

Investigating Acute Viral Hepatitis with Healthcare Exposures

Zoë Langdon, MPH
Healthcare-Associated Infections (HAI) Program
Center for Health Care Quality
California Department of Public Health

Objectives:

- I. Describe roles and responsibilities during HAI investigations
- II. Review healthcare-associated acute viral hepatitis (HA-hepatitis) epidemiology
- III. Understand HA-hepatitis prevention strategies
- IV. List steps to investigate HA-hepatitis
- V. Highlight recent outbreaks of HA-hepatitis

Roles and Responsibilities

- Local Health Department (LHD)
 - Receives reports
 - Investigates
 - Completes CDPH case report form
 - Communicates with healthcare facilities as needed

Roles and Responsibilities, cont'd

- CDPH Immunization Branch (IZB)
 - Reviews cases, maintains database of healthcare facilities where hepatitis exposure may have occurred
- CDPH HAI Program
 - Provides investigation consultation and assistance for reported cases with healthcare exposures
- CDPH L&C
 - Ensures licensed healthcare facilities comply with laws and regulations

HBV/HCV Background

<https://www.cdc.gov/hepatitis/index.htm>

	HBV	HCV
Prevention in Healthcare	Infection control practices and the HBV vaccine	Infection control practices
Incubation Period	45-160 days 6 weeks – 5+ months	2 weeks – 6 months
Survival in the Environment	1+ week	Up to 3 weeks
Communicability Period	Considered infectious if hepatitis B surface antigen (HBsAg) is found in blood	Considered infectious if HCV RNA is found in blood
Transmissibility after Needle stick	6-30%	1.8%

Modes of Transmission

<https://www.cdc.gov/hepatitis/index.htm>

Transmission Mode	HBV	HCV
Blood	+++	+++
Birth	+++	++
Sex	+++	+
Household	+	+/-

Modes of Transmission in Healthcare

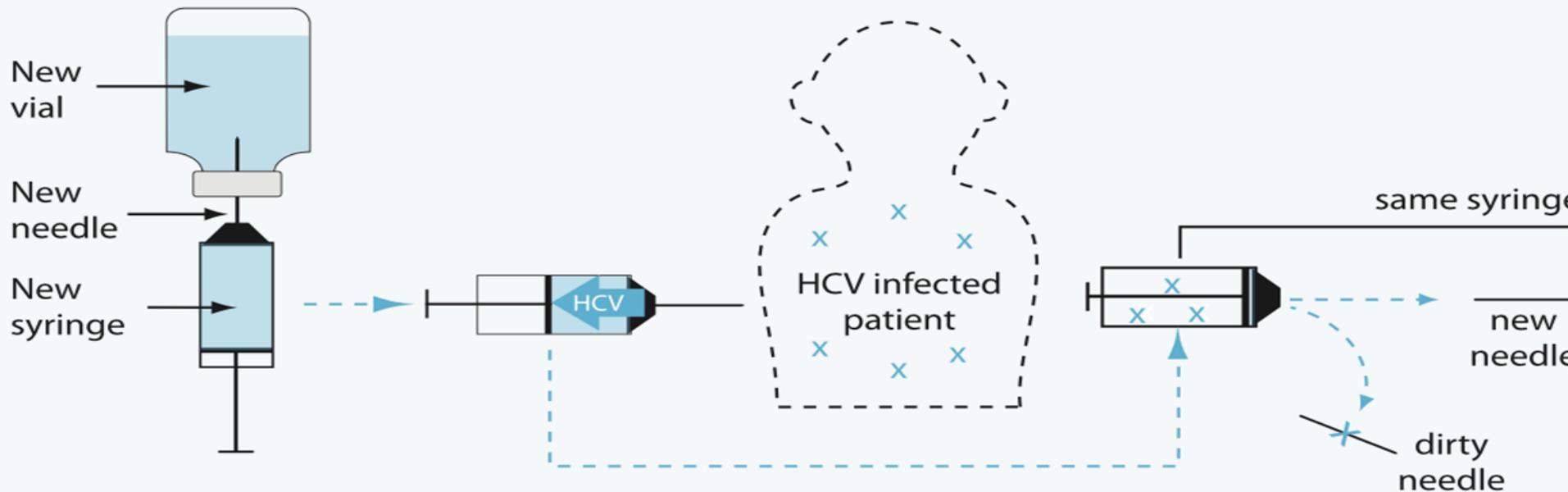
- Injections or infusions
- Assisted blood glucose monitoring
- Cross-contamination
 - Healthcare worker or environment
- Transfusions and organ transplantation

Common Reasons for Unsafe Injection Practices

- Lack of safe injection policies at healthcare facility
- Staff are poorly trained or unaware of safe injection practices
- Healthcare provider is rushed and takes a shortcut
- Healthcare provider learned safe injection practices at some point but has forgotten
- To save money

Unsafe Injection Practices and Disease Transmission

Improper use of syringes, needles, and medication containers can transmit infectious diseases such as hepatitis C virus or MRSA.



