysis of trends and comparisons by demographic subgroup 	<ul style="list-style-type: none"> ▪ Inconsistent data quality (e.g. missing data and linkage of cases across systems) ▪ Limitations of ICD-10-based opioid case definitions ▪ Variation in diagnosis coding practices

Data Source <i>(Hyperlinks included when available and accessed by hovering mouse over linked term)</i>	Examples of Opioid Indicators	Strengths	Limitations
<p>Police Data: Collected at the city or county level. Detailed records of arrests, victims, and crimes are collected and may be identifiable as drug or opioid-related. May be available through an open data catalogue. State, county, and national data available through the Federal Bureau of Investigation Uniform Crime Reporting (UCR) System.</p>	<ul style="list-style-type: none"> ▪ Arrests related to opioid intoxication, distribution, possession, or sales ▪ Naloxone administrations by police officers ▪ Pharmacy burglaries 	<ul style="list-style-type: none"> ▪ City or county estimates ▪ Near real-time surveillance ▪ Systematic data collection ▪ Analysis of trends and comparisons by demographic subgroup 	<ul style="list-style-type: none"> ▪ Determination of an opioid-related police event is subjective ▪ Underreporting by police create incomplete or biased data ▪ Influenced by scope of law enforcement and local contextual factors ▪ Not easily aggregated at state level
<p>911 Call Data: Collected at the city or county level by one or more entities. Contains call narrative and structured data elements describing location, demographics, main complaint, incident, and rationale for 911 calls.</p>	<ul style="list-style-type: none"> ▪ Drug-related call volume ▪ Opioid-related volume ▪ Suspected overdoses ▪ Demographic profile and geographic density of opioid-related calls 	<ul style="list-style-type: none"> ▪ City or county estimates ▪ Near real-time surveillance ▪ Analysis of trends and comparisons by demographic subgroup 	<ul style="list-style-type: none"> ▪ Non-standard data collection ▪ Inconsistent data quality (e.g. missing data) ▪ Influenced by local contextual factors ▪ Not easily aggregated at state level
<p>Emergency Medical Service (EMS Data): Collected at the city or county level. Contains a narrative component and structured data describing patient demographics, main patient complaint, medical procedures performed, medications administered, and rationale for EMS response.</p>	<ul style="list-style-type: none"> ▪ Opioid-related EMS responses ▪ Suspected overdoses ▪ Naloxone administrations ▪ Comorbid conditions and physical and psychosocial contributing factors 	<ul style="list-style-type: none"> ▪ City or county estimates ▪ Near real-time surveillance ▪ Analysis of trends and comparisons by demographic subgroup ▪ Documented physical, and psychosocial factors ▪ Likely to capture special populations and includes individuals refusing healthcare 	<ul style="list-style-type: none"> ▪ Non-standard data collection ▪ Inconsistent data quality ▪ Determination of opioid context may be subjective ▪ Not easily aggregated at state level

<p>Data Source <i>(Hyperlinks included when available and accessed by hovering mouse over linked term)</i></p>	<p>Examples of Opioid Indicators</p>	<p>Strengths</p>	<p>Limitations</p>
<p>Syndromic Surveillance: health data collected in a clinical setting pre-diagnosis that is accessed through the National Syndromic Surveillance Program (NSSP) and the Biosense Platform to look for signals of an outbreak. May be used to look for surges in overdoses.</p>	<ul style="list-style-type: none"> ▪ Overdose hospitalizations ▪ Opioid hospitalizations 	<ul style="list-style-type: none"> ▪ Near real-time surveillance ▪ Likely to capture special populations ▪ Analysis of trends and comparisons by demographic subgroup ▪ Participation supported by Meaningful Use Specialized Registry designation 	<ul style="list-style-type: none"> ▪ Infrastructure and hospital participation vary across states ▪ Evolving syndromic definitions ▪ Inconsistent validation methods ▪ Variation in signal-detection methods ▪ Not easily aggregated at state level
<p>Drug Enforcement Administration (DEA) Automation of Reports and Consolidated Orders Systems (ARCOS): Retail drug purchases included purchases by weight by pharmacies, hospitals, practitioners, narcotic treatment programs, and teaching institutions.</p>	<ul style="list-style-type: none"> ▪ Opioid purchases (by pharmacies) reported to the DEA in grams or morphine milligram equivalent (MME) 	<ul style="list-style-type: none"> ▪ National, state, and county estimates ▪ Analysis of trends ▪ Includes veterinary doses 	<ul style="list-style-type: none"> ▪ Excludes heroin and opioids purchased outside of healthcare setting ▪ Cannot distinguish between prescriptions issues for pain and other reasons ▪ Includes opioid doses sent but not dispensed
<p>National Survey of Drug Use and Health (NSDUH): Administered annually collecting data on drug use, mental health and other related health issues. State data accessible from SAMHSA website.</p>	<ul style="list-style-type: none"> ▪ Opioid use and misuse by demographic subgroup and by type of opioid 	<ul style="list-style-type: none"> ▪ National and state estimates ▪ Analysis of trends and comparisons by demographic subgroup ▪ Bayes modelling to generate sub-state estimates 	<ul style="list-style-type: none"> ▪ Small numbers can lead to unstable estimates ▪ Self-reporting bias ▪ Cross sectional data prohibits causal inference ▪ Excludes homeless and institutionalized populations
<p>National HIV Risk Behavior Survey (NHBS): Annual CDC-funded survey assessing HIV risk behaviors including substance use in sites nationwide.</p>	<ul style="list-style-type: none"> ▪ Opioid use among special populations (MSM, IVDU, and high-risk heterosexuals) 	<ul style="list-style-type: none"> ▪ National estimates ▪ Systematic data collection and complete data capture ▪ Collects data from special populations 	<ul style="list-style-type: none"> ▪ Small numbers can lead to unstable estimates ▪ Self-reporting bias ▪ Cross sectional data prohibits causal inference

