HIV and Hepatitis testing in the dental office. Hepatitis Dental Considerations

Jennifer Webster-Cyriaque DDS PhD
University of North Carolina
Why test?
Unaware People Transmit HIV!

68% Reduction in Unprotected Sex once they know diagnosis

~25% Unaware of Infection

~75% Aware of Infection

Accounting for:

~54% of New Infections

~46% of New Infections

People Living with HIV/AIDS: 1,039,000-1,185,000
New Sexual Infections Each Year: ~44,000

Source: Marks, Aids 2006;20;1447-50, JAIDS 2005;39;446), courtesy of Dr. Van der Horst
1 in 3 are diagnosed with AIDS less than a year after HIV diagnosis.

The Challenge: Late HIV Diagnoses
AIDS Diagnosis < 12 Months After HIV Diagnosis, by Race/Ethnicity

- Total: 33% (14,220/43,114)
- White: 32% (3,803/11,866)
- Black/African American: 32% (6,856/21,715)
- Hispanic/Latino: 38% (3,103/8,273)
- Asian: 36% (167/466)
- American Indian/Alaska Native: 34% (66/193)
- Native Hawaiian/Other Pacific: 26% (9/34)

Source: CDC 2011; 40 States and 5 U.S. Dependent Areas

Courtesy of the Institute of Medicine
Late Diagnosis in the Southeastern US and missed opportunities

Advanced immunosuppression at entry to HIV care in the southeastern United States and associated risk factors

Cynthia L. Gay, Sonia Napravnik and Joseph J. Eron Jr

BRIEF OBSERVATION

Late Diagnosis of HIV Infection: The Role of Age and Sex

Michael J. Mugavero, MD, MHS,a Chelsea Castellano, BS,b David Edelman, MD, MHS,c,d Charles Hicks, MDh

“Division of Infectious Diseases and International Health, Department of Medicine, University of Alabama at Birmingham; “Division of Infectious Diseases and International Health, Department of Medicine, Duke University, Durham, NC; “Center for Health Services Research in Primary Care, Durham VA Medical Center, Durham, NC; and “Division of General Internal Medicine, Department of Medicine, Duke University, Durham, NC.

Risk-Based HIV Testing in South Carolina Health Care Settings Failed to Identify the Majority of Infected Individuals

Wayne A. Duffus, M.D., Ph.D.,1,2 Kristina Weis, Ph.D.,3 Lynda Kettinger, M.P.H.,1 Terri Stephens, M.S.P.H.,1 Helmut Albrecht, M.D.,2 and James J. Gibson, M.D., M.P.H.1
### Patient-reported Barriers to HIV testing in 2006

<table>
<thead>
<tr>
<th>Barriers</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lack of Perceived Risk</td>
<td>61%</td>
</tr>
<tr>
<td><strong>Doctor never recommended it</strong></td>
<td>21%</td>
</tr>
<tr>
<td>Concerned about confidentiality</td>
<td>13%</td>
</tr>
<tr>
<td>Don’t know where to get tested</td>
<td>10%</td>
</tr>
<tr>
<td>Don’t like needs or giving blood</td>
<td>8%</td>
</tr>
<tr>
<td>Afraid they will test positive</td>
<td>3%</td>
</tr>
</tbody>
</table>

Source: 2006 Kaiser Family Foundation *Survey of Americans on HIV/AIDS*, from SGIM presentation
Most physicians do not conduct Routine HIV screening

HIV Screening Among U.S. Physicians, 1999–2000

Kyle T Bernstein, Ph.D., Sc.M., 1,2 Elizabeth Begier, M.D., M.P.H., 1 Ryan Burke, M.P.H., 1,3 Adam Karpatic, M.D., M.P.H., 1 and Matthew Hogben, Ph.D. 4

Abstract

In 2006, the Centers for Disease Control and Prevention (CDC) put forth recommendations for routine HIV screening for all individuals aged 13–64. The frequency and correlates of HIV screening among U.S. physicians in 2000 were examined to provide baseline data for evaluating the implementation of the 2006 CDC HIV testing guidelines through a survey mailed to a random sample of U.S. physicians in the American Medical Association’s Masterfile. The primary outcome was self-reported HIV screening of asymptomatic male and non-pregnant female patients. A total of 4,133 (adjusted completion rate of 70.2%) returned a completed survey. Overall, 1,133 (28.4%) of physicians reported HIV screening. U.S. physicians, who were female, black, Hispanic, practiced in a city of more than 250,000 people, diagnosed HIV in the past 2 years, or followed up with patients to see if they notified their sexual partners, were more likely to screen their patients for HIV. Emergency medicine, internal medicine, and pediatrics specialists were less likely to screen than family/general practitioners. In 2000, only a quarter of U.S. physicians reported screening their patients for HIV and these rates varied by physician characteristics and practice settings.
CDC recommends HIV testing for all patients ages 13-64 in all healthcare settings regardless of HIV risk (2006)
Why don’t physicians test for HIV? A review of the US literature