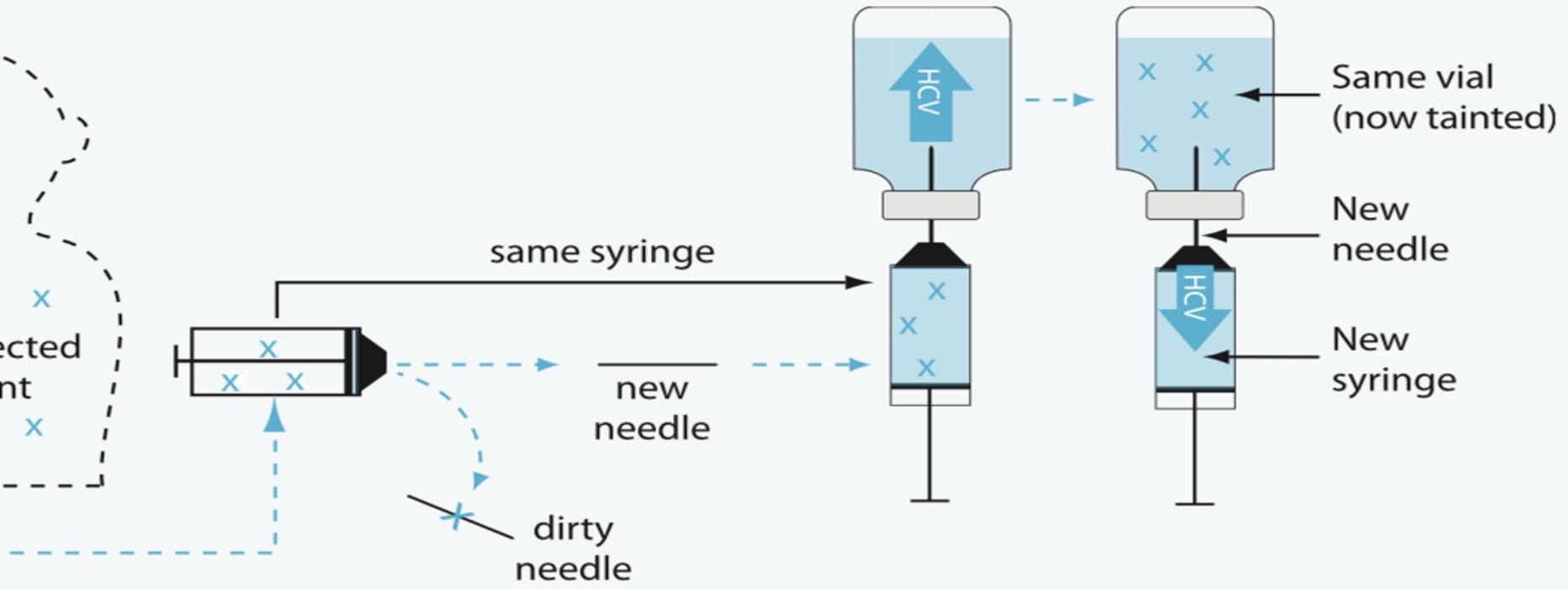
1. New needle and syringe are used to draw medication.

2. When used on an HCV-infected patient, backflow from the injection contaminates the syringe. Changing the needle does not prevent contamination of the syringe.

3. When reused to obtain medication, the contaminated syringe contaminates the medication vial.

Disease Transmission

Medication containers can transmit HCV or MRSA.



infected
the injection
e. Changing
vent
syringe.

3. When reused to obtain medication, the contaminated syringe contaminates the medication vial.

4. If the contaminated vial is used for other patients, they can become infected with HCV.

Single-Dose Vials

- Single-dose vials are to be used one time on one patient
- No preservative: pooling medication contents together or using on multiple patients increases risk for contamination
- Labels must be checked to determine if the vials are single or multi-dose



<http://www.oneandonlycampaign.org/single-dose-multi-dose-vial-infographic>

Multi-Dose Vials

- Multi-dose vial use should be limited
- More opportunities for contamination with multi-dose vials
 - When carried into immediate patient care area
 - When used on multiple patients
- Multi-dose vials should be dedicated to a single patient when possible
- If multi-dose vial used, prepare in a dedicated medication preparation area

Bags of Intravenous (IV) Solution: Single Patient Use

- Bags of IV solution must not be used as a common source of supply for more than one patient
- Everything from the medication bag to the patient's IV catheter is a single interconnected unit



Saline bags



Intravenous tubing

Assisted Blood Glucose Monitoring

- If blood glucose monitors are shared, disinfection should occur between each patient following the manufacturer's instructions
- Hand hygiene must be used between each patient

Assisted Blood Glucose Monitoring, cont'd

- Insulin-pen devices are designed for use for a single patient
- Fingertick devices (including lancet holders) must only be used on one patient



<http://www.cdc.gov/injectionsafety/blood-glucose-monitoring.html>

Avoid Cross-Contamination

- Improper disinfection of reusable equipment can lead to cross-contamination
 - Podiatry care
 - Dental care
 - Dialysis
- Improper handling of used equipment can lead to cross-contamination between clean and dirty equipment
 - Failure to maintain separation of reprocessing and clean storage areas