Data Source (<i>Hyperlinks included when available and accessed by hovering mouse over linked term</i>)	Examples of Opioid Indicators	Strengths	Limitations
<p>Behavioral Risk Factor Surveillance System (BRFSS):¹ Telephone survey administered annually. Some jurisdictions may add opioid specific questions.</p>	<ul style="list-style-type: none"> ▪ Adults receiving an opioid prescription in the past 12 months ▪ Adults with leftover opioid medication ▪ Adult using opioids not prescribed to them 	<ul style="list-style-type: none"> ▪ National and state estimates ▪ Analysis of trends and comparisons by demographic subgroup ▪ Structured systematic data collection 	<ul style="list-style-type: none"> ▪ Small numbers can lead to unstable estimates ▪ Self-reporting bias ▪ Does not include illicit drug use ▪ Cross sectional data prohibits causal inference
<p>Youth Risk Behavior Survey (YRBS): Annual survey administered to high school students, supported by CDC. Some jurisdictions may have added opioid specific questions.</p>	<ul style="list-style-type: none"> ▪ High school students using prescriptions drugs or heroin 	<ul style="list-style-type: none"> ▪ National and state estimates ▪ Systematic data collection ▪ Analysis of trends and comparisons by grade and demographic subgroup 	<ul style="list-style-type: none"> ▪ Small numbers can lead to unstable estimates ▪ Self-reporting bias ▪ Cross sectional data prohibits causal inference
<p>Prescription Drug Monitoring Program (PDMP) Data: Administered at the state level to assist in improving patient care and reduce misuse of controlled substances. PDMP stores a comprehensive client record of reportable prescriptions across providers.</p>	<ul style="list-style-type: none"> ▪ Opioid prescription volume (a.k.a. pill burden) ▪ Opioid prescriptions per capita ▪ Initial opioid prescriptions ▪ High dosage opioid prescribing rate 	<ul style="list-style-type: none"> ▪ National estimates ▪ Systematic data collection ▪ Near real-time surveillance ▪ Analysis of trends and comparisons by opioid and demographic subgroup ▪ Interstate PDMP data sharing 	<ul style="list-style-type: none"> ▪ Can be difficult data to access ▪ Excludes heroin ▪ PDMP participation and utilization laws vary by state ▪ Inconsistent data quality ▪ Some providers do not enter in PDMP
<p>Claims data from All Payer Claims Database (APCD) or Medicare: APCD claims aggregation and analysis organizations administered at the state level working to contain healthcare costs and improve health system performance using comprehensive, local, encounter-specific data. Medicare claims data are publicly available for download and are released on an annual basis.</p>	<ul style="list-style-type: none"> ▪ Opioid prescription volume (a.k.a. pill burden) ▪ Individuals diagnosed with opioid misuse, dependence, or adverse events 	<ul style="list-style-type: none"> ▪ Systematic data collection ▪ Near real-time surveillance ▪ Can be combined with medical, dental, and pharmacy data ▪ Analysis of trends and comparisons by prescribed opioid and demographic subgroup 	<ul style="list-style-type: none"> ▪ Lacking uninsured patient claims ▪ APCDs not existent in all states ▪ Inconsistent data quality ▪ Excludes self-funded healthcare or administered in correctional facilities

¹ Survey frequency, administration, and composition vary greatly between and within states. Many locales have introduced opioid specific questions primarily focused on opioid use into local surveys. Many states and counties administer a jurisdiction specific health survey not included in this matrix that may contain opioid specific data.

<p>Data Source <i>(Hyperlinks included when available and accessed by hovering mouse over linked term)</i></p>	<p>Examples of Opioid Indicators</p>	<p>Strengths</p>	<p>Limitations</p>
<p>Clinical and Pharmacy Data from Electronic Health Record, or Health Information Exchange or Claims Data: A healthcare organization, health information exchange (HIE), or payer may share clinical data with the public health department for the purposes of opioid surveillance.</p>	<ul style="list-style-type: none"> ▪ Opioid prescribing rate ▪ Initial opioid prescriptions ▪ Opioid diagnosis ▪ Individuals receiving treatment services 	<ul style="list-style-type: none"> ▪ Longitudinal patient clinical records including opioid use, misuse, dependence, and overdose ▪ Near real-time surveillance ▪ Self-reported drug use and comorbid conditions ▪ May include both prescriptions and dispenses 	<ul style="list-style-type: none"> ▪ Prescribing and pharmacy data excludes heroin ▪ Care seeking population may differ from general population ▪ Difficult to access ▪ Not easily aggregated at state level
<p>State Unintentional Drug Overdose Reporting System (SUDORS): States receiving Enhanced Opioid response funds will use SUDORS to summarize toxicology, death scene investigations, route of administration, and other risk factors that may be associated with a fatal overdose.</p>	<ul style="list-style-type: none"> ▪ Overdose deaths by opioid 	<ul style="list-style-type: none"> ▪ Systematic and structured data collection ▪ Summarizes information from toxicology, coroner, and death certificate ▪ Analysis of trends and comparisons by prescribed opioid and demographic subgroup 	<ul style="list-style-type: none"> ▪ Not all states reporting to SUDORS ▪ Data latency and timeliness
<p>Treatment Episode Data Set (TEDS): TEDS compiles client-level substance abuse treatment admissions. States collect data from facilities about their treatment admissions and discharges.</p>	<ul style="list-style-type: none"> ▪ Opioid treatment admissions ▪ Percent of total treatment admissions attributed to opioids 	<ul style="list-style-type: none"> ▪ National and state estimates ▪ Analysis of trends and comparisons by prescribed opioid and demographic subgroup ▪ Includes self-reported drug use ▪ Systematic data collection 	<ul style="list-style-type: none"> ▪ Some states only collect and report publicly funded admissions ▪ Does not link multiple treatment episodes to one individual ▪ Does not include all treatment facilities
<p>American Association of Poison Control Center's National Poison Data System (NPDS): Tracks poisoning and their sources, including drugs and medicine, from America's 55 poison centers. Data can be requested from NPDS.</p>	<ul style="list-style-type: none"> ▪ Poison center calls for prescription opioid exposure 	<ul style="list-style-type: none"> ▪ National, state, and county estimates ▪ Analysis of trends and comparisons by prescribed opioid and demographic subgroup 	<ul style="list-style-type: none"> ▪ Exposures do not necessarily represent overdoses or poisonings ▪ Difficult to determine accuracy and severity of poison center calls ▪ Self-report bias

Opioid Data Source Inventory References and Resources

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Using International Classification of Diseases (ICD) Codes to Assess Opioid-Related Overdose Deaths

Since 1999, there has been a four-fold increase in opioid-related overdose death rates.¹ To prevent these deaths, public health professionals, including practitioners who are committed to preventing opioid misuse and overdose, must first understand which opioids are contributing to these deaths and which populations are affected. This information can be found in death data.

Opioid-related overdose death data are compiled from individual death certificates, which contain information on primary and contributing causes of death. The diseases and/or health conditions included under these causes are recorded using **International Classification of Diseases (ICD)**² codes. ICD codes provide a common language for reporting and monitoring diseases and health problems across multiple disciplines, and facilitate analysis by enabling the consistent formatting and storage of data. ICD codes are updated periodically; the latest version is the 10th revision, referred to as ICD-10.

This tool is designed to support practitioners in using ICD-10 codes to understand and describe the impact of opioid overdose in their communities. Specifically, it provides:

- Benefits of understanding ICD codes;
- Specific ICD-10 codes for opioid-related overdose deaths;
- Examples of how to use ICD-10 codes to inform prevention planning; and
- Limitations of using these codes, accompanied by potential solutions.

WHY DO PREVENTION PRACTITIONERS NEED TO UNDERSTAND ICD CODES?

Important reasons for understanding and using ICD codes include the following:

- **To find what you're looking for.** Data from all state death certificates is converted into ICD-10 codes before being sent to the Centers for Disease Control and Prevention's (CDC) National Center for Health Statistics (NCHS)—the Federal agency responsible for compiling and releasing cause of death data and statistics in the United States.³

¹ Centers for Disease Control and Prevention, National Center for Health Statistics. Multiple Cause of Death 1999-2016 on CDC WONDER Online Database, released December, 2017.