Ryan C. Burke\textsuperscript{a,b}, Kent A. Sepkowitz\textsuperscript{a}, Kyle T. Bernstein\textsuperscript{a,c}, Adam M. Karpati\textsuperscript{a}, Julie E. Myers\textsuperscript{a}, Benjamin W. Tsoi\textsuperscript{a} and Elizabeth M. Begier\textsuperscript{a}

• Policy Barriers
  • Burdensome Consent Process
  • Pre-test counseling requirements
  • Inadequate reimbursement

• Educational Barriers
  • Lack of knowledge/training
  • Lack of patient acceptance

• Logistical Barriers
  • Insufficient time
  • Competing priorities
  • Language
HIV testing practices among black primary care physicians in the United States

Eric Y Wong¹, Wilbert C Jordan², David J Malebranche³, Lori L DeLaitsch¹, Rebecca Abravanel⁴, Alisha Bermudez⁴ and Bryan P Baugh⁴

<table>
<thead>
<tr>
<th>Barriers</th>
<th>% physicians</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patient may perceive the recommendation as accusatory or judgmental</td>
<td>57</td>
</tr>
<tr>
<td>Patient wouldn’t want to be identified as HIV positive/worried that people will find out</td>
<td>48</td>
</tr>
<tr>
<td>Competing priorities/other needs more urgent</td>
<td>45</td>
</tr>
<tr>
<td>Insufficient time with the patient</td>
<td>45</td>
</tr>
<tr>
<td>There’s such a stigma associated with HIV, and many doctors don’t want to offend anyone</td>
<td>43</td>
</tr>
</tbody>
</table>

*Most frequently mentioned by physicians among their top five barriers according to the survey question: What are the key factors that limit black physicians from recommending HIV testing?
Barriers and Facilitators to Routine HIV screening among NC physicians

• “So I think time is a huge barrier. And I read an article recently that said to be the perfect family physician, you have to basically work 24 hours a day just to get the basics done. It’s just overwhelming. So I think that’s part of the issue is too much going on and too little time to spend with them.”.. urban female internal medicine physician

• “I think stigma is part of it. People still have a perception of stigma with HIV and also the seriousness of the diagnosis. And then I guess not understanding who is at risk, who is not at risk, or misperceptions about who is at risk and who is not at risk.” An urban female family medicine physician
Healthcare Provider Attitudes, Practices, and Recommendations for Enhancing Routine HIV Testing and Linkage to Care in the Mississippi Delta Region

Nathan Sison, BA,¹,² Annajane Yolken, AB,² Joanna Poceta, AB,¹,² Leandro Mena, MD, MPH,³ Philip A. Chan, MD, MS,¹,² Arti Barnes, MD, MPH,⁴ Erin Smith,¹ and Amy Nunn, ScD, MS¹,²

not the current standard of care? Years ago, you had to get their permission to do it. Is that still the standard of care? Don’t you have to get their written consent?

This is one of the ten poorest counties in the nation. This isn’t Minneapolis. And the government will make a lot of recommendations. But then they don’t fund those recommendations!
Dentists Willingness to provide expanded HIV Screening in Oral Health Care Settings: Nationally Representative Survey

- Nationally representative sample from the American Dental Association Survey Center examined barriers and facilitators to testing (n=1802, 70% response rate)

- Major barrier: dentists perception of patient acceptance

- Willingness to perform testing was positively associated with
  - agreement with patients acceptance
  - agreement with the importance of testing and familiarity with the CDC recommendation regarding routine testing
  - colleagues improved perception of them

Pollack HA et al, 2014 Am J Public Health 104 (5) 872-80
Attitude toward rapid HIV testing in a dental school clinic

• Patients willingness to take a rapid HIV test administered in a dental school
• 383/443 answered the questionnaire
• Patients were highly likely to participate:
  - 84% Hispanic, 64% Caucasian, 80% Black, 67% Asian
• Of those never tested 63% were willing to be tested