Reports of Hepatitis Transmission in Outpatient Dialysis

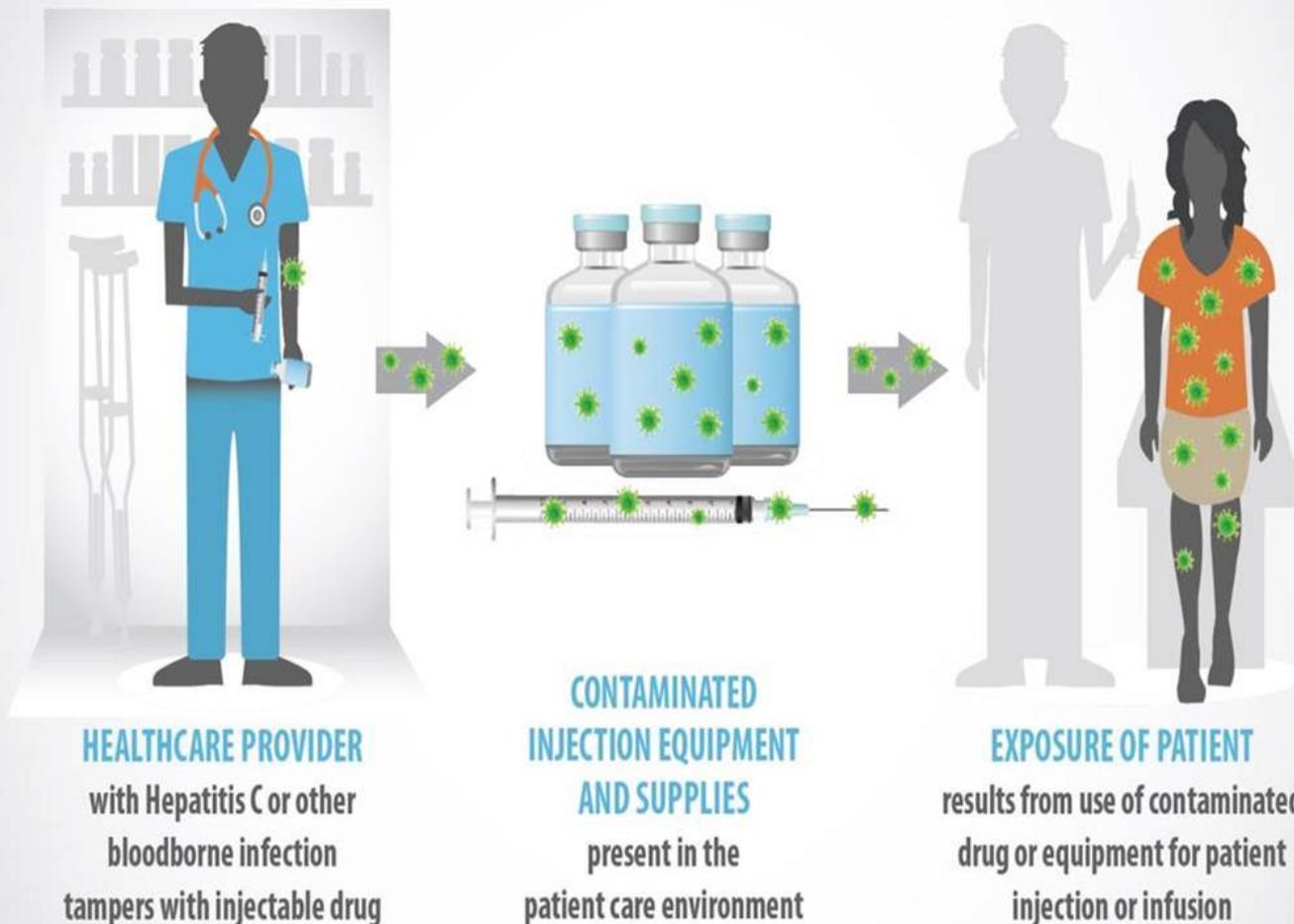
- CDC Healthcare Alert Network - 2016
 - Increasing number of reports of newly acquired HCV in patients undergoing hemodialysis
- Many opportunities for transmission in dialysis centers
 - Lapses in cleaning and disinfection
 - Cross-contamination between clean and contaminated equipment
 - Medication preparation
 - Hand hygiene

<https://emergency.cdc.gov/han/han00386.asp>

Evaluation of Acute Hepatitis in Outpatient Dialysis

- LHD leads the investigation
 - Gathers information
 - Coordinates with the dialysis clinic
 - Prospective surveillance of additional cases of acute HBV/HCV in clinic
 - Specimen collection as needed
- CDPH HAI Program
 - Consults
 - Provides on-site assistance with an infection control assessment (in collaboration with/accompanied by LHD)
 - Coordinates with CDC

DRUG DIVERSION* SPREADS INFECTION FROM HEALTHCARE PROVIDERS TO PATIENTS



*Drug diversion occurs when prescription medicines are obtained or used illegally by healthcare providers.

FOR MORE INFORMATION, VISIT WWW.ONEANDONLYCAMPAIGN.ORG



Healthcare-Associated HBV/HCV Outbreaks

- 59 healthcare-associated viral hepatitis outbreaks reported to CDC, 2008-2015
 - 56 (95%) occurred in non-hospital settings
 - Less regulation, fewer resources for infection control