² Centers for Disease Control and Prevention, National Center for Health Statistics (2016). International Classification of Diseases, Tenth Revision (ICD-10). Retrieved from <https://www.cdc.gov/nchs/icd/icd10.htm>

³ Centers for Disease Control and Prevention, National Center for Health Statistics (2017). Instructions for Classifying the Underlying Cause of Death. Retrieved from https://www.cdc.gov/nchs/data/dvs/2a_2017.pdf

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- **To understand local problems.** NCHS uses ICD-10 codes to generate raw mortality data files and populate CDC's Wide-ranging Online Data for Epidemiologic Research (WONDER). CDC WONDER is used by public health professionals and researchers to obtain opioid-overdose death data for their states and communities.
- **To make comparisons.** Since ICD-10 codes provide a standard coding language within and across states, prevention practitioners can use these codes to identify high-need communities within their state, and compare their state estimates to national and/or other state estimates.

CRACKING THE CODE

The National Center for Health Statistics (NCHS) captures causes of deaths from death certificates using the codes included in ICD-10. All death certificates include a primary or *underlying cause of death* and up to 20 non-primary or *contributing* causes of deaths. Each code includes a letter followed by a number.

- Codes for **underlying cause of overdose death** include the letter X or Y (for example, X40: accidental poisoning, X60: intentional self-harm).
- Codes for **opioid-related contributing cause of overdose death** include a T (for example., T40.1: heroin, T40.4: other synthetic opioids).

The ICD codes for opioid-overdose related deaths are provided in Table 1, below.

NCHS data is compiled in the CDC WONDER online tool (<https://wonder.cdc.gov>). To retrieve these data from the tool:

- Select the [Multiple Cause of Death \(Detailed Mortality\)](#) query system;
- Select table layout (for example, by year, state, county); and
- Supply the appropriate underlying codes (X and Y code) and contributing codes (T codes) presented in Table 1.

So, for example, if you were interested in identifying heroin-related accidental poisoning rates for Baltimore, MD among African American men between 1999–2016, you would go to the CDC WONDER website, select the Multiple Causes of Death database, and do the following:

- Highlight year = all years, state = Maryland, and county = Baltimore City;
- Select race = Black or African American from demographics;
- Select X40–X44 from the underlying cause of death codes; and
- Select T40.1 (heroin) from the multiple cause of deaths.

Please note: X and Y codes *must* be used in combination with T codes to identify opioid-related deaths. For more information, go to <https://wonder.cdc.gov/mcd-icd10.html>.

TABLE 1. ICD-10 CODES FOR OPIOID-RELATED DEATHS


Manner of Death	Underlying Cause of Death	Contributing Cause of Death
<p>Accidental Poisoning</p>	<p>X40: Accidental poisoning by and exposure to non-opioid analgesics, antipyretics and anti-rheumatics</p> <p>X41: Accidental poisoning by and exposure to antiepileptic, sedative-hypnotic, anti-parkinsonism and psychotropic drugs, not elsewhere classified</p> <p>X42: Accidental poisoning by and exposure to narcotics and psychodysleptics [hallucinogens], not elsewhere classified</p> <p>X43: Accidental poisoning by and exposure to other drugs acting on the autonomic nervous system</p> <p>X44: Accidental poisoning by and exposure to other and unspecified drugs, medicaments and biological substances</p>	<p>T40.0: Poisoning by Opium</p> <p>T40.1: Poisoning by Heroin</p> <p>T40.2: Poisoning by Other Opioids</p> <p>T40.3: Poisoning by Methadone</p> <p>T40.4: Poisoning by Other Synthetic Narcotics</p> <p>T40.6: Poisoning by Other and Unspecified Narcotics</p>
<p>Intentional Self-Poisoning (Suicide)</p>	<p>X60: Intentional self-poisoning by and exposure to non-opioid analgesics, antipyretics and anti-rheumatics</p> <p>X61: Intentional self-poisoning by and exposure to antiepileptic, sedative-hypnotic, anti-parkinsonism and psychotropic drugs, not elsewhere classified</p> <p>X62: Intentional self-poisoning by and exposure to narcotics and psychodysleptics [hallucinogens], not elsewhere classified</p> <p>X63: Intentional self-poisoning by and exposure to other drugs acting on the autonomic nervous system</p> <p>X64: Intentional self-poisoning by and exposure to other and unspecified drugs, medicaments and biological substances</p>	<p>T40.0: Poisoning by Opium</p> <p>T40.1: Poisoning by Heroin</p> <p>T40.2: Poisoning by Other Opioids</p> <p>T40.3: Poisoning by Methadone</p> <p>T40.4: Poisoning by Other Synthetic Narcotics</p> <p>T40.6: Poisoning by Other and Unspecified Narcotics</p>


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Manner of Death	Underlying Cause of Death	Contributing Cause of Death
Assault (Homicide)	X85: Assault by drugs, medicaments and biological substances	<p>T40.0: Poisoning by Opium</p> <p>T40.1: Poisoning by Heroin</p> <p>T40.2: Poisoning by Other Opioids</p> <p>T40.3: Poisoning by Methadone</p> <p>T40.4: Poisoning by Other Synthetic Narcotics</p> <p>T40.6: Poisoning by Other and Unspecified Narcotics</p>
Poisoning: Undetermined Intent	<p>Y10: Poisoning by and exposure to non-opioid analgesics, antipyretics and anti-rheumatics, undetermined intent</p> <p>Y11: Poisoning by and exposure to antiepileptic, sedative-hypnotic, antiparkinsonism and psychotropic drugs, not elsewhere classified, undetermined intent</p> <p>Y12: Poisoning by and exposure to narcotics and psychodysleptics [hallucinogens], not elsewhere classified, undetermined intent</p> <p>Y13: Poisoning by and exposure to other drugs acting on the autonomic nervous system, undetermined intent</p> <p>Y14: Poisoning by and exposure to other and unspecified drugs, medicaments and biological substances, undetermined intent</p>	<p>T40.0: Poisoning by Opium</p> <p>T40.1: Poisoning by Heroin</p> <p>T40.2: Poisoning by Other Opioids</p> <p>T40.3: Poisoning by Methadone</p> <p>T40.4: Poisoning by Other Synthetic Narcotics</p> <p>T40.6: Poisoning by Other and Unspecified Narcotics</p>

WHAT ARE THE LIMITATIONS OF ICD CODES?

There are important limitations to consider prior to using ICD codes to analyze opioid-related hospitalizations and overdose deaths. These include the following:

- 
Drug overdose deaths can be hard to categorize. In approximately 1 in 5 drug overdose deaths, no specific drug is listed on death certificates.⁴ Even when a drug is listed, a significant number of opioid-related poisonings are coded into broader categories such as *other opioids* (T40.2) and *other and unspecified narcotics* (T40.6).