• Durall et al, Special Care Dentist 2015 35(1)29-36
(2010) State Medicaid Coverage of Routine HIV screening expansion
(2010) NATIONAL HIV AIDS STRATEGY

• Reducing new infections

• Increasing access to care and improving health outcomes

• Reducing HIV-related health disparities and health inequities
850,000 HIV+ Americans (72%) lack viral control

Refs: MMWR 2011; see also Gardner CID 2011; Burns CID 2010
National HIV/AIDS Strategy (NHAS)

• There are three primary goals for the NHAS:
  • Reducing HIV incidence
  • Increasing access to care and optimizing health outcomes
  • Reducing HIV-related health disparities

• The NHAS calls for an increase from 79% who presently know their HIV serostatus to 90% who are aware of their serostatus by 2015.
Public Health Need for Rapid HIV Tests

- High rates of non-return for test results
  - In 2000, 31% did not return for results of HIV-positive conventional tests at publicly funded sites

- Need for immediate information or referral for treatment choices
  - Perinatal settings
  - Post-exposure treatment settings

- Screening in high-volume, high-prevalence settings
Role for Rapid HIV Tests

- Increase receipt of test results
- Increase identification of HIV-infected pregnant women so they can receive effective prophylaxis
- Increase feasibility of testing in acute-care settings with same-day results
- Increase number of venues where testing can be offered to high-risk persons
Rationale for Revising Recommendations

- Many HIV-infected persons access health care but are not tested for HIV until symptomatic.
- Effective treatment available.
- Awareness of HIV infection leads to substantial reductions in high-risk sexual behavior.
- Inconclusive evidence about prevention benefits from typical counseling for persons who test negative.
- Great deal of experience with HIV testing, including rapid tests.
Review of HIV Testing Methods

- **Standard HIV Test: ELISA**
  - ELISA antibody testing looks for antibodies to HIV in the patient’s blood. After a patient has blood drawn, it is sent to a laboratory for processing where a laboratory technician places the serum in contact with particles of HIV in the presence of an indicating substance. In the ELISA test, if HIV antibodies are present, they will bind to the HIV particles and cause the serum to change color. If the ELISA test is positive, the laboratory will automatically perform a confirmatory test.

- **HIV Viral Load: Rapid tests are in development**
  - PCR based determination of HIV RNA or DNA based on HIV copy number. There are now single copy number tests in use. Can detect acute HIV while the antibody test does not.
Rapid HIV Tests

ANTIBODY Based

• Rapid tests are similar to the ELISA test in that they look for antibodies in the patient’s blood, serum, or oral fluid. They are called rapid as the results are available within 1 hour or less compared to several days for ELISA. If a rapid test is positive, it must be followed up with a confirmatory test. For a complete list of FDA-approved rapid HIV tests, see Table 2, which appears courtesy of the American Academy of HIV Medicine.

• The sensitivity (the proportion of people with a disease who are accurately identified by a test) and specificity (the proportion of people without a disease who are correctly identified by a test) of these tests ranges from 98.4% to 100%. A patient with a history of recent HIV risk behaviors should have a repeat rapid HIV test because it may take up to 3 to 6 months for HIV antibodies to be detected after exposure. Testing during this period may be indeterminate or give a false-negative test result.
Confirmatory Tests

- **Western Blot**: This is the most widely used confirmatory test for HIV infection. Western Blot uses an electrophoretic technique that separates out specific HIV antigens. The Western Blot confirmatory test will rarely be indeterminate (and this most frequently occurs if the patient were recently infected).

- **Immunofluorescence antibody** (IFA): Infected HIV cells are fixed to a microscope slide. Serum is added and allowed to interact with HIV antigens. If HIV antibodies are present in the serum, a fluorescent label will light up the slide.

- **HIV PCR** for viral load.
Educating the Client Before Testing

• It is important to offer rapid HIV testing as part of a health screening, to educate clients about HIV infection and about the test, and to give them an opportunity to ask questions and to decline testing. The provider should reassure clients that the rapid HIV test is just as accurate as the standard HIV test. The provider should emphasize that a second test always is performed in order to confirm a positive rapid test result. When possible, rapid testing should be made available during a regular office visit so that clients do not face additional waiting time.
The Rapid Screening Solution

• March 2004- FDA approves Rapid HIV screening Test and grants it a CLIA waiver.

• Can be preformed by non-laboratory staff.

