Diabetes – Fast Facts

• **Prevalence**: 30.3 million Americans (23.1 million were diagnosed, and 7.2 million were undiagnosed), or 9.4% of the population, had diabetes.
  - Approx. 1.25 million American children and adults have type 1 diabetes.
  - **Prevalence in Seniors**: 25.2%, or 12.0 million seniors (diagnosed and undiagnosed) age 65 and older
  - **New Cases**: 1.5 million Americans are diagnosed with diabetes every year.
  - **Prediabetes**: In 2015, 84.1 million Americans age 18 and older had prediabetes
  - **Deaths**: Diabetes remains the 7th leading cause of death in the United States in 2015, with 79,535 death certificates listing it as the underlying cause of death, and a total of 252,806 death certificates listing diabetes as an underlying or contributing cause of death.


Wisconsin

What’s true nationwide is also true in Wisconsin. Diabetes and prediabetes cost an estimated $5.9 billion in Wisconsin each year.

Fast Facts

• Diagnosed - 541,523 (11.2%) of the adult population
• Undiagnosed - 142,000 have diabetes but don’t know it
• Prediabetes - 1,550,000 people (36.1% of the adult population)
• Newly diagnosed - 21,000/year

HCV and Diabetes: A non-chance association


Glycemic Control

Liver Disease and Diabetes Mellitus

- Liver disease occurring as a consequence of diabetes mellitus
- Diabetes mellitus and abnormalities of glucose homeostasis occurring as a complication of liver disease
- Liver disease occurring coincidentally with diabetes mellitus and abnormalities of glucose homeostasis


Genetic & Environmental Factors Associated w/ Non-alcoholic Fatty Liver Disease (NAFLD)

- Obesity
- Insulin Resistance
- Hyperlipidemia
- Metabolic Syndrome
- Inflammation


Progression of non-alcoholic fatty liver disease (NAFLD)

- Normal
- Steatosis
- Steatohepatitis
- Fibrosis/ Cirrhosis
- Hepatocellular carcinoma
- Liver-related death
- Liver transplant

Liver cirrhosis of various etiologies manifests as different clinical glucose metabolism disorders with the progression of the disease. HCV hepatitis C virus, DM diabetes mellitus, NAFLD nonalcoholic fatty liver disease.

The Vicious Circle

Hep C carcinoma

Blood Borne Pathogens

- HIV

- Hepatitis - symptoms are similar no matter which type of hepatitis you have.
  - Hepatitis A
  - Hepatitis B
  - Hepatitis C
  - Hepatitis D
  - Hepatitis E

<table>
<thead>
<tr>
<th>Type of Viral Hepatitis</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
</tr>
</thead>
<tbody>
<tr>
<td>Source of virus</td>
<td>Feces</td>
<td>Blood-borne body fluids</td>
<td>Blood-borne body fluids</td>
<td>Blood-borne body fluids</td>
<td>Feces</td>
</tr>
<tr>
<td>Route of transmission</td>
<td>Fecal-oral</td>
<td>Percutaneous</td>
<td>Percutaneous</td>
<td>Percutaneous</td>
<td>Fecal-oral</td>
</tr>
<tr>
<td>Chronic infection</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Prevention</td>
<td>Pre-post-exposure immunization</td>
<td>Pre-post-exposure immunization</td>
<td>Blood donor screening; risk behavior modification</td>
<td>Pre-post-exposure immunization; risk behavior modification</td>
<td>Ensure safe drinking water</td>
</tr>
</tbody>
</table>

Source: Center for Disease Control and Prevention (CDC)
Hepatitis Vaccine

- Hepatitis A - People with chronic liver disease, including HCV should be protected from Hep A

- Hepatitis B
  - Adults under 60 years of age with diabetes
  - People with chronic liver disease
  - Dialysis and pre-dialysis patients
  - People infected with HIV
  - Residents and staff of facilities for developmentally disabled people
  - Sexually active people who are not in long-term, mutually monogamous relationships

Who should be tested for Hep C?

- Abnormal liver function
- Sexual partners have been diagnosed with hepatitis C
- Infants born to HCV-infected mothers
- HIV
- Injecting drug users
- Ever been incarcerated
- Recipients of clotting factors made before 1987
- Long-term hemodialysis
- Baby boomers (born during 1945–1965)

CDC Grand Rounds: Preventing Unsafe Injection Practices in the U.S. Health-Care System

Background

Unsafe injections contribute significantly to the transmission of hepatitis B and C and HIV. They can also lead to adverse local and systemic complications. The Centers for Disease Control and Prevention (CDC) and other organizations recommend infection control practices to prevent the transmission of bloodborne pathogens during injections. However, unsafe injection practices remain a significant public health issue. This issue is complex and requires a multidimensional approach.