- 
Multiple opioids (for example, heroin and methadone) and/or opioids combined with other drugs (for example, methadone and sleep medications) are often involved in overdose incidences. This can make it difficult to identify specific opioid(s) responsible for overdose(s). In such cases, consider assigning partial attribution to the different opioids involved (for example, overdose incidence where both heroin and methadone are involved can be attributed as 0.5 each). This can prevent overestimating the impact of any particular opioid. When presenting data on such incidences, it is also helpful to provide a footnote that specifies the different opioids and/or other drugs involved.

- 
Some synthetic opioids do not yet have designated codes. For example, overdose deaths involving synthetic opioids such as fentanyl have gone up significantly in recent years.⁵ However, because there is no specific ICD-10 code for fentanyl, it can be difficult to make fentanyl-related overdose estimates. Where available, toxicology reports from coroner or medical examiner offices can facilitate identification of fentanyl-related cases. It can also be helpful to look at data sources that capture fentanyl-related data. For example, the National Forensic Laboratory Information System (<https://www.deadiversion.usdoj.gov/nflis/2017fentanyl.pdf>) provides information on drug products obtained by law enforcement that tested positive for fentanyl, and the National Poison Data System (<http://www.aapcc.org/data-system/>) provides information on poison center calls regarding fentanyl overdose.

⁴ Rudd, R.A., Seth, P., David, F., & Scholl, L. (2016). Increases in Drug and Opioid-Involved Overdose Deaths — United States, 2010–2015. *MMWR Morb Mortal Wkly Rep* 65(50-51), 1445–1452. doi:10.15585/mmwr.mm655051e1

⁵ Centers for Disease Control and Prevention. (2017). Fentanyl. Retrieved from <https://www.cdc.gov/drugoverdose/opioids/fentanyl.html>

Summary of CSTE's Substance Abuse and Mental Health Surveillance Indicators, Version 3 (2019)

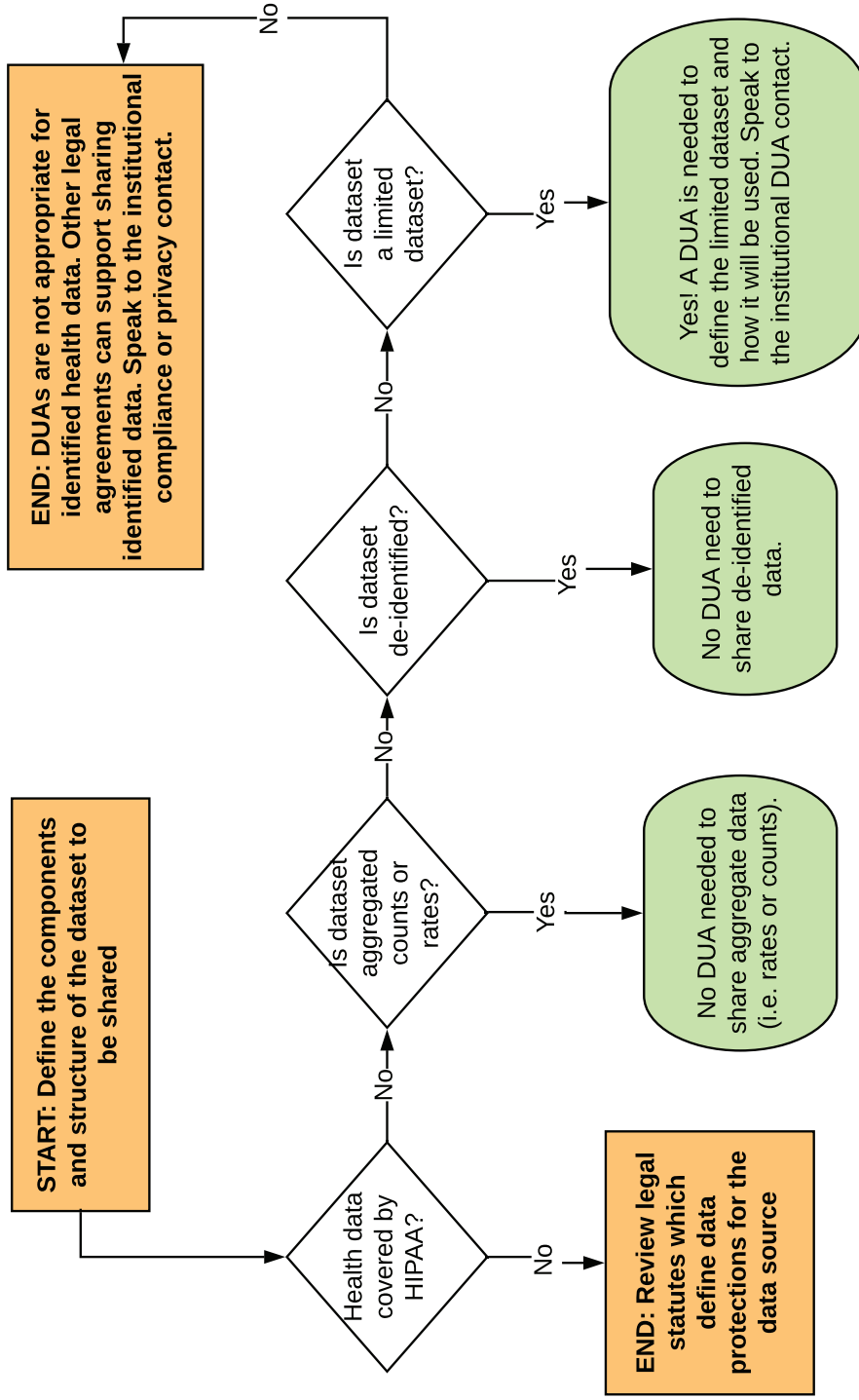
Indicator #	Indicator	Measure of frequency to be reported
1	Adult binge drinking	Annual prevalence: crude with 95% CIs.
2	Youth binge drinking	Biennial (odd years) prevalence with 95% CI.
3	Alcohol-related crash deaths	Annual number of deaths. Annual crude mortality rate per 100,000
4	Mortality from liver disease and cirrhosis	Annual number of deaths. Annual mortality rate per 100,000: crude.
5	State excise tax; beer, wine, distilled spirits	Rate per gallon
6	Drug overdose mortality, all drugs	Annual number of deaths. Annual mortality rate per 100,000: crude, as a total for all drug types together and by drug type.
7	Hospitalization attributable to drugs with potential for abuse and dependence; all drugs, heroin poisoning, cocaine poisoning, non-heroin opioid poisoning, benzodiazepine-based tranquilizer poisoning, amphetamine poisoning, cocaine abuse or dependence, opioid abuse or dependence	Annual number of hospital discharges. Annual rate of hospital discharge per 100,000: crude.
8	Prescription opioid sales per capita	Morphine milligram equivalents (MME) per capita.
9	Drug or alcohol dependence or abuse in the last year	Two year prevalence with 95% CIs. States should combine two survey years (e.g., 2013-2014) to provide stable state-level estimates.
10	Prevalence of use of selected prescription and illicit drugs; past month illicit drug use*, past year marijuana use, past month marijuana use, past month illicit drug use other than marijuana*, past year cocaine use, past year non-medical use of pain relievers*	Two year prevalence with 95% CIs. States should combine two survey years (e.g., 2013-2014) to provide stable state-level estimates. *not available for 2014-2015
11	Suicide rate	Annual number of deaths. Annual mortality rate per 100,000: crude.
12	Hospital discharges for mental disorders; all, mood and depressive disorders, schizophrenic disorders, all mental disorders EXCEPT drug- and alcohol-induced mental disorders.	Annual number of hospital discharges. Annual rate of hospital discharge per 100,000: crude and.
13	Emergency department visits for intentional self-harm	Annual number of ED admissions. Annual rate of ED admissions per 100,000: crude.
14	Self-reported youth suicide attempts	Biennial (odd years) prevalence with 95% CIs.