<https://www.cdc.gov/hepatitis/outbreaks/healthcarehepoutbreaktable.htm>

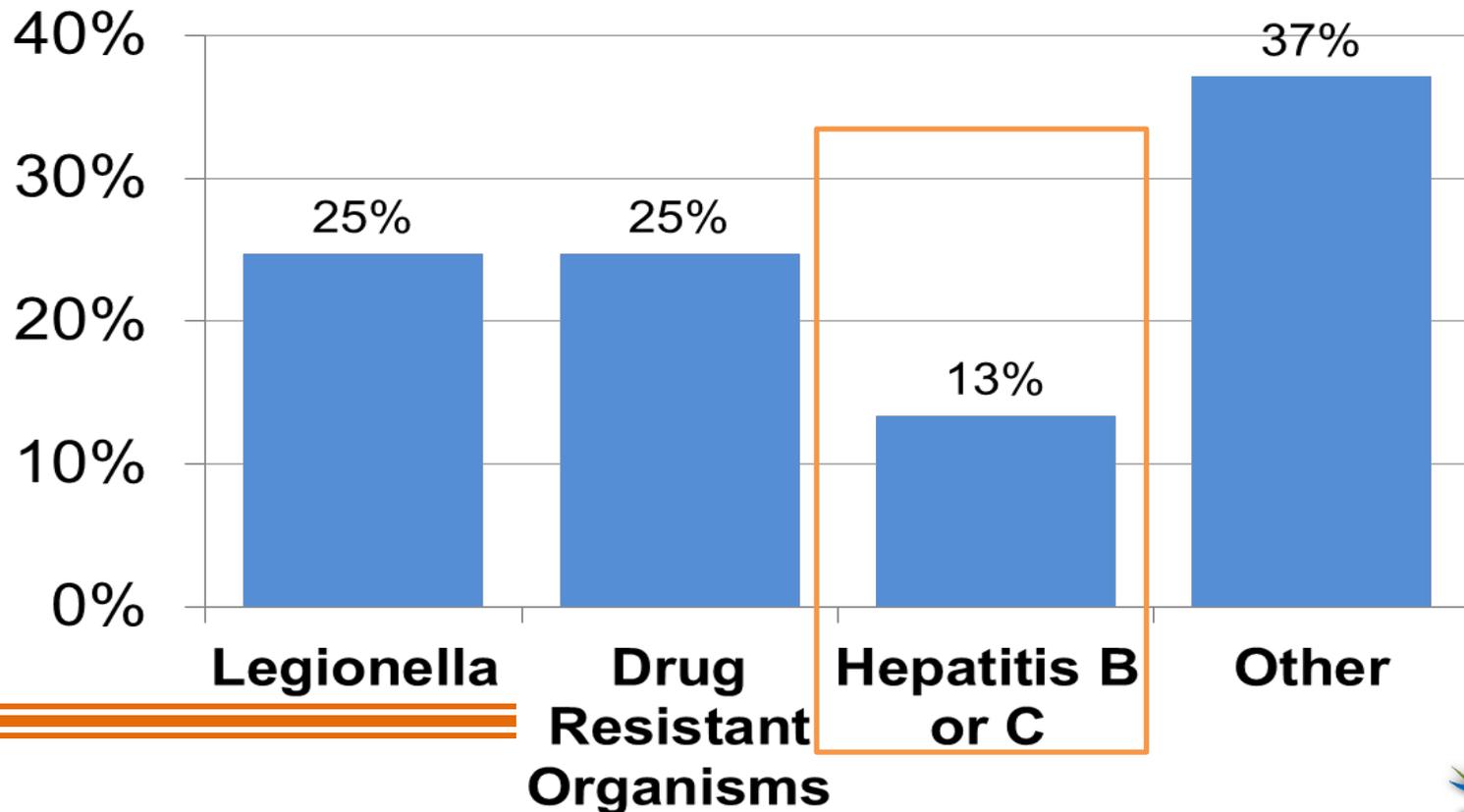
Outbreaks by Healthcare Setting

<https://www.cdc.gov/hepatitis/outbreaks/healthcarehepoutbreaktable.htm>

Setting	Virus (#)	Procedure/Exposures
Hospital	HCV (3)	Staff drug diversion
Outpatient Hemodialysis	HCV (18)	Dialysis
Long-term care	HBV (17) HCV (1)	Assisted blood glucose monitoring, podiatry, multiple*
Oral Health	HBV (1)	Free dental clinic in school gym
Other outpatient	HBV (5) HCV (11)	Injections, infusions, assisted blood glucose monitoring, staff drug diversion

HAI Program Assistance LHD, 2015-2016

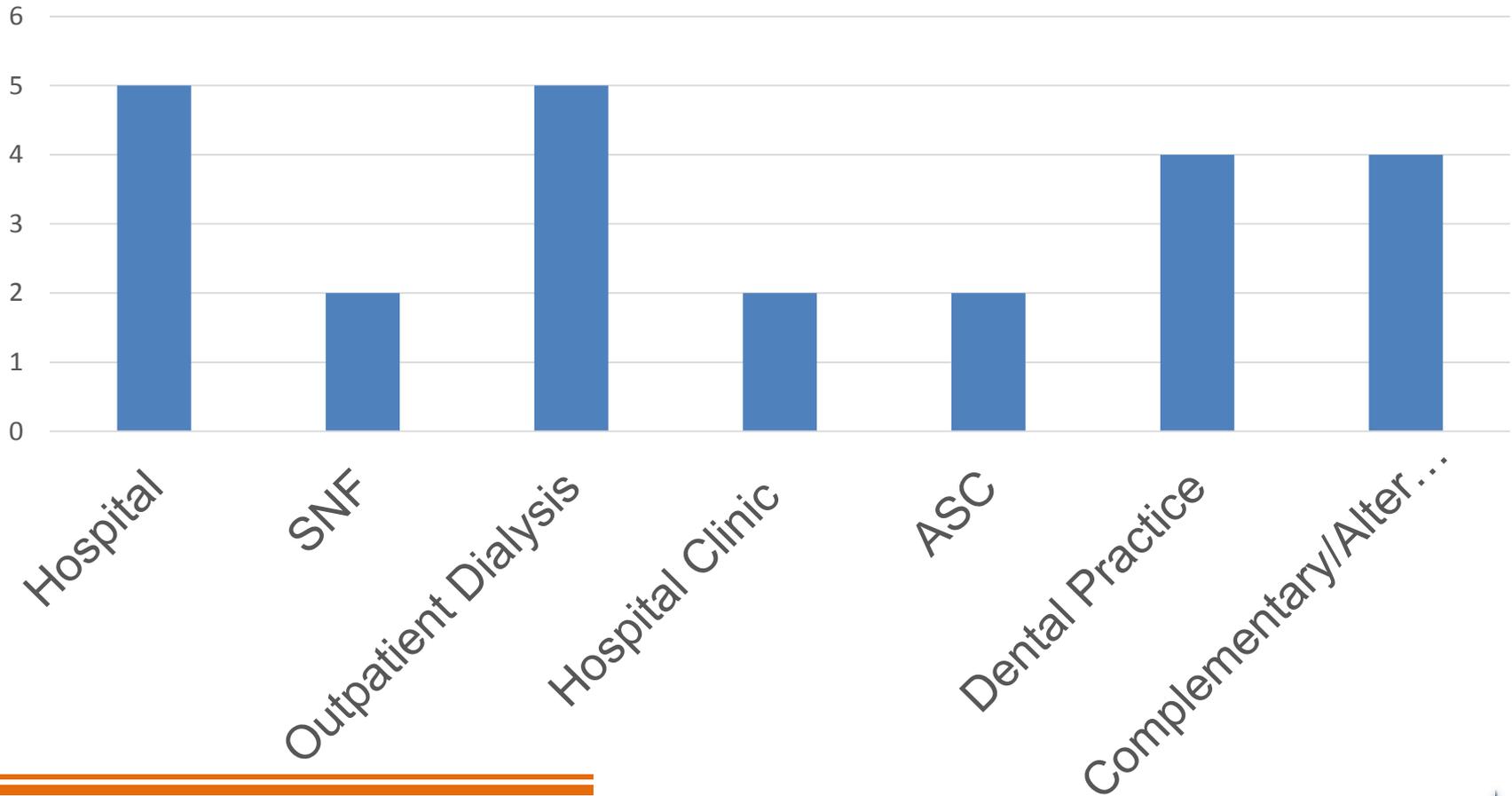
- 61 of 97 (63%) consultations were due to three pathogen types: *Legionella*, drug resistant organisms, and hepatitis B or C