• Oral Fluid, Serum or Whole Blood.
OraQuick ADVANCE®
Rapid HIV-1/2 Antibody Test

• Simple
  • Rapid HIV-1/2 antibody testing with oral fluid collection – results in 20 minutes

• Accurate
  • Results with >99% sensitivity and specificity across all specimen types

• Versatile
  • Testing platform suitable for both clinical and non-clinical settings using several specimen types
• Single-use testing device with built-in procedural control

• Single-use test developer solution vial

• Reusable test stand

• Disposable single-use specimen collection loop
Oral Fluid – Specimen Collection

- Remove test device from Pouch. **DO NOT** touch the flat pad.

- Label device with subject information. **DO NOT** block holes on back of device.

**NOTE:** Test Device must be inserted into vial within 30 minutes of sample introduction.

- Make sure an Absorbent Packet is present. If no Absorbent Packet is present, discard Device; obtain a new Pouch for testing.
Oral Fluid – Specimen Collection

- Place the flat pad above the teeth against the outer gum.
  - Gently swab completely around the outer gums, both upper and lower, one time around, using the Flat Pad.
  - **DO NOT** swab the roof of the mouth, the inside of the cheek or the tongue.

- **NOTE**: It is okay to use both sides of the Flat Pad during this procedure.
• Insert Flat Pad of device into the bottom of Developer Vial.

• Start timing test.

• Pink fluid will travel up Result Window. Fluid disappears as test develops. DO NOT remove device while test is running.

• Read results after 20 minutes but not more than 40 minutes. Adequate lighting must be available.
Interpreting a Non-Reactive Test

A Non-Reactive test result means that HIV-1 and HIV-2 antibodies were not detected in the specimen.

The test result is interpreted as NEGATIVE for HIV-1 and HIV-2 antibodies.

Follow CDC Guidelines to inform subject of test result and interpretation.
Giving Reactive (Preliminary Positive) Rapid Test Results

• The following wording is suggested when the client's rapid test result is reactive:

• "Your preliminary test result was reactive, but since this is a screening test you will need to take a confirmatory test to know that it truly reacted to the presence of HIV. In the meantime, you should take precautions to avoid transmitting the virus. This means protecting sex partners from possible exposure (using condoms, for example), not sharing injection drug needles or syringes, and so forth." Emphasize the importance of a confirmatory test, arrange for the confirmatory test to be performed as soon as possible, and let the patient know that these tests and their results will be at the medical facility they are referred to.
Summary

- There is an urgent need to increase the proportion of persons who are aware of their HIV-infection status
- Expanded, routine, voluntary, opt-out screening in health care settings is needed
- Such screening is cost-effective
- Recommendations Revised: September 2006
- Several jurisdictions have already begun
Why test in the dental setting?

- Dental offices represent novel settings to reach millions in the U.S. who visit a dentist during the course of a year, but who do not see a physician.

- Dental facilities can serve as additional sites to identify health issues among diverse groups of patients.
Linkage!

- Linkage to confirmatory testing and care is integral to the success of HIV screening in the dental setting.
- Relationships should be in place with one of the following:
  - a private practice infectious disease physician; a credentialed HIV medical provider;
  - a state funded disease intervention specialist;
  - a Ryan White HIV/AIDS funded program;
  - a community health center with experience in managing HIV disease;
  - a free health clinic with experience in managing HIV disease;
  - a linkage to HIV care coordinator usually housed at an AIDS service organization
Hepatitis C Testing

• In primary care settings, HIV infection status was independently associated with the likelihood of receiving HCV RNA testing (Yartel, A 2015). 1/3 of HIV negative subjects did not receive anti HIV RNA testing.

• OraSure Technologies has an FDA approved test for HCV that used finger-stick blood and has a salivary test that is widely used in Europe but not approved for sale in the US. This test matches results of the Abbott HCV EIA antibody test 97.5% of the time (Corstjens et al., JADA 2012)
1 IN 3 ARE DIAGNOSED WITH AIDS LESS THAN A YEAR AFTER HIV DIAGNOSIS
The USPSTF recommends that clinicians screen for HIV infection in adolescents and adults aged 15 to 65 years. Grade A (“high certainty” of net benefit)

Younger adolescents and older adults who are at increased risk should also be screened. Grade A (“high certainty” of net benefit)
Routine HIV Screening in North Carolina in the Era of the Affordable Care Act: Update on Laws, Reimbursement, and Tests