15	Depressive episodes in the past year	Two year prevalence with 95% CIs. States should combine two survey years (e.g., 2014-2015) to provide stable state-level estimates.
16	Any adult mental illness in the past year	Two year prevalence with 95% CIs. States should combine two survey years (e.g., 2014-2015) to provide stable state-level estimates.
17	Serious adult mental illness in the past year	Two year prevalence with 95% CIs. States should combine two survey years (e.g., 2014-2015) to provide stable state-level estimates.
18	Frequent mental distress (≥14 days out of 30)	Annual prevalence: crude with 95% CIs.

For full report of Recommended CSTE Surveillance Indicators for Substance Abuse and Mental Health please visit: https://cdn.ymaws.com/www.cste.org/resource/resmgr/crosscutting/CSTE_Substance_Abuse_and_Men.pdf

Decision Tree: Do I need a Data Use Agreement?

A Data Use Agreement or DUA is a legal agreement between two organizations used to exchange of a limited dataset (LDS), as defined by HIPAA. A DUA is developed by nonprofit, government or private industry, where the **data being shared** is nonpublic or is otherwise subject to some restrictions on its **use**. The DUA establishes permitted use and users for the LDS.



Reminders, suggestions, and additional notes:

A limited datasets(LDS) is PHI.

Institutional policies should be reviewed for specific guidance around sharing or use of low counts (a.k.a. small cell suppression) and counts for individuals >90 years.

Never DUA alone. Each public health institution should have a legal resource to facilitate legal agreements that support data sharing. Analytic personnel should not feel responsible for drafting, coordinating, or signing data use agreements. If uncertain, public health staff should contact their manager or leadership to learn more about the appropriate process to put a data use agreement in place with an external organization.

How to Create a Surveillance Analytic Plan

Overview

An Analytic Plan (AP) is a surveillance tool that helps a group of surveillance stakeholders put thoughts into a plan of action. Convening technical and non-technical surveillance stakeholders to complete and comment on AP can building consensus on how surveillance tasks will be carried out for a given data source and what information will be produced. AP originally used in research data analysis but have been adapted for and adopted by public health practitioners for surveillance.

An AP provides an opportunity to collect input from collaborators, preserve continuity of surveillance operations, document processes, and provides a platform for orienting and training new team members. Having a clear plan of action is also important for surveillance integrity and quality and increases the likelihood that surveillance data can be reproduced and achieve its intended purpose.

Central to any AP are the surveillance questions that a data source can and will address. For example: 'How many opioid overdoses occurred in the past month?' and 'Have opioid overdoses increased?' Surveillance questions are often framed broadly and need to be clearly defined. When possible, framing surveillance questions as testable hypotheses can clarify how the data should be structured, analyzed and presented to meet the stakeholders needs.

Principles

An AP provides a map of your planned analysis and developing this map can assist you to work through, step-by-step, important pieces of information without getting lost. It can help if you can visualize the intended surveillance outcomes: what is the main picture you are trying to convey? What are the main figures/tables that illustrate your outcome? These questions should be clearly addressed in your plan.

The AP end product is a document which is similar to a recipe; it outlines which variables you will be including in the analysis, and a step-by-step methodology for how you will approach the surveillance questions and hypotheses. As such, it is considered best practice to have a solid AP before embarking on surveillance data analysis.

The AP is a tool that can be used within teams; the level of detail required may differ depending on the team's needs. The exact contents of methods section may depend on your team. The AP, and in particular the methods section, is iterative and is a living document which should be updated over time. Start with your 'best idea' of what the analysis will be, though this may change. Early AP drafts may include only brief bullets which may mature into paragraphs that include more complete and detailed descriptions.

To assist in developing an analysis plan you may need to have a brief look at the data set. This could include doing some basic frequency tables and graphs. Data cleaning also needs to be undertaken. Data cleaning procedures are not covered in this guide but are a very important part of preparing to start data analysis.

AP Components

There are four main components of an AP: background; aims; methods; and planned tables and figures. Each institution or team may have different expectations of what to include or the level of detail required, but these basic components form a solid base for a AP.

Background

The background should present an overview of the relevant literature and background information and context needed to understand the rationale for analysis. The rationale should justify your surveillance questions and your approach for analysis. When deciding on your approach to the analysis it is important to look at what has been done in other studies. The background can include the objective of the surveillance analysis. The AP background can often be reused for abstracts or manuscripts in the introduction or background section.

Aims

The aims section includes the specific aims, surveillance questions, and testable hypotheses for the analysis. While defining aims, questions, and hypotheses can seem redundant, The surveillance aims and questions need to be clearly defined and translated into testable hypotheses. The hypotheses are the bridge between the ideas and the data; data will be able to confirm or refute a hypothesis.

Methods

The methods section is the main component of the AP and should include details on:

- Data sources
- Analytic Team
- Study population: include a definition and outline the inclusion/exclusion criteria
- Indicators/Measures: detail definitions and derivations (including categorization used, if any) of study measures including:
 - Main exposure variables
 - Outcome variables
 - Other covariates, including potential confounders and mediators
- Sub-groups: you may wish to examine if the main effect varies by sub-groups of participants.
- Missing data: Include details about methods used for dealing with missing data (complete case analysis, coding missing values as separate categories, imputation methods and/or sensitivity analyses)
- Sensitivity analyses: detail any sensitivity analyses to be undertaken.

- Sequence of planned analyses including: statistical methods; how hypotheses will be tested; and how potential confounding and bias will be assessed and addressed. The sequence often includes:
 - Outline of main comparison groups
 - Frequency and cross-tabulations of main variables
 - Basic analysis model (usually age- and sex-adjusted)
 - Final analysis model (including adjustment for other confounders)
- Statistical methods ideally include planned model building approach, methods used to verify statistical assumptions, alternate methods to be adopted in case of violations of assumption and choice significance level. Clinical significance levels would need to be pre-specified, if relevant.
- Analysis software: outline the software and version number you will be using for the analysis.

Planned Tables and Figures

Planned tables and figures (also called dummy tables) are basically an outline of a table or figure which will be used to present the result. The dummy table has empty cells which are to be populated after the data analysis. The planned tables and figures bring into focus what you are doing and how you will display your results. Planned tables and figures can also be a useful talking point for discussing the analyses with collaborators and allow for refinement of your research intentions. Further, the planned tables and figures can be copied directly into the results section of a paper or chapter and the cells populated after analysis.