HAI Program Assistance- HBV/HCV

Types of Healthcare Exposures, 2015-16

n = 13



Acute HBV/HCV Cases Reported in California, 2011-2015

- Total cases:1023
- 187 (18%) no traditional risk factors
 - Of those, 75 (40%) had healthcare as an potential exposure during the incubation period
- Most common healthcare exposures
 - Fingertstick or blood draw
 - Dental work or oral surgery
 - Prior hospitalization
 - Prescribed injections or infusions



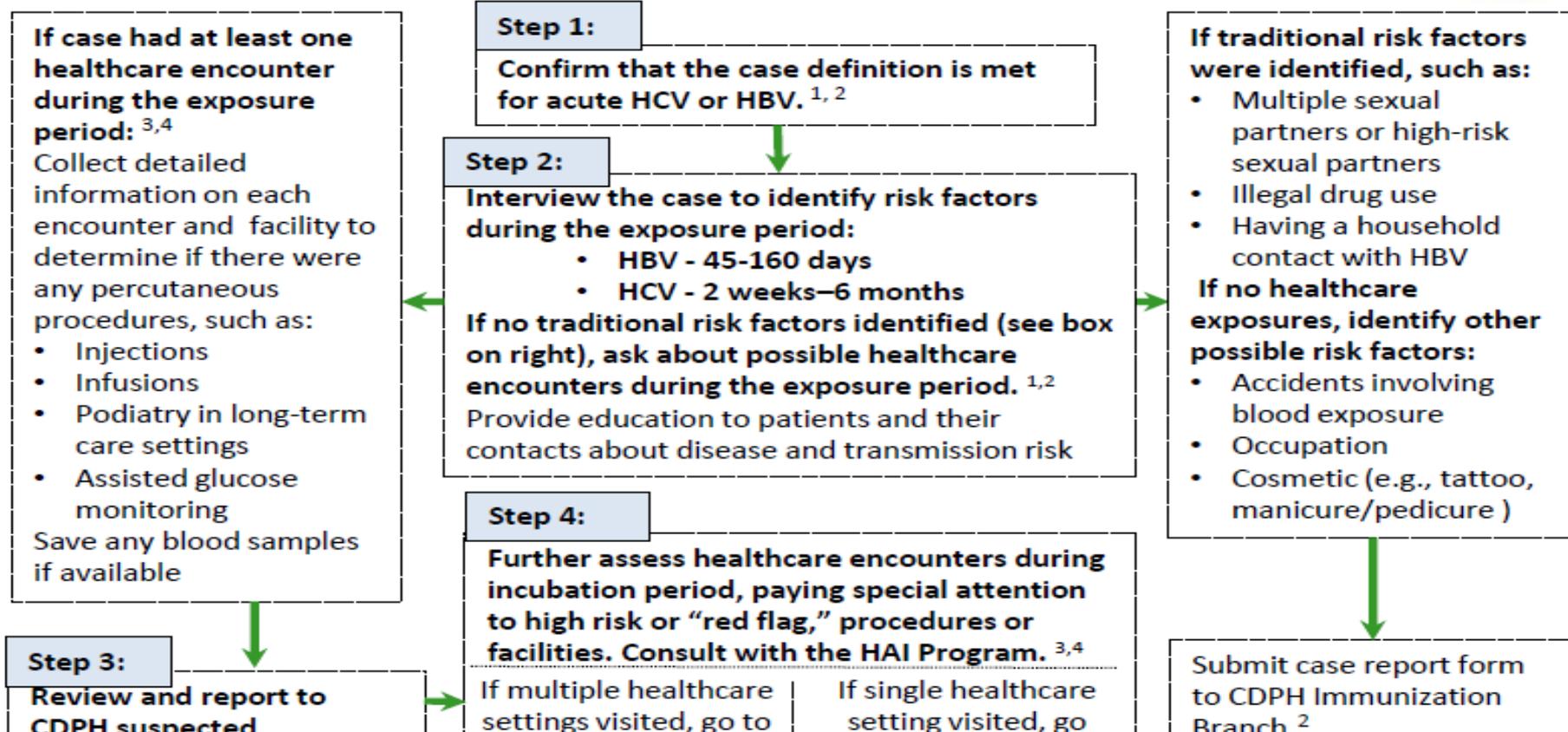
Investigation Steps

1. Confirm the case definition
2. Interview the case to identify risk factors during the exposure period
3. Review and report suspected healthcare-associated HCV/HBV
4. Further assess healthcare encounters in consultation with HAI Program
5. Respond based on assessment findings

