Overview of Today’s Presentation

- Brief overview of hepatitis B serologic and virologic markers

- Hepatitis B surveillance in Wisconsin
  - Case reporting to the Centers of Disease Control and Prevention (CDC).
  - Revised surveillance case definitions for hepatitis B.
  - Case classification algorithm and instructions.

- Review of the updated hepatitis B disease-specific forms in the Wisconsin Electronic Disease Surveillance System (WEDSS)
  - Documentation of perinatal follow-up and contact investigations.
  - Updated forms for documenting laboratory, clinical, and risk information.
Markers of Hepatitis B Virus (HBV) Infection

Hepatitis B Virus (HBV) Infection Markers
- HBV DNA: hepatitis B viral DNA
- HBcAg: hepatitis B core antigen (not detectable in serum)
- HBsAg: hepatitis B surface antigen
- HBeAg: hepatitis B e antigen

Interpretation of HBV Infection Serologic Markers

<table>
<thead>
<tr>
<th>Test Result</th>
<th>Interpretation</th>
</tr>
</thead>
<tbody>
<tr>
<td>HBsAg – anti-HBc, total – anti-HBs –</td>
<td>Susceptible to HBV infection</td>
</tr>
<tr>
<td>HBsAg – anti-HBc, total + anti-HBs +</td>
<td>Immune due to natural HBV infection</td>
</tr>
<tr>
<td>HBsAg – anti-HBc, total – anti-HBs +</td>
<td>Immune due to hepatitis B vaccination</td>
</tr>
<tr>
<td>HBsAg + anti-HBc, total + IgM anti-HBc + anti-HBs –</td>
<td>Acutely infected</td>
</tr>
<tr>
<td>HBsAg + anti-HBc, total + IgM anti-HBc – anti-HBs –</td>
<td>Chronically infected</td>
</tr>
<tr>
<td>HBsAg – anti-HBc, total + anti-HBs –</td>
<td>Interpretation unclear – four possibilities:</td>
</tr>
<tr>
<td></td>
<td>1. Distantly resolved infection (most common)</td>
</tr>
<tr>
<td></td>
<td>2. Susceptible with false-positive anti-HBc</td>
</tr>
<tr>
<td></td>
<td>3. Chronic infection with 'low-level' HBsAg</td>
</tr>
<tr>
<td></td>
<td>4. Resolving acute infection</td>
</tr>
</tbody>
</table>

Serologic Markers of HBV Infection
- HBsAg: hepatitis B surface antigen
- HBeAg: hepatitis B e antigen
- anti-HBc: total hepatitis B core antibody
- IgM anti-HBc: IgM antibody to hepatitis B core antigen
- anti-HBs: hepatitis B surface antibody
- anti-HBe: antibody to hepatitis B e antigen

HBeAg + indicates higher viral load and infectivity

CDC, Interpretation of HBV Serologic Markers: [http://www.cdc.gov/hepatitis/HBV/HBVsero.htm](http://www.cdc.gov/hepatitis/HBV/HBVsero.htm)
Virologic and Serologic Response to Acute HBV Infection with Recovery

Symptoms: average of 12 weeks after exposure, range 9-21 weeks

Virologic and Serologic Markers in Patients with Chronic HBV Infection with Persistent HBeAg

University of Washington Hepatitis Web Study: http://depts.washington.edu/hepstudy/hepB/clindx/serology/discussion.html
Virologic and Serologic Markers in Patients with Chronic HBV Infection with Resolution of HBeAg

Hepatitis B Disease Surveillance in Wisconsin

- WEDSS – initiated in 2007
- Hepatitis B – a reportable disease in Wisconsin since 1981
  - Acute and perinatal hepatitis B disease incidents are currently electronically transmitted to the CDC.
  - Chronic and unspecified hepatitis B disease incidents are not transmitted to the CDC, but may transmit chronic cases in the future.
- CDC and the Council of State and Territorial Epidemiologists (CSTE) revised hepatitis B case definitions in July 2012
  - Revised definitions adopted in Wisconsin beginning January 1, 2013.
- CDC’s Hepatitis (Case Transmission) Message Mapping Draft
  - Based on existing Viral Hepatitis Case Report form, which includes: demographic information, clinical data, diagnostic tests, and patient history and risk sections.
Hepatitis B Case Definitions for HBV Surveillance

Perinatal hepatitis B infection

Confirmed:
HBsAg positivity in any infant aged >1-24 months who was born in the United States or in a U.S. territory to an HBsAg-positive mother.