Analytic Plan Template

A template is provided below with example questions to prompt stakeholders when populating each section. This template is intended to be a starting point. The questions included below are not exhaustive and not all questions listed will be relevant to every analysis. Each AP should be customized to the needs of the stakeholders, jurisdiction, and surveillance analysis.

Background

- What public health problem does this analysis address?
- What do existing data tell us about the burden of this issue?
- Are there any theories, concepts, terms, and ideas that require an explanation?
- What historical data provides context on why the current issue emerged?
- Are there any concepts that may be unfamiliar to the reader and need an explanation?

Aims

- What are the surveillance questions?
- What are the hypotheses?

Methods

Data Source

- How is this data collected?
- What is the primary purpose of this data?
- Who is the primary owner of this data?
- What are the expectations and restrictions around the use of this data?
- What agreements are in place permitting this use of the data? Link to a DUA, BAA, or partner agreement.
- What are the known limitations of this data source?

Analytic Team

- Who are the members of the analytic team?
- Who is the lead analyst? Supporting analysts?
- Who oversees this analysis and will sign off on final products?
- Does the analytic team meet? Where? When?
- Where is analytic collateral stored?

Study Population

- What population is included in the dataset?
- Of the population in the dataset, what population will be used in the analysis?
- Who is included? What criteria and methods are used to select the population?
- Who is excluded?
- When used, include consort diagram to explain inclusion and exclusion criteria.

Variables

- Include data dictionary
- What are the variables in the native dataset?
 - How are those variables formatted?
- What transformations will be made to these variables?
- Which variables will be used in the analysis?
- What are the main exposure and outcome variables?
- What variables will be calculated and added to the dataset?
 - How will those variables be calculated?
 - How will those variables be formatted?
 - Are the variables continuous or discrete/categorical?
 - What categories will be used and how are those determined?
- How will missing data for each variable be treated?

Indicators/Measures

- Which indicators will be calculated and how are they defined?
- Is the measure continuous or discrete/categorical? What categories will be used and how are those determined?
- What stratifications or subgroups will be applied to the indicator?

Analysis

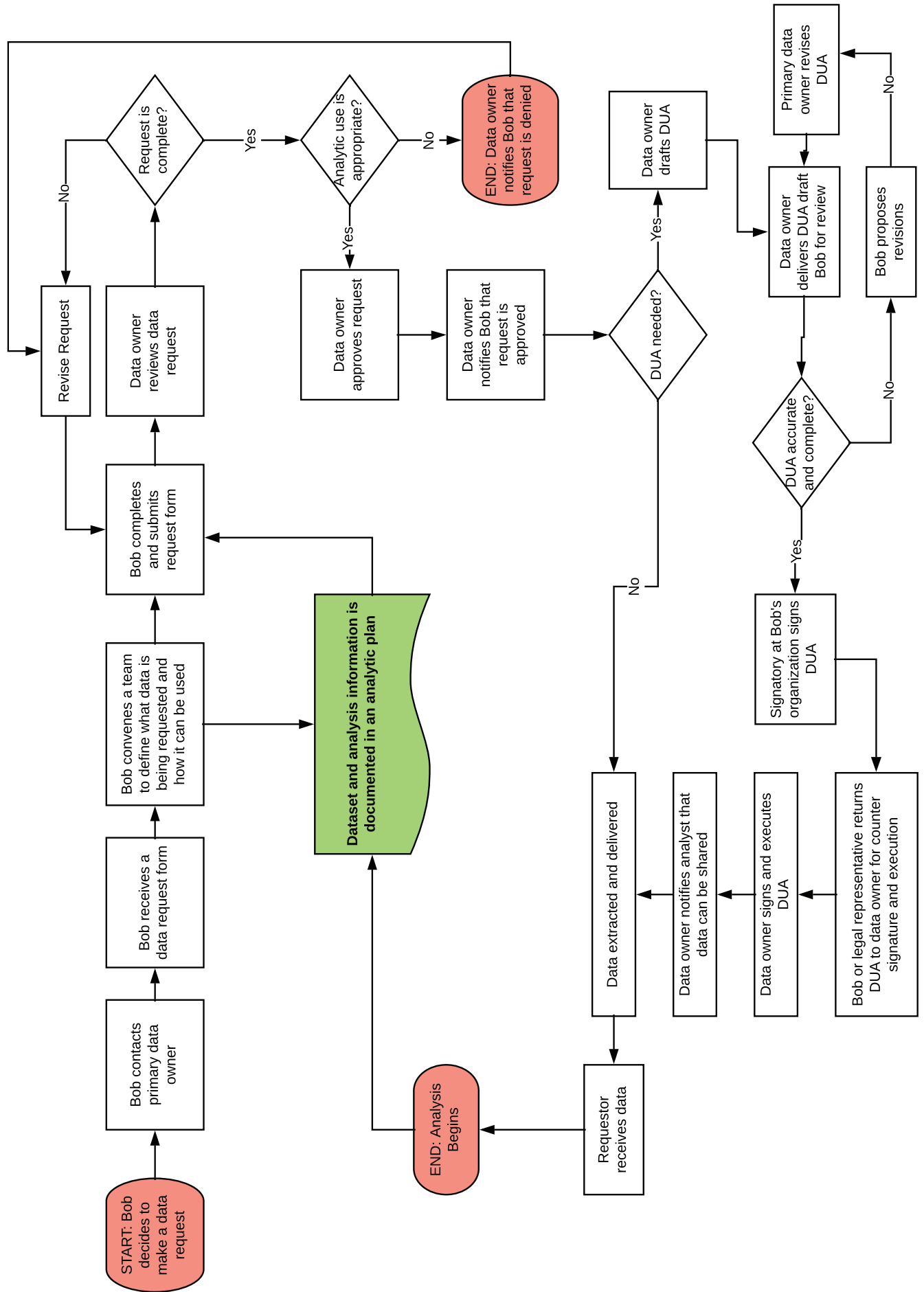
- Describe sequence of analytic steps.
- When used, include analytic workflow.
- What statistical methods will be used and what tests will be performed?
- Will sensitivity analyses be performed?
- What potential confounding and bias exists and how will it be assessed and addressed?
- What analytic software will be used? (include software version number)

Tables and Figures

- Include shell tables and figures.
- As analysis progresses, modify table shells as needed
- Populate tables and figures with results
- Add footnotes
- When completed, draft narrative results and key findings can be included

Example Process to Access New Health Data Source for Opioid Surveillance

This process flow defines how a public health practitioner ('Bob') might approach a new surveillance data source



Free Analysis, Visualization and Reporting (AVR) Software Selection Tool

This tool can assist with the selection of a free Analysis, Visualization and Reporting (AVR) software product appropriate for the type of data being used. It also outlines some of the necessary skill sets of the data analyst and additional system requirements to use each product.