HA-Hepatitis Investigation Quicksheet



California Department of Public Health Healthcare-Associated Hepatitis B and C (HBV/HCV) Investigation Quicksheet Algorithm



http://www.cdph.ca.gov/programs/hai/Documents/HA_HBVandHCV_Quicksheet%20Jan2017.pdf



Step 1: Confirm Case Definition

- Refer to CDPH Acute HBV or HCV Case Report Form
- Determine if the case definition has been met
 - Clinical
 - Laboratory criteria for acute HBV/HCV

OR

- Seroconversion
 - HCV(12 months)
 - HBV(6 months)

<https://www.cdph.ca.gov/pubsforms/forms/CtrlForms/cdph8703.pdf>

Step 2: Interview the Case Patient for Risk Factors

- Ask about previous negative lab results
- Interview the case patient to identify traditional, healthcare, and other risk factors during the incubation period
- Provide education to patients and their contacts about disease and transmission risk

Step 2: Interview the Case Patient for Risk Factors, cont'd

- Traditional risk factors
 - Illegal drug use
 - Multiple sexual partners
 - Having a household contact with HBV
- Other possible risk factors
 - Accidents where case patient was exposed to blood
 - Occupation may expose case patient to body fluids
 - Cosmetic treatments
- Healthcare encounters

Step 2: Interview the Case Patient for Risk Factors, cont'd.

- Encounters with percutaneous procedures during the incubation period
 - Injections
 - Infusions
 - Podiatry
 - Assisted blood glucose monitoring
 - Outpatient hemodialysis
 - History of blood donation
 - Save blood samples if available at the local health department lab
-
-

Step 3: Review and Report Suspected Healthcare-Associated Hepatitis

- Submit case report form to CDPH Immunization Branch (IZB)
 - IZB notifies HAI Program for cases potentially acquired through healthcare exposures
 - IZB checks against list of healthcare facilities that have been reported previously
- Obtain specimen from case and test status of sexual and/or household contacts if their status is unclear

Step 4A: If Multiple Healthcare Settings, Prioritize Red Flag Settings

Settings with Frequent Injections or Infusions	Assisted Blood Glucose Monitoring for Multiple Patients	Previous Complaints/Outbreaks
<ul style="list-style-type: none"> 📌 Ambulatory surgery centers 📌 Oncology clinics 📌 Pain management clinics 📌 Long-term care settings 📌 Outpatient dialysis centers 📌 Alternative/complementary medicine clinics 	<ul style="list-style-type: none"> 📌 Long-term care facilities 📌 Assisted living facilities 	<ul style="list-style-type: none"> 📌 Facility/clinic associated with a prior case of acute hepatitis 📌 Previous reports or complaints 📌 Other setting types where prior outbreaks have occurred

Step 4B: Evaluate Single and Priority Healthcare Settings

- Consult with HAI Program as needed
- Research the facility/ practice to gather information on the types of services provided
- Review case patient records
- If necessary, perform onsite visit; HAI Program may provide assistance
- Review all infection control policies and procedures

Step 4B: Evaluate Single and Priority Healthcare Settings

- Investigate if additional patients seen were potential sources of HBV/HCV or were recently diagnosed with acute HBV/HCV
 - Obtain list(s) of patients seen during the same time period as the index patient
 - Identify additional cases through record review and acute or chronic hepatitis B and C registry match
 - HAI Program can coordinate CDPH hepatitis registry match

Investigation Step 5: Respond to Assessment Findings

- If during the investigation you observe or hear of unsafe practices, immediately advise the facility to correct their actions
 - Notify appropriate regulatory authorities depending on infection control breach identified
- Consider patient notification for testing for HBV, HCV, and HIV if additional patients are found to be at risk

Infection Control Breaches that Require Immediate Reporting

- Using the same needle for more than one patient
- Using the same syringe, pen or injection device for more than one patient
- Re-using a needle or syringe to administer medication or enter a medication container, and then using the contents on another individual
- Using the same lancet device for more than one patient, even when the lancet is changed

Case Study:
Investigation of Acute HCV
IV-Insulin Infusion Clinic, 2015

Case Study: Investigation of Acute HCV - IV Insulin Infusion Clinic, 2015

- In 2015, a local health department was contacted about a newly diagnosed patient with HCV
- Healthcare provider reported concern that the case patient had potential exposures in an alternative medicine clinic
- Patient had no traditional risk factors
 - Two healthcare encounters during the incubation period

Investigation of Acute HCV - IV Insulin Infusion Clinic, 2015

- On April 15, 2015 the HAI Program was notified by the local health department
- The two healthcare encounters were both considered “red flags” by the HAI Program
 - Clinic A: vitamin infusions at a wellness clinic
 - Clinic B: IV insulin infusions at an alternative medicine clinic
 - Frequent blood glucose monitoring during insulin infusion

Investigation of Acute HCV - IV Insulin Infusion Clinic, 2015, cont'd

- LHD visits Clinic A
 - Infection control lapses identified where vitamin infusions were administered
- LHD receives additional reports of two additional cases with healthcare encounters at Clinic B

Investigation of Acute HCV - IV Insulin Infusion Clinic, 2015, cont'd.

- LHD and HAI Program visit Clinic B
 - Infection control breaches found at on site-visit
 - Lancet holders being used on multiple patients
 - Glucometers being shared between patients without adequate cleaning/disinfection



This device is designed for your personal use. Do not share this device with any other person. Sharing this device can transmit serious, even grave infections.