Hepatitis B Case Definitions for HBV Surveillance

Acute hepatitis B infection

Confirmed: revisions implemented January 1, 2013, in Wisconsin
Discrete onset of symptoms* (e.g., fever, headache, malaise, anorexia, nausea, vomiting, diarrhea, abdominal pain, dark urine) AND jaundice or elevated serum aminotransferase levels (ALT) >100 IU/L AND

IgM anti-HBc positive OR HBsAg positive (AND IgM anti-HAV negative [if done])

*Note: A documented negative HBsAg result within 6 months prior to a positive HBsAg, HBeAg, or HBV DNA test result does not require an acute clinical presentation to meet the surveillance case definition

Chronic hepatitis B infection

Confirmed:

IgM anti-HBc negative AND a positive result on one of the following tests: HBsAg, HBeAg, or HBV DNA
OR

HBsAg positive or HBV DNA positive or HBeAg positive two times at least 6 months apart. (Any combination of these tests performed 6 months apart is acceptable.)

Probable: definition available since 2007

Single HBsAg positive or HBV DNA positive or HBeAg positive lab result, and does not meet the case definition for acute hepatitis B.

Wisconsin Department of Health Services

Hepatitis B Case Classification Algorithm for Surveillance

acute and chronic hepatitis B cases, not including perinatal

Serologic Markers of HBV Infection
- HBsAg: hepatitis B surface antigen
- HBeAg: hepatitis B e antigen
- anti-HBc: total hepatitis B core antibody
- IgM anti-HBc: IgM antibody to hepatitis B core antigen
- anti-HBs: hepatitis B surface antibody
- anti-HBe: antibody to hepatitis B e antigen

*Note: for public health surveillance – not to be used for clinical diagnosis of acute or chronic hepatitis B infection


Reported cases of non-perinatal hepatitis B disease, Wisconsin Electronic Disease Surveillance System (WEDSS), 2000-2011
Hepatitis B Case Classification Instructions

- Once a disease incident has been classified and finalized (i.e., **Final “Resolution Status”** and **Confirmed “Process Status”** in WEDSS) as **hepatitis B, acute** or **hepatitis B, perinatal**
  - The disease incident should remain finalized (as acute or perinatal) because that is how the case was first identified in Wisconsin.
  - Although the case may meet the **hepatitis B, chronic** case definition over time, we do not change his/her classification to chronic if the criteria for acute or perinatal hepatitis B were met initially and finalized as such.
- Please note the recent change in the case definition for **hepatitis B, acute**
  - A documented **negative** HBsAg result within 6 months prior to a positive HBsAg, HBeAg, or HBV DNA test result does not require an acute clinical presentation to meet the surveillance case definition.

2013 Changes in Hepatitis B Forms in WEDSS

- Moved documentation of perinatal follow-up and contact investigations from WEDSS Case Manager to Reporter.
- Added sections to document receipt of hepatitis B vaccine and immune globulin (for contacts).
- Combined patient risk documentation forms for acute and chronic hepatitis B (consistent with hepatitis C risk form).
- Improved format of laboratory results section.
Changes in Documentation of Perinatal Follow-up

• Documentation of perinatal follow-up was moved from WEDSS Case Manager to Reporter for several reasons:
  o To simplify and ensure linkage of mother and infant.
  o To ensure linkage of perinatal follow-up and a perinatal disease incident.
  o In response to requests from several local health departments.
  o To accommodate CDC grant reporting requirements (forms in Reporter can be customized more easily).
• Information already reported in Case Manager will remain there.
  o Anna Kocharian will transfer perinatal follow-up data in Case Manager for infants born in 2013 to Reporter by the end of March 2013.

Documentation of Perinatal Follow-up in WEDSS is Required

• Documentation of perinatal follow-up for infants born to HBsAg-positive mothers is **required** and should be completed using WEDSS Reporter.
  o Please use **WEDSS Reporter** instead of Case Manager or DPH form 4631 below (Wisconsin Perinatal Hepatitis B Prevention Program Information Collection Form) to document perinatal follow-up.
• Please continue to submit the spreadsheet for perinatal follow-up reimbursement to Stephanie Borchardt until further notice from the Immunization Program.
Upon receipt of an electronic laboratory report (ELR) with a positive hepatitis B test result (particularly HBsAg, HBeAg, HBV DNA), check patient’s gender and date of birth. If patient is a woman of childbearing age (15-44 years), determine patient’s pregnancy status to decide if perinatal follow-up needs to be initiated.