Note: Several software products requiring licensing fees (e.g., ESRI, ArcGIS, Pentaho, SAS, STATA, SUDDAN) were intentionally excluded from this tool. This list is by no means an exhaustive collection of all open source AVR products relevant to epidemiological data activities.

Product Name	Product Summary	Pros	Cons	System/Other Software Requirements and Data Formats	Skills Needed	Source
Epi Info 7	Different modules allow for survey creation and data capture. The Analysis module can be used with data imported from 24 different formats.	Available in desktop (Microsoft Windows), mobile and web/cloud versions; Epi Map and Epi Report allow for additional visualization and formatting; available in 16 languages.	Not available on MAC or Linux operating systems (although these projects are underway); limitations in ability to support various ANOVA and regression methods.	Microsoft Windows XP or newer; Microsoft .NET 4.0 Accepted data formats include: ASCII text file, Microsoft Access, Microsoft Excel, Microsoft SQL Server Database.	Basic to intermediate knowledge of statistics; familiarity with Boolean expressions and some knowledge of Microsoft Access helpful; mapping, map projections and GIS basics if using Epi Map.	Centers for Disease Control and Prevention. 2016. "Epi Info." https://www.cdc.gov/epiinfo/index.html
GRASS GIS	Geographic Resources Analysis Support System, commonly referred to as GRASS, is a software suite used for geospatial data management and analysis, image	Can be used as either a stand-alone application or a backend for other software packages (e.g., R); interfaces allow for transfer of GRASS data into R and for results to be returned to GRASS. GRASS GIS 7 offers a	Support subject to the constraints of volunteer community support (commercial contractor options do exist in many countries).	Available for Microsoft Windows XP (requires Microsoft Visual C++ Redistribution Packages) or newer; X 10.8 or newer, or Linux operating systems. Accepted data formats include: Microsoft Access, MySQL, ODBC,	Mapping, map projections, GIS basics, and spatial analysis.	GRASS Development Tea. 2016. "GRASS GIS: Bringing Advanced Geospatial Technologies to the World." https://grass.osgeo.org/

Product Name	Product Summary	Pros	Cons	System/Other Software Requirements and Data Formats	Skills Needed	Source
	processing, graphics and maps production, spatial modeling, and visualization.	new Python interface for application creation; handles raster, vector, image processing, and graphic data.		Oracle, PostgreSQL, SQLite.		
QGIS	An open-source geographic information system that provides data viewing, editing, and analysis.	Desktop, spatial file browser, server application, and web applications exist currently; Android Mobile Application is in development; available in multiple languages; R and GRASS plugins available for advanced spatial statistics.	Lack of 3D integration; much of the symbology palette must be downloaded opposed to pre-existing options; support subject to the constraints of volunteer community support (commercial contractor options do exist in many countries).	Available for Microsoft Windows, MAC OS X, and Linux operating systems. Accepted data formats include: AutoCAD DXF, ENC, geodatabase, MapInfo, Microstation, MSSQL Spatial databases, Oracle Spatial, Shapefiles, SpatialLite, WellKnownText (WKT).	Mapping, map projections, GIS basics, and spatial analysis.	QGIS Community. 2016. "QGIS." http://www.qgis.org/en/site/about/index.html .
R	A spatial computing language and environment for data manipulations, calculation and graphical display.	Ease of design for publication-quality plots; strong user community and package library.	Memory management (data must be stored in physical memory), speed and efficiency are shortcomings, cannot be directly embedded into a web browser (see R-Shiny).	Available for Microsoft Windows, MAC OS X, and Linux operating systems. Accepted data formats include: ASCII text file, CSV, Microsoft Excel, Minitab, SPSS.	Intermediate knowledge of statistics; the syntax-based analyses will present a greater learning curve for users familiar with a menu-driven interface without knowledge of programming	The R Foundation. 2016. "R: The R Project for Statistical Computing." http://www.r-project.org/ .

Product Name	Product Summary	Pros	Cons	System/Other Software Requirements and Data Formats	Skills Needed	Source
R-Shiny	A platform as a service (PaaS) from RStudio that allows for building web applications using R.	Created for R users with no web development experience; can also be written in HTML, CSS, or JavaScript for additional flexibility.	Depending on use case/business need, may incur a fee.	Installation requires R and a web connection; web deployment requires servers or a hosting service.	fundamentals; advanced users can write C code to manipulate R objects directly. Requires functional knowledge of the R statistical language.	RStudio. 2016. "Shiny." http://shiny.rstudio.com/ RStudio. 2016. "Shiny – Tutorial." http://shiny.rstudio.com/tutorial/ .
SaTScan	Software for the spatial, temporal, and space-time scan statistics, or SaTScan, allows users to perform geographical surveillance and evaluate statistical significance of disease clusters.	Possible to scan multiple datasets simultaneously; allows for Poisson-based, Bernoulli, space-time permutation, ordinal, exponential and normal models.	Initial data formatting may be cumbersome for first-time users.	Microsoft Windows Requirements (also available for MAC X 10.6 or newer and Linux): Vista or newer, Intel or a compatible processor, 20 MB hard drive space and Oracle Java Runtime Environment 6.0 or higher. Accepted data formats include: CSV, dBase, Shapefiles, SaTScan ASCII text file.	Mapping, map projections, GIS basics, and spatial analysis.	Kulldorff, Martin and Information Management Services Inc. 2005. "SaTScan – Software for the Spatial, Temporal, and Space-Time Scan Statistics." http://www.satscan.org/ Kulldorff, Martin, 2015. "SaTScan TM User Guide." http://www.satscan.org/ .
Tableau Public 9.3	Business Intelligence (BI) software with a menu-driven interface	"Show Me" feature offers one-click options when user knows what data they	Limited data source options compared to paid products; files may only be saved to	Server-side requirements: (Microsoft Windows Requirements, also available for Mac)	Excel proficiency highly desired; online trainings sufficient with	Tableau Software Incorporated, 2016. "Tableau Public." http://public.tableau.com/ .

Adapted from the Toolkit for Planning an EHR-based Surveillance Program available at <http://www.phii.org/EHRtoolkit>

Product Name	Product Summary	Pros	Cons	System/Other Software Requirements and Data Formats	Skills Needed	Source
	designed to share interactive visualizations on the web.	need for analysis but need assistance creating an effective view; utilizes OpenStreetMap.	your Tableau Public profile, not your computer/network; as results must be posted to the web to be shared, not appropriate for confidential data.	Microsoft Windows Vista SP2 or newer, Microsoft Windows Server 2008 R2 or newer, minimum of Intel Pentium 4 or AMD Opteron processor, Internet Explorer 8 or newer. Client-side requirements: Android Browser 3.2 or newer, Internet Explorer 8 or newer, Mozilla Firefox 3.x or newer, Google Chrome, Tableau mobile apps. Accepted data formats include: ASCII text file, Microsoft Access, Microsoft Excel, Microsoft SQL Server, Google Analytics, MySQL, Oracle, Tableau Server.	working knowledge of Excel graphics options.	
WEAVE	The Web-based Analysis and Visualization Environment, or WEAVE, is designed for users of any skill level to integrate,	Multiple examples available from local governments currently using the platform; utilizes OpenStreetMap.	Installation requires multiple software downloads, which might present challenges to users without IT administrative rights.	Available for Microsoft Windows, MAC OS X, and Linux operating systems. Server-side requirements: MySQL,	Mapping, map projections and GIS basics if using GIS features.	University of Massachusetts Lowell. 2016. "Weave (Web-Based Analysis and Visualization Environment)." http://oicweave.org/index.php/