Investigation of Acute HCV - IV Insulin Infusion Clinic, 2015

- Clinic B was advised to immediately stop the unsafe practices
- Medical board notified – physician owned practice
- Patient notification for testing
 - 92 patients were notified for screening
 - 9 cases of newly identified HCV in clinic

Recent Reports of Syringe Reuse

- MMWR 2017 - Hepatitis C Transmission from Inappropriate Reuse of Saline Flush Syringes for Multiple Patients in an Acute Care General Hospital
 - A telemetry unit nurse was reusing prefilled saline flush syringes for multiple patients
- MMWR 2016 - Investigation of Hepatitis C Virus Transmission Associated with Injection Therapy for Chronic Pain
 - Physician at prolotherapy clinic reusing syringes on multiple patients

https://www.cdc.gov/mmwr/volumes/66/wr/mm6609a4.htm?s_cid=mm6609a4_e

<https://www.cdc.gov/mmwr/volumes/65/wr/mm6521a4.htm>

Summary

- Acute HBV/HCV transmission in healthcare continues to occur
- CDPH Quicksheet algorithm can guide you through the investigation of HA-hepatitis B and C cases
- Use “red flags” to prioritize which health facility to investigate
- Promote safe injection practices and other infection control recommendations to prevent HA-hepatitis

Injection Safety Checklist

https://www.cdc.gov/injectionsafety/pdf/sipc_checklist.pdf

INJECTION SAFETY CHECKLIST

The following Injection Safety checklist items are a subset of items that can be found in the *CDC Infection Prevention Checklist for Outpatient Settings: Minimum Expectations for Safe Care*.

The checklist, which is appropriate for both inpatient and outpatient settings, should be used to systematically assess adherence of healthcare personnel to safe injection practices. (Assessment of adherence should be conducted by direct observation of healthcare personnel during the performance of their duties.)

Injection Safety	Practice Performed?	If answer is No, document plan for remediation
Injections are prepared using aseptic technique in a clean area free from contamination or contact with blood, body fluids or contaminated equipment.	Yes No	
Needles and syringes are used for only one patient (this includes manufactured prefilled syringes and cartridge devices such as insulin pens).	Yes No	
The rubber septum on a medication vial is disinfected with alcohol prior to piercing	Yes No	
Medication vials are entered with a new needle and a new syringe, even when obtaining additional doses for the same patient.	Yes No	
Single dose (single-use) medication vials, ampules, and bags or bottles of intravenous solution are used for only one patient.	Yes No	
Medication administration tubing and connectors		

CDPH Adherence Monitoring Tools

- CDPH Injection Safety Adherence Monitoring Tool
<https://www.cdph.ca.gov/programs/hai/Documents/AdherenceMonitoringInjectionSafetyApproved101516.pdf>
- CDPH Hand Hygiene Adherence Monitoring Tool
<https://www.cdph.ca.gov/programs/hai/Documents/AdherenceMonitoringHandHygieneApproved101516.pdf>
- CDPH Blood Glucose Monitoring Tool
<https://www.cdph.ca.gov/programs/hai/Documents/AdherenceMonitoringBloodGlucose%20Approved101516.pdf>



Healthcare-Associated Infections Program Adherence Monitoring Safe Injection Practices

Assessment completed by:
Date:
Unit:

Regular monitoring with feedback and staff education is recommended to improve safe injection practices. Use this tool to identify gaps and opportunities for improvement. Monitoring may occur in any type of patient care location where medication is prepared or provided to patients.

Instructions: This form can be used to observe up to 4 areas where providers are preparing or providing patient medications, or 4 observation opportunities for each practice type. Observe each practice and check a box if adherent, Yes or No. In the column on the right, record the total number of "Yes" for adherent practices observed and the total number of observations ("Yes" + "No"). Calculate adherence percentage in the last row.

Safe Injection Practices		Area 1 or Opportunity 1	Area 2 or Opportunity 2	Area 3 or Opportunity 3	Area 4 or Opportunity 4	Adherence	
						# Yes	# Observed
SI1.	Proper hand hygiene is performed prior to preparing and administering medication.	<input type="checkbox"/> Yes <input type="checkbox"/> No					
SI2.	Medication preparation area is clean and free from contact with blood, body fluids, or contaminated equipment.	<input type="checkbox"/> Yes <input type="checkbox"/> No					
SI3.	Needles and syringes are used for only one patient. This includes manufactured prefilled syringes and cartridge devices such as insulin pens.	<input type="checkbox"/> Yes <input type="checkbox"/> No					
SI4.	The rubber septum on a medication vial is disinfected with alcohol prior to piercing.	<input type="checkbox"/> Yes <input type="checkbox"/> No					
SI5.	The medication vial is entered with a new needle and a new syringe, even when obtaining additional doses for the same patient.	<input type="checkbox"/> Yes <input type="checkbox"/> No					
SI6.	Single-dose or single-use medication vials, ampules, and bags or bottles of intravenous solution are used for only one patient.	<input type="checkbox"/> Yes <input type="checkbox"/> No					
SI7.	Medication administration tubing and connectors are used for only	<input type="checkbox"/> Yes <input type="checkbox"/> No					



Healthcare-Associated Infections Program Adherence Monitoring Hand Hygiene

Assessment completed by:

Date:

Unit:

Regular monitoring with feedback of results to staff can improve hand hygiene adherence. Use this tool to identify gaps and opportunities for improvement. Monitoring may be performed in any type of patient care location.

Instructions: Observe at least 10 hand hygiene (HH) opportunities per unit. Observe a staff member and record his/her discipline. Check the type of hand hygiene opportunity you are observing. Indicate if HH was performed. Record the total number of successful HH opportunities and calculate adherence.