Global Burden of Disease Associated with Unsafe Injections

Estimated Annual Incidence, 2000
- > 20 million Hepatitis B virus infections
  - 30% of new infections
- >2 million Hepatitis C virus infections
  - 40% of new infections
- >250,000 HIV infections
  - 5% of new infections

Ezzati M et al. Lancet. 360(9343): 1347-60, 2002

Injection safety is a complex public health issue

Requires a multidimensional approach (4Es):
- Epidemiologic surveillance,
- reporting, monitoring, and investigation of outbreaks potentially related to unsafe injections;
- Educational initiatives
- to promote understanding and use of safe injection and basic infection control practices
- Enforcement
- and oversight by federal and state authorities; and
- Engineering of devices,
- equipment, and processes to reduce or eliminate disease transmission risks.

https://www.cdc.gov/mmwr/pdf/wk/mm6221.pdf
https://www.cdc.gov/mmwr/preview/mmwrhtml/mm6221a3.htm?s_cid=mm6221a3_e
Hepatitis B

- Hepatitis B virus is 50 – 100 times more infectious than HIV
- The hepatitis B virus can survive outside the body at least a week.
- Infection
  - Acute hepatitis B refers to the first 6 months
  - Chronic hepatitis B refers to the illness that occurs when the hepatitis B virus remains in a person’s body.

Diabetics at Risk for HBV

- In the United States (US), patients with diabetes mellitus (DM) have twice the risk for developing acute hepatitis B virus (HBV) infections as healthy adults.\(^1\)
- The seroprevalence of antibodies to HBV core antigen (anti-HBC) is 60% higher among patients with DM than those without DM.\(^2\)

Diabetics at Risk for Hep C

- Everyone with diabetes should get an HCV test.
- Everyone with HCV, needs to be assessed for diabetes on a regular basis.
- Patients with Type 2 Diabetes (T2D) were at an increased risk of acquiring HCV infection compared to non-T2D subjects (pooled OR = 3.50)

---


---


CDC. Viral Hepatitis Statistics and Surveillance

Forecasted Annual Deaths Associated with Chronic Hepatitis C Infection


Outbreak: Erosion of Trust in Health Care
- Disease transmission
- Patient/family anxiety
- Malpractice
- Legal charges
- Criminal charges
- Bad publicity
Dean Clinic says patients may have been exposed to hepatitis, HIV

Most of patients possibly exposed to HIV, hepatitis have been tested

Dean Clinic reports contacting 80 percent of those potentially exposed to bloodborne diseases
Expired testing kits found at site where patients possibly exposed to hepatitis, HIV

More than 900 patients, possibly 355 of whom had been treated at the clinic, were potentially exposed to hepatitis and HIV.

http://host.madison.com/wsj/news/local/health_med_fit/expired-testing-kits-found-at-site-where-patients-possibly-exposed/article_0ab6e6a6-eada-11e0-933d-001cc4c03286.html

HIV, hepatitis testing continues for Dean Clinic patients

More than 900 Dean Clinic patients have been tested for hepatitis and HIV, and two patients were potentially exposed to the viruses over the past five years, a Dean official said Wednesday.

The results have been released. Testing will continue until the patients have passed the six-month window after exposure during which results could be positive. Dean spokeswoman Kim Forrester said.

Man sues Dean Health after contracting hepatitis C

A lawsuit filed against Dean Health by a man who contracted hepatitis C after he was treated at a Dean clinic has been dismissed by a federal judge.

Board reprimands nurse who potentially exposed patients to hepatitis, HIV

May 3, 2012

The Wisconsin Board of Nursing on Thursday reprimanded former diabetes nurse educator at Dean Health System who potentially exposed more than 3,000 patients to hepatitis or HIV over five years.

More than 60 test positive for hepatitis, but state finds no link to Dean Clinic incident

Aug 23, 2012

Contaminated devices

- Blood glucose monitoring
- Insulin pens/Syringe reuse
- Toe nail clippers
- Sharps disposal

http://www.oneandonlycampaign.org/sites/default/files/upload/image/SIPC_Brochure_InsulinPen_1.png
Blood Glucose Monitoring

Components of Tool Kit

- Introduction
- Sample Policy
- Resources
- Perceived Barriers to Single Use Glucose Meters
- Samples
  - Procedural Steps for Blood Glucose Monitoring
  - Device Evaluation Tool
  - Competency of Glucose Meter Monitoring

Single Patient Use Blood Glucose Meters

- Select a glucose monitoring device
- Follow instructions for use
- Review competency annually
- Conduct quality control measures
- Issue glucose monitoring device to each patient
- Label each device with resident’s name
- Store securely in resident’s room
- Arrange for resident owned device at discharge
- Disinfect issued device before issuing to another resident

Blood glucose monitoring devices

- Assign to each patient if possible.
- Clean and disinfect between patients.
- Restrict use of finger stick devices to individual patient.
- Maintain supplies and equipment w/in patient rooms
- Use single-use lancets that permanently retract after puncture.
- Never reuse finger stick devices and lancets.
- Thoroughly clean B4 disinfection.
- Disinfect the exterior surfaces following the manufacturer’s directions.