Product Name	Product Summary	Pros	Cons	System/Other Software Requirements and Data Formats	Skills Needed	Source
	<p>analyze, and visualize data with the option to disseminate results in a web page.</p>			<p>PostgreSQL, Oracle, or SQL Server; Java Development Kit (Includes Java Runtime Environment); Tomcat or Glassfish; any web browser with the Adobe Flash Player plugin version 10.0 or newer.</p> <p>Client-side requirements: any web browser with the Adobe Flash Player plugin version 10.0 or newer.</p> <p>Accepted data formats include: CSV, .dbf component of an ESRI Shapefile, Microsoft Excel, native WEAVE datasets, WFS.</p>		

Paid Analysis, Visualization and Reporting (AVR) Software Selection Tool

This tool can assist with the selection of a paid Analysis, Visualization and Reporting (AVR) software product appropriate for the type of data being used. It also outlines some of the necessary skill sets of the data analyst and additional system requirements to use each product. This list is by no means an exhaustive collection of all AVR products that can be used for epidemiology and surveillance.

Product Name	Product Summary	Pros	Cons	System/Other Software Requirements and Data Formats	Skills Needed	Source
Tableau Desktop 10.5	Business Intelligence (BI) software with a menu-driven interface designed to conduct data analysis and create and share interactive visualizations on the web.	Remarkable visualization capabilities for small or large datasets; great user interface; easily connects to and combines multiple data sources; speed and reliability; strong user community; mobile friendly.	Cost; weak user support; limited security functionality and business intelligence capabilities for real time operational reporting; can require assistance from technical staff; limited versioning functionality.	Server-side requirements: (Microsoft Windows Requirements, also available for Mac) Microsoft Windows Vista SP2 or newer, Microsoft Windows Server 2008 R2 or newer, minimum of Intel Pentium 4 or AMD Opteron processor, Internet Explorer 8 or newer. Client-side requirements: Android Browser 3.2 or newer, Internet Explorer 8 or newer, Mozilla Firefox 3.x or newer, Google Chrome, Tableau mobile apps.	Basic data comprehension, analytic, and visualization skills; data modelling and transformation proficiency highly desired; experience with other Tableau products is helpful.	https://www.tableau.com/products/desktop

Product Name	Product Summary	Pros	Cons	System/Other Software Requirements and Data Formats	Skills Needed	Source
				Accepts hundreds of data formats including: ASCII text file, Microsoft Excel and SQL Server, Google Analytics, and Oracle.		
STATA 15.1	A spatial computing language, integrated software package, and environment for data manipulations, calculation and graphical display.	Many quality statistical features and graphics; speed; lifetime license is portable; robust econometric functionality; strong user community.	Extra cost for more processors; limited machine learning and natural language processing functionality; not designed to work with multiple datasets at once; limited data cleaning functionality.	Available for Microsoft Windows, MAC OS X, and Linux operating systems. Accepted data formats include: ASCII text file, CSV, ODBC, XML, SPSS, SAS, and Microsoft Excel, Microsoft SQL Server.	Intermediate knowledge of statistics; the syntax-based analyses will present a greater learning curve for users familiar with a menu-driven interface without knowledge of programming fundamentals.	https://www.stata.com/
ARCGIS 10.6	A platform to create, manage, share, and analyze spatial data by programming or point and click tools. ARCGIS offers server components, mobile and desktop applications,	Industry standard geospatial analysis software; tons of features and statistical tools; foundation for many proprietary GIS apps.	Cost; user interface is difficult; processing requirements can cause the program and machine to crash.	Available for Microsoft Windows and some Linux operating systems. Runs on 64-bit systems only. Installation requires a web connection; web deployment requires servers or a hosting	Basic data comprehension, analytic, and visualization skills; experience with or knowledge of basic geospatial analysis concepts.	www.arcgis.com

Product Name	Product Summary	Pros	Cons	System/Other Software Requirements and Data Formats	Skills Needed	Source
	and developer tools.			Compatible with Python.		
SAS 9.4 ('Base SAS')	A computing language and environment for data manipulations, calculation, complex statistical analysis, and graphical display.	Simple to learn, strong support community, handles large databases easily, easy to debug, comprehensive logging and error messages, reliable, secure, dedicated customer support	Cost; added cost for many features; not great graphics; procedural language = more lines of code; limited text mining functions.	Available for Microsoft Windows and Linux operating systems. Accepted data formats include: ASCII text file, CSV, ODBC, XML, SPSS, Microsoft Excel, Microsoft SQL Server.	Intermediate knowledge of statistics; the syntax-based analyses will present a greater learning curve for users familiar with a menu-driven interface without knowledge of programming fundamentals	www.sas.com
SAS Enterprise Guide (SAS EG)	See SAS description above. SAS EG has an easy-to-use menu- and wizard-driven tool for analyzing data and publishing analytic results.	Less expensive than purchasing multiple Base SAS licenses; point and click features, process flow, and code wizard.	Speed, not compatible with all SAS programming commands	Same as above.	Same as above. Point and click tools reduce the experience needed with written programming.	www.sas.com Transitioning to SAS Enterprise Guide. www.lexjansen.com/nesug/nesug08/ph/ph12.pdf

Success Story Tips and Template

Tips for writing Success Stories

Title:

- Capture the overall message of the story
- Use active language
- Capture the reader's attention

Problem Overview:

- Describe the problem or situation being addressed and why it is important
- Use data to frame the situation, including health burden and economic costs
- Specify the affected population(s)

Program/Activity Description:

- Identify who was involved, including your partners
- Describe the program/activity that was implemented, including where and when it took place and how it addressed the situation
- Identify the target audience of the program/activity
- Describe how the progress of the program/activity was evaluated

Program/Activity Outcomes:

- Identify the short-term or intermediate outcomes that demonstrate how the program/activity addressed the situation (e.g., improved data collection, increased stakeholder engagement)
- Provide a conclusion to the success story that avoids using broad sweeping statements such as “There was noticeable improvement in data collection.”
- Show the impact, not just what was done but the result of what was done. What changed as a result?
- Remember that the types of outcomes achieved by a program might vary depending on the stage and maturity of the program. Sometimes a success story is a “work in progress.” Consider updating or enhancing your story as new information and outcome data become available.

Success Story Tips and Template

Title:

Problem Overview:

Program/Activity Description:

Program/Activity Outcomes:

For More Information:

Name of Jurisdiction/Health Department:

Name of Primary Point of Contact (POC):

POC phone number:

POC e-mail address:

Source: Adapted from CDC Division of Adolescent and School Health, Success Story Tips and Template

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