Becky L. White, MD, MPH, Yvonne L. Carter, MD, MPH, Katherine Records, MPH, JD, and Ian B.K. Martin, MD

- ACA requires most private insurers to cover preventive services rated A or B by USPSTF without requiring patient copays

- ACA states will receive federal monetary incentives if its Medicaid Programs cover USPSTF A and B level recommendations
**Remaining Gaps**

- “better understanding of the most effective screening strategies”
- “Improve testing uptake”
- “improve linkage and retention into care”
- “impact of repeat screening”
- “optimal time intervals for rescreening in different populations”
Hepatitis and Dental Considerations

Jennifer Webster-Cyriaque DDS PhD
University of North Carolina Chapel Hill
The Liver

- is one of our most important and vital organs.
- multi-functional organ that performs over 500 functions.
- a virtual chemical storage & processing plant.
- ensures that the body absorbs everything it needs and gets rid of everything it doesn't need.
VIRAL HEPATITIS
Important liver functions:
- bilirubin uptake/bile secretion
- synthesis of most serum proteins
- cholesterol & lipoprotein metabolism
- drug clearance
- carbohydrate metabolism/storage

Liver malfunction:
- hepatocyte enzymes in blood
- elevated bilirubin (jaundice, dark urine)
- reduced bile in feces
- URQ pain

-because the liver has the ability to regenerate, clinical disease only apparent when much of the liver is infected
Cirrhosis: What certain forms of Hepatitis can do to the liver
To date, at least seven hepatitis viruses have been recognized, and these have been named:-
Hepatitis A, B, C, D and E......
The hepatitis viruses
- cause several clinically similar diseases (liver inflammation)
  having distinct etiologies and epidemiologies

<table>
<thead>
<tr>
<th></th>
<th>Hepatitis A picornavirus</th>
<th>Hepatitis B hepadnavirus</th>
<th>Hepatitis C flavivirus</th>
<th>Hepatitis D deltavirus</th>
<th>Hepatitis E calicivirus</th>
</tr>
</thead>
<tbody>
<tr>
<td>Synonym</td>
<td>Infectious hepatitis</td>
<td>Serum hepatitis</td>
<td>Hepatitis C NANB hepatitis</td>
<td>Delta hepatitis</td>
<td>Hepatitis E</td>
</tr>
<tr>
<td>Nucleic acid type</td>
<td>ssRNA</td>
<td>ds DNA</td>
<td>ssRNA</td>
<td>ssRNA</td>
<td>ssRNA</td>
</tr>
<tr>
<td>Incubation period</td>
<td>2-6 weeks</td>
<td>1-6 months</td>
<td>1-5 months</td>
<td>1-4 months</td>
<td>2-6 weeks</td>
</tr>
<tr>
<td>Transmission</td>
<td>Fecal-oral</td>
<td>Parenteral (sexual, vertical)</td>
<td>Parenteral (sexual)</td>
<td>Mainly parenteral</td>
<td>Fecal-oral</td>
</tr>
<tr>
<td>Carrier state</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
</tr>
</tbody>
</table>
General features of viral hepatitis

Acute disease
-symptoms of jaundice, low grade fever, anorexia, nausea and malaise
-elevated liver enzymes (alanine, aspartate amino transferase)
-variable duration of 2-3 weeks

-compliations include:
fulminant hepatitis w/necrosis—rare in HAV, common in HBV
chronic hepatitis (active disease >6 months) esp. w/HBV or HCV
primary hepatocellular carcinoma—assoc. w/HBV and HCV
Why? the main route of transmission - close personal contact with patients with HAV during their asymptomatic periods

-infection rates are increased by exposure to
-children, since children are more asymptptomatically infected
-populations of low socioeconomic status, such as immigrants,\textsuperscript{19}

(ASHKENAZI, 2001)
<table>
<thead>
<tr>
<th>Concentration of Hepatitis B Virus in Various Body Fluids</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>High</strong></td>
</tr>
<tr>
<td>blood</td>
</tr>
<tr>
<td>serum</td>
</tr>
<tr>
<td>wound exudates</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>
Hepatitis B outbreak at volunteer dental clinic in 2009