Luminol

- Latent blood reagent
- Tested all blood glucose monitoring devices.
- Back sides of devices were typically contaminated with blood from gloved hand.
- Document cleaning of devices after patient use.

FDA: Injectable insulin pens not for use by more than one patient

March 24, 2018 | 3:42PM

What part of the phrase “not of spreading blood-born disease” did the staff of two New Jersey hospitals not understand when they began, starting in 2015, using a new-generation “insulin pen” for insulin injection procedures? "unauthorized needles to diabetics?"

Sure, they got the idea that they should use a new needle each time they used the pen, as they should.
One Insulin Pen, Only One Person

- Studies have demonstrated that retrograde travel of blood and tissue back into the insulin pen cartridge can occur, which can lead to disease transmission even when the needle is changed between patients.


Insulin Pens: Recommendations For Safe Use

- Insulin pens and other injection equipment are meant to be used on one person only.
- Insulin pens should never be used for more than one person, even when the needle is changed or when there is leftover medicine.
- Insulin pens and other injection equipment should be clearly labeled with the person’s name or other identifying information to ensure that the correct pen is used only on the correct person.
- Health care facilities should review their policies and educate their staff regarding safe use of insulin pens and similar devices.
- If reuse is identified, patients should be promptly notified and offered appropriate follow-up including blood borne pathogen testing.
- These recommendations apply to any setting where insulin pens and other injection equipment are used. This includes hospitals, assisted living facilities, nursing homes, clinics, health fairs, shelters, detention facilities, homes, schools, and camps.
Why does this keep happening?

- Dosing accuracy
- Convenience
- Ease of use
- Pre-labeled with product name and barcode
- Patient specific barcode option
- Ready for administration
- Takes less time
- Reduces waste
- Less risk for needle stick injury


**Medication Errors**

A Clinical Reminder About The Safe Use of Insulin Vials

Safe Use of Insulin Vials

- Staff education
- Pharmacy oversight
- Insulin dosing
- Insulin syringes
- Small vial size
- Stock the smallest vials
- Stock appropriate syringes (segregate TB syringes)
- Label vials and syringes
- Separate and verify drugs to prevent mix-ups
- Don’t rule out problems

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4671461/

Insulin Concentration History

U500 Is Highly Concentrated

- U500 R contains 500 units of insulin in each mL (5x more concentrated than U100).
- U500 R allows a patient to inject on fifth the insulin volume compared with injecting the same dose of a U100 insulin

**Patient Education**

- Some patients have tried to inject insulin without removing the needle cover, thus failing to administer the insulin.

---

**Remember:** Insulin Pens

Place all needles and other sharps in a sharps disposal container immediately after they have been used.

http://www.1on1.org/assets/images/education/insulin_pen_beadware.pdf

---

http://www.flickr.com/photos/57215070@N00/6321875537/in/album-72157627949569161/
Dispose of used sharps disposal containers according to your community guidelines.

- Drop box or supervised collection sites
  [Link](http://dnr.wi.gov/topic/wasteprogram/documents/facilities/sharpscollection.pdf)
- Household hazardous waste collection sites
- Mail-back programs
- Residential special waste pick-up services

Household generated “Sharps” including needles, syringes, and lancets are accepted at the La Crosse County HHM Facility free of charge from La Crosse County Residents who treat themselves for medical conditions such as diabetes.

Sharps must be brought to HHM in approved containers. The only acceptable containers are:
- a registered, red “Sharps” container
- a thick plastic laundry detergent bottle with a screw type cap.

Detergent containers should be labeled with the word “SHARPS” using black, permanent marker.

Be sure lids are closed tightly or locked.

Note: if the sharps are in a container other than those listed above (i.e. milk jug, soda bottle, coffee container, bag, box etc.) they cannot be accepted.

[Link](http://www.co.la-crosse.wi.us/solidwaste/hhm.asp#whatis8)

One-Handed Needle Recapping Method

- Step 1: Place the cap on a flat surface like the table or counter with something firm to “push” the needle cap against
- Step 2: Holding the syringe with the needle attached in one hand, slip the needle into the cap without using the other hand
- Step 3: Push the capped needle against a firm object to “seat” the cap onto the needle firmly using only one hand.