HH Opportunity	Discipline	What type of HH opportunity was observed? (select/ <input checked="" type="checkbox"/> 1 per line)	Was HH performed for opportunity observed? <input type="checkbox"/>
<i>Example</i>	N	<input type="checkbox"/> before care/entering room* <input type="checkbox"/> before task <input type="checkbox"/> after body fluids <input type="checkbox"/> after care* <input checked="" type="checkbox"/> upon leaving room *Remember: Hand hygiene should be performed before <u>and</u> after glove use	<input checked="" type="checkbox"/>
HH1.		<input type="checkbox"/> before care/entering room <input type="checkbox"/> before task <input type="checkbox"/> after body fluids <input type="checkbox"/> after care <input type="checkbox"/> upon leaving room	
HH2.		<input type="checkbox"/> before care/entering room <input type="checkbox"/> before task <input type="checkbox"/> after body fluids <input type="checkbox"/> after care <input type="checkbox"/> upon leaving room	
HH3.		<input type="checkbox"/> before care/entering room <input type="checkbox"/> before task <input type="checkbox"/> after body fluids <input type="checkbox"/> after care <input type="checkbox"/> upon leaving room	
HH4.		<input type="checkbox"/> before care/entering room <input type="checkbox"/> before task <input type="checkbox"/> after body fluids <input type="checkbox"/> after care <input type="checkbox"/> upon leaving room	
HH5.		<input type="checkbox"/> before care/entering room <input type="checkbox"/> before task <input type="checkbox"/> after body fluids <input type="checkbox"/> after care <input type="checkbox"/> upon leaving room	
HH6.		<input type="checkbox"/> before care/entering room <input type="checkbox"/> before task <input type="checkbox"/> after body fluids <input type="checkbox"/> after care <input type="checkbox"/> upon leaving room	
HH7.		<input type="checkbox"/> before care/entering room <input type="checkbox"/> before task <input type="checkbox"/> after body fluids <input type="checkbox"/> after care <input type="checkbox"/> upon leaving room	
HH8.		<input type="checkbox"/> before care/entering room <input type="checkbox"/> before task <input type="checkbox"/> after body fluids <input type="checkbox"/> after care <input type="checkbox"/> upon leaving room	
HH9.		<input type="checkbox"/> before care/entering room <input type="checkbox"/> before task <input type="checkbox"/> after body fluids <input type="checkbox"/> after care <input type="checkbox"/> upon leaving room	
HH10.		<input type="checkbox"/> before care/entering room <input type="checkbox"/> before task <input type="checkbox"/> after body fluids <input type="checkbox"/> after care <input type="checkbox"/> upon leaving room	
Disciplines: CNA = Nurse Assistant D = Dietary N = Nurse P = Physician RT = Respiratory Therapist S = Student VIS = Visitor VOL = Volunteer W = Social Worker OTH = Other, Specify U = Unknown			Opportunities: <input checked="" type="checkbox"/> = Opportunity Successful <input type="checkbox"/> = Opportunity Missed

Resources

CDPH

- [CDPH Acute HBV and HCV Public Health Investigation Quicksheet](https://www.cdph.ca.gov/HealthInfo/discond/Documents/AcuteHepatitisBCquicksheet.pdf)
<https://www.cdph.ca.gov/HealthInfo/discond/Documents/AcuteHepatitisBCquicksheet.pdf>
- [CDPH Acute Hepatitis B and C Case Report Form](https://www.cdph.ca.gov/pubsforms/forms/CtrlIdForms/cdph8703.pdf)
<https://www.cdph.ca.gov/pubsforms/forms/CtrlIdForms/cdph8703.pdf>
- [CDPH Healthcare-Associated Hepatitis B and C \(HBV/HCV\) Investigation Quicksheet Algorithm](http://www.cdph.ca.gov/programs/hai/Documents/HA_HBVandHCV_Quicksheet%20Jan2017.pdf)
http://www.cdph.ca.gov/programs/hai/Documents/HA_HBVandHCV_Quicksheet%20Jan2017.pdf
- [California's One and Only Campaign](http://www.oneandonlycampaign.org/partner/california)
<http://www.oneandonlycampaign.org/partner/california>

Resources

CDC

- [CDC Viral Hepatitis-Outbreaks and Healthcare Investigation Toolkit](http://www.cdc.gov/hepatitis/outbreaks/index.htm) <http://www.cdc.gov/hepatitis/outbreaks/index.htm>
- [CDC Guide to Infection Prevention For Outpatient Settings \(Guide & Checklist\)](http://www.cdc.gov/HAI/settings/outpatient/outpatient-care-guidelines.html)
<http://www.cdc.gov/HAI/settings/outpatient/outpatient-care-guidelines.html>
- [Injection Safety](http://www.cdc.gov/injectionsafety/)
<http://www.cdc.gov/injectionsafety/>
- [CDC Patient Notification Toolkit](http://www.cdc.gov/injectionsafety/pntoolkit/index.html)
<http://www.cdc.gov/injectionsafety/pntoolkit/index.html>
- [Minnesota Hospital Association Drug Diversion Resources](http://www.mnhospitals.org/quality-patient-safety/collaboratives/drug-diversion-prevention)
<http://www.mnhospitals.org/quality-patient-safety/collaboratives/drug-diversion-prevention>
- [Risks of Healthcare-associated Infections from Drug Diversion](https://www.cdc.gov/injectionsafety/drugdiversion/)
<https://www.cdc.gov/injectionsafety/drugdiversion/>

Thank you for participating!

Next HAI Investigation Webinar:

***Clostridium difficile* Infection (CDI) Investigations**

Thursday, May 18, at 11am

Questions?

The HAI Program is available for consultation.

Contact us by email at HAIProgram@cdph.ca.gov