<table>
<thead>
<tr>
<th>TYPE OF DENTAL CLINIC PARTICIPATION</th>
<th>DENTAL PROCEDURE RECEIVED</th>
<th>SYMPTOM ONSET DATE</th>
<th>DUTIES PERFORMED</th>
<th>REPORTED BLOOD EXPOSURE DURING DENTAL CLINIC</th>
<th>LOST TO FOLLOW-UP</th>
</tr>
</thead>
<tbody>
<tr>
<td>As Volunteer</td>
<td>NA*</td>
<td>October 2009</td>
<td>Escorted patients to treatment waiting area</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>As Volunteer</td>
<td>NA</td>
<td>September 2009</td>
<td>Logistics; maintenance of clean and dirty medical equipment</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>As Patient</td>
<td>Extractions, dental prophylaxis</td>
<td>October 2009</td>
<td>NA</td>
<td>Unknown</td>
<td>Yes</td>
</tr>
<tr>
<td>As Patient</td>
<td>Extractions, restorations</td>
<td>October 2009</td>
<td>NA</td>
<td>Unknown</td>
<td>No</td>
</tr>
<tr>
<td>As Patient</td>
<td>Extractions</td>
<td>September 2009</td>
<td>NA</td>
<td>Unknown</td>
<td>Yes</td>
</tr>
</tbody>
</table>

* NA: Not applicable
Hepatitis C Life Cycle

Schaefer, Gastro 2012; 142: 1340-50
Hepatitis C Diagnosis
Anti-HCV and HCV RNA (RT-PCR)

Diagnosis
-serology to detect HCV antibodies and PCR for RNA
Natural History of HCV Infection

Acute infection

3–6 months

Persistent infection (60–90%)

Viral recovery (10–40%)

End-stage liver disease (2–30%)

Asymptomatic persistent infection (70–98%)

Chronic Hepatitis

Fibrosis

Hepatocellular Ca

Chronic HCV Infection Is Prevalent in ~25% of HIV-Infected Persons

Prevalence Differs by HIV Risk Group

IVDU = intravenous drug users; MSM = men who have sex with men.
Awareness of HCV Infection Status
NHANES Survey 2001–2008

Knowledge of HCV Infection

Unaware: 50%
Aware: 50%

Hepatitis C... Isn’t that the one I have been vaccinated for? NO
Special Concerns for HIV/HCV Coinfected Patients

• Higher viral loads
• Faster rates of fibrotic progression
• Increased risk of hepatic decompensation
• Drug-drug interactions
• Lower overall response rates to antiviral therapies

Hepatitis C Treatment

• Interferon is becoming obsolete, although it is still indicated for (RARE) selected patients

• Combinations of direct acting antivirals have become the new standard of care
  • Not all combinations have proven to be effective
  • Not a “mix and match” like HIV antiretrovirals

• Three currently approved combinations for genotype 1:
  • Sofosbuvir-ledipasvir
  • Paritaprevir-ombitasvir-dasabuvir (with ritonavir and ribavirin)
  • Sofosbuvir-simeprevir
Dental Considerations
HCV salivary loads in patients with active infection were correlated with serum viral loads, not degree of liver disease or periodontal disease.
Bleeding is a major Dental Concern

<table>
<thead>
<tr>
<th>Test</th>
<th>Normal values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bleeding time</td>
<td>1-3 minutes</td>
</tr>
<tr>
<td>Prothrombin time</td>
<td>11-15 seconds</td>
</tr>
<tr>
<td>Thrombin time</td>
<td>15-20 seconds</td>
</tr>
<tr>
<td>Thromboplastin time</td>
<td>25-35 seconds</td>
</tr>
<tr>
<td>Platelet count</td>
<td>150,000-400,000/mm³</td>
</tr>
<tr>
<td></td>
<td>&lt; 50,000/mm³: bleeding</td>
</tr>
<tr>
<td>INR</td>
<td>0.9-1.1</td>
</tr>
</tbody>
</table>

### Drugs metabolized mainly in the liver

<table>
<thead>
<tr>
<th>Category</th>
<th>Drugs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local anesthetics</td>
<td>Lidocaine, Prilocaine, Mepivacaine, Bupivacaine</td>
</tr>
<tr>
<td>Analgesics</td>
<td>Aspirin, Acetaminophen (Paracetamol), Ibuprofen, Codeine, Meperidine</td>
</tr>
<tr>
<td>Sedatives</td>
<td>Diazepam, Barbiturates</td>
</tr>
<tr>
<td>Antibiotics</td>
<td>Erythromycin, Clindamycin, Tetracycline</td>
</tr>
<tr>
<td>Antifungals</td>
<td>Ketoconazole, Fluconazole</td>
</tr>
<tr>
<td>Category</td>
<td>CONTRAINDIATED</td>
</tr>
<tr>
<td>----------------</td>
<td>--------------------------------</td>
</tr>
<tr>
<td>Anesthetics</td>
<td>Halothane, Thiopentone</td>
</tr>
<tr>
<td>Analgesics</td>
<td>Acetylsalicylic acid, Codeine, Indomethacin, Mefenamic Acid, Ibuprofen</td>
</tr>
<tr>
<td>Antibiotics</td>
<td>Tetracycline, Erythromycin, estolate, Metronidazole</td>
</tr>
<tr>
<td>CNS depressants</td>
<td>Opioids</td>
</tr>
</tbody>
</table>
In 2013……