[Link](https://www.fda.gov/downloads/MedicalDevices/ProductsandMedicalProcedures/HomeHealthandConsumer/Sharps/UCM278775.pdf)
Personal Sharps Containers

- Discharge education
  - Travel
  - Outings

How to get an elder to cut their toenails? – Diabetic Toe Nail Clippers

Try clipping toenails after a warm bath or soak as this softens toenails and makes them easier to cut. Try using a footrest as the elderly person can place their feet on it to cut their toenails. Make sure it is non-slip as they have thin, long-handled toenail scissors and long-handled clippers.
Infection Prevention and Control in the Podiatric Medical Setting
Challenges to Providing Consistently Safe Care

Matthew S. Wise, MPH, PhD\*\* 
Eliane Brion, MD, MPH
Ernest J. Canned, RN, BSN, CCE
Susan Haft-Ross, RN, MPH
Parikh High, MPH, RN, CIC
Moei Yan, MD, MPH
Emily Luderer, MD, MPH
Joseph P. Pepe, DO\*\*
Lynne M. Schubach, MD
Glenn Tyson, RN, BSN
Mary Beth Yoder, MD
Barbara Burrows, MD, MPH

Unsafe practices are an underestimated contributor to the disease burden of bloodborne viruses. Outbreaks associated with failures in basic infection prevention have been identified in nonhospital settings with increased frequency in the United States during the past 15 years, representing an alarming trend and indicating that the challenge of providing consistently safe care is not always met. As has been the case with most medical specialties, public health investigations by state and local health departments, and the Centers for Disease Control and Prevention, have identified some instances of unsafe practices that have placed podiatric medical patients at risk for viral, bacterial, and fungal infections. All health-care providers, including podiatric physicians, must make infection prevention a priority in any setting in which care is delivered.


Hepatitis C virus transmission in a skilled nursing facility, North Dakota, 2013

Mariana Caljo, PhD, MPH, RN, CIC; Bernice J. Collier MD, MPH; Sony Chaudhary PhD; Teresa Morris-Hoppin RN, BSN, CIC; Jennifer Vomelbach RN, BSN, CIC; Sarah Wenger RN, BSN; Tracy E. Zeller RN, BSN; North Dakota Hepatitis C Virus Investigation Team

http://dx.doi.org/10.1016/j.ajic.2015.10.018
Clean & Disinfect after Use

- Whenever possible, blood glucose meters should not be shared. If they must be shared, the device should be cleaned and disinfected after every use, per manufacturer's instructions.
- If the manufacturer does not specify how the device should be cleaned and disinfected then it should not be shared.
- Use an EPA registered disinfectant effective against HIV and Hep B
  - Follow instructions for use for registered disinfectant
    - Know the kill time.
    - Personal Protective Equipment (PPE)
Immunizations

- Hepatitis B
- Influenza
- Pneumococcal
- Tdap
- Shingles
- And possibly Hepatitis A

Use of Hepatitis B Vaccination for Adults with Diabetes Mellitus: Recommendations of the Advisory Committee on Immunization Practices (ACIP)

- Hepatitis B vaccination should be administered to unvaccinated adults with diabetes mellitus who are aged 19 through 59 years (recommendation category A; evidence type 2).
- Hepatitis B vaccination may be administered at the discretion of the treating clinician to unvaccinated adults with diabetes mellitus who are aged ≥60 years (recommendation category B; evidence type 2).
- Decisions to vaccinate adults with diabetes who are aged ≥60 years of age should incorporate consideration of the patient's likelihood of acquiring HBV infection, including the risk posed by an increased need for assisted blood-glucose monitoring in LTC facilities.

Rationale for the Recommendation

- Use of blood glucose meter for more than one resident without cleaning and disinfection between uses
- Failure to consistently wear gloves and perform hand hygiene between fingerstick procedures
- Use of the same fingerstick devices for more than one resident
- Cross-contamination of clean supplies with contaminated blood glucose monitoring equipment used by home health agencies
- Use of the same injection equipment such as a syringe or insulin pen for more than one person
- Failure to maintain separation of clean and contaminated podiatry equipment
- Improper sterilization of contaminated podiatry equipment
- Failure to perform environmental cleaning and disinfection between podiatry patients

Effectiveness of the Hep B Vaccine

- A 3-dose course of recombinant hepatitis B vaccine induced protective levels of antibodies in 75.4% of diabetic participants and 82.0% control participants matched for age and BMI, with no statistically significant difference in seroprotection rate.
- Increasing age and BMI were associated with decreased likelihood of achieving seroprotection after hepatitis B vaccination in the regression model, with age appearing to be the most clinically relevant factor. Seroprotection rates declined with age in all study participants regardless of DM status, with only 58.2% of participants with DM and 70.2% controls aged >60 y achieving seroprotection.

Exposure Investigation

1. Verify the diagnosis of health care associated infection with a blood borne pathogen.
2. Phone a friend (the local health department).

---

Healthcare Investigation Guide


---

Questions?

Identify the one thing you will do to decrease your risk or your patient’s risk to acquiring a life threatening infection related to unsafe injection practices.