- Oklahoma oral surgeon who may have exposed as many as 7000 patients to HIV, hepatitis B and hepatitis C over the past six years.

- The Oklahoma Board of Dentistry conducted a surprise investigation of the dentist’s two offices as a result of a patient who tested positive for HIV and hepatitis C. This patient had no known exposure risks except for treatment in the dental facility.

- As a result of their inspection, officials from the Oklahoma Board reported having observed numerous violations of infection control protocols, as well as improper dispensing and recording of medications and illegal administration of intravenous sedation by dental assistants.
The importance of Universal Precautions

Count V-XI 59 O.S. § 328.32(A)(13) Being a menace to the public health by reasons of practicing dentistry in an unsafe or unsanitary manner or place, specifically violations of Board Rule 195:35-1-4(a)(1) failing to comply with universal precautions recommended for dentistry by the Centers for Disease Control and Prevention (CDC); by use of multi-dose medication vials used on multiple patients; use of multi-dose medication vials in the operatory area; use of multi-dose vials of medication without attaching the appropriate dates; having open vials of medication and absorbent materials in the “dry socket” box used on multiple patients; separation of instruments and different cleaning procedures for known infection carrier patients versus unknown or non-infection carrier patients; utilization of non-sterilized porous and rusty instruments;

Count XII - 59 O.S. § 328.32(A)(17) - Committing gross negligence in the practice of dentistry specifically by deferring all decisions and supervision of cleaning, infection control and turning over all inventory and maintenance of scheduled and legend drugs to dental assistants.
Occupational Risk in international setting- example Moldova

Occupational health problems among dentists in Moldavian Region of Romania by Bârlean L et al

AIM:
to evaluate the occupational health problems among dentists in the Moldavian Region of Romania.

METHODS:
Questionnaire-based study was conducted on 152 dentists aged between 25-65 years practicing in 6 counties the Moldavian Region of Romania.

RESULTS:
91% consider that they are exposed to an occupational risk
41.8% experienced a percutaneous injury caused by sharp instruments in the last year.
74.6% of the dentists are protected by vaccination against hepatitis B
76.1% of the dentists are protected by vaccination against influenza.
49.3% of the dentists reported eye injuries caused by solid particles (13.2%), blood splashes (14.7%) and/or chemicals (20.5%).
<table>
<thead>
<tr>
<th></th>
<th>Mode</th>
<th>Incubatn</th>
<th>Carrier</th>
<th>Chronic Disease</th>
<th>Genome</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Fecal-oral</td>
<td>2-6wk</td>
<td>No</td>
<td>No</td>
<td>ssRNA</td>
</tr>
<tr>
<td>B</td>
<td>Blood Sex</td>
<td>1-6 mo</td>
<td>Yes</td>
<td>Yes</td>
<td>DNA</td>
</tr>
<tr>
<td>C</td>
<td>Blood</td>
<td>2-26wk</td>
<td>Yes</td>
<td>Yes</td>
<td>RNA</td>
</tr>
<tr>
<td>Delta</td>
<td>Blood Sex</td>
<td>1-6mo</td>
<td>Yes/w/</td>
<td>Yes</td>
<td>RNA</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>B</td>
<td></td>
<td></td>
</tr>
<tr>
<td>E</td>
<td>Fecal-oral</td>
<td>6 wk</td>
<td>?</td>
<td>No</td>
<td>ssRNA</td>
</tr>
</tbody>
</table>
Hepatitis Summary: CDC definitions

A: is a liver disease caused by the hepatitis A virus (HAV). Hepatitis A can affect anyone. In the United States, hepatitis A can occur in situations ranging from isolated cases of disease to widespread epidemics.

B: is a serious disease caused by a virus that attacks the liver. The virus, which is called hepatitis B virus (HBV), can cause lifelong infection, cirrhosis (scarring) of the liver, liver cancer, liver failure, and death.

C: is a liver disease caused by the hepatitis C virus (HCV), which is found in the blood of persons who have the disease. HCV is spread by contact with the blood of an infected person.

D: is a liver disease caused by the hepatitis D virus (HDV), a defective virus that needs the hepatitis B virus to exist. Hepatitis D virus (HDV) is found in the blood of persons infected with the virus.

E: is a liver disease caused by the hepatitis E virus (HEV) transmitted in much the same way as hepatitis A virus. Hepatitis E, however, does not occur often in the United States.
<table>
<thead>
<tr>
<th>COMPONENT</th>
<th>RECOMMENDATIONS FOR USE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hand Hygiene</td>
<td>Perform after touching blood, body fluids, secretions, excretions, contaminated items; immediately after removing gloves; between patient contacts.</td>
</tr>
<tr>
<td>Personal Protective Equipment</td>
<td></td>
</tr>
<tr>
<td>Gloves</td>
<td>Wear when touching blood, body fluids, secretions, excretions, contaminated items; wear when touching mucous membranes and nonintact skin.</td>
</tr>
<tr>
<td>Mask, eye protection, face shield</td>
<td>Wear during procedures and patient-care activities likely to generate splashes or sprays of blood, body fluids, secretions</td>
</tr>
<tr>
<td>Gown</td>
<td>Wear during procedures and patient-care activities when contact of clothing or exposed skin with blood or body fluids, secretions and excretions is anticipated</td>
</tr>
<tr>
<td>Proper Use of Equipment and Drug Delivery Systems</td>
<td></td>
</tr>
<tr>
<td>Soiled patient-care equipment</td>
<td>Handle in a manner that prevents transfer of microorganisms to others and to the environment; wear gloves if visibly contaminated; perform hand hygiene after handling</td>
</tr>
<tr>
<td>Environmental infection control</td>
<td>Develop procedures for routine care, cleaning and disinfection of environmental surfaces, especially frequently touched surfaces in patient-care areas.</td>
</tr>
<tr>
<td>Textiles (linen and laundry)</td>
<td>Handle in a manner that prevents transfer of microorganisms to others and to the environment.</td>
</tr>
<tr>
<td>Needles and other sharps</td>
<td>Do not recap, bend, break or hand-manipulate used needles; use safety features when available; place used sharps in a puncture-resistant container</td>
</tr>
<tr>
<td>Injection safety</td>
<td>Never administer medications from the same syringe to more than one patient; do not enter a medication vial with a used needle or syringe; never use single-dose vials for more than one patient; follow proper infection control practices during administration of injected medications</td>
</tr>
<tr>
<td>Respiratory Hygiene and Cough Etiquette</td>
<td>Instruct a symptomatic person to cover his or her mouth and nose when sneezing or coughing; use tissues and dispose in no-touch receptacle; observe hand hygiene after soiling of hands with respiratory secretions; wear surgical mask if tolerated or maintain spatial separation from other people, more than three feet if possible</td>
</tr>
</tbody>
</table>

* Adapted from Siegel and colleagues. *
<table>
<thead>
<tr>
<th>RESOURCE</th>
<th>WEBSITE</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Healthcare-Associated Hepatitis B and C Outbreaks Reported to the Centers for Disease Control and Prevention (CDC) in 2008-2012*</td>
<td><a href="http://www.cdc.gov/hepatitis/healthcare/hepatitisBOutbreaks/">www.cdc.gov/hepatitis/healthcare/hepatitisBOutbreaks/</a></td>
<td>Listing of investigations of health care–associated transmission of hepatitis B or C, including links to references.</td>
</tr>
<tr>
<td>Injection Safety†</td>
<td><a href="http://www.cdc.gov/injectionsafety">www.cdc.gov/injectionsafety</a></td>
<td>Continuing education documents, slides and campaign materials</td>
</tr>
<tr>
<td>Healthcare-Associated Infections: Guidelines and Recommendations¶</td>
<td><a href="http://www.cdc.gov/HAI/prevent/prevent_pubs.html">www.cdc.gov/HAI/prevent/prevent_pubs.html</a></td>
<td>Links to detailed documents about infection control, including hand hygiene and standard precautions</td>
</tr>
</tbody>
</table>

* Source: Centers for Disease Control and Prevention.
† Source: Centers for Disease Control and Prevention.
§ Source: Centers for Disease Control and Prevention.
¶ Source: Centers for Disease Control and Prevention.