1. Search by name and date of birth (DOB) to determine if patient already exists (find a “match”) in WEDSS by clicking “Select Patient” below.
2. If patient:
   - already has an existing hepatitis B disease incident in WEDSS,
   - is not a woman of childbearing age (15-44 years), and
   - public health follow-up was already completed, then simply import electronic laboratory report by checking the matched disease incident and clicking “Only Attach Lab Report” below.
   Do not create a duplicate hepatitis B disease incident.
Instructions for Documenting Perinatal Follow-up in WEDSS – Continued

Instructions are provided in Contacts section of hepatitis B disease incidents (demonstrated in previous slide)

- To document perinatal hepatitis B follow-up prior to infant’s birth, enter parent’s last name and “pregnancy” as the first name.
  - Enter expected delivery date and the date when perinatal follow-up was initiated with the mother by the local health department.

- If perinatal follow-up is not completed, indicate reason.
  - If patient moves out of state, contact state hepatitis B coordinator to transfer case management to appropriate state.

- After child’s birth, create contact investigation to document perinatal follow-up, including hepatitis B immune globulin (HBIG) date, hepatitis B vaccination information and post-vaccination serologic testing results – click “Create Investigation” in Contacts section.
1. Complete Hepatitis B Immune Globulin (HBIG) and Hepatitis B Vaccination History sections for infants born to HBsAg-positive women.

2. Document post-vaccination serologic testing results in Hepatitis B Initial Laboratory Results - MANDATORY section.

**WEDSS Documentation of Contact Investigations**

- Documentation of individual non-perinatal contact investigations (e.g., sexual, other household, needle sharing) through WEDSS Reporter is optional.

It is sufficient to complete the Hepatitis B – public health follow-up summary section in the Hepatitis B Intervention tab for non-perinatal/other contacts. However, the Contacts section can also be used, if needed by the local health department, to document individual non-perinatal contact investigations, similarly to the perinatal follow-up documentation, using the fields (in the Contacts section) below or by creating a Contact Investigation as demonstrated in previous slides.
## Updated Hepatitis B Laboratory Results Tab

### Hepatitis B Case Definition
- **Negative HBsAg Result Prior To First Positive**

### Updated Hepatitis B Laboratory Results Tab

<table>
<thead>
<tr>
<th>Hepatitis B Initial Laboratory Results - MANDATORY</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Hepatitis B surface antigen result</strong></td>
<td></td>
</tr>
<tr>
<td>Positive</td>
<td>Negative</td>
</tr>
<tr>
<td><strong>Hepatitis B e antigen result</strong></td>
<td></td>
</tr>
<tr>
<td>Positive</td>
<td>Negative</td>
</tr>
<tr>
<td><strong>Hepatitis B core antigen result</strong></td>
<td></td>
</tr>
<tr>
<td>Positive</td>
<td>Negative</td>
</tr>
<tr>
<td><strong>Total anti-HBc (total antibody to hepatitis B core antigen) result</strong></td>
<td></td>
</tr>
<tr>
<td>Positive</td>
<td>Negative</td>
</tr>
<tr>
<td><strong>Hepatitis B virus DNA (HBV DNA) - viral</strong></td>
<td></td>
</tr>
<tr>
<td>Positive</td>
<td>Negative</td>
</tr>
</tbody>
</table>

### Complete Hepatitis B Repeat Laboratory Results section for results that are ≥ 6 months after the already-documented initial positive results (for those disease incidents that meet the case definition for chronic hepatitis B).

Please do not over-write already documented laboratory results in the “LabClinical” tab with new lab results – enter new lab results (if not already automatically populated by ELR) in the “lab widget” (Laboratory Information section) at the bottom of the “LabClinical” tab.
Wisconsin Department of Health Services

Additional Hepatitis Laboratory Results – Optional Form for Local Health Departments

For local health departments that would like to document additional or negative test results for case management or contact investigations (and would prefer to use a form similar to the Hepatitis Laboratory Results section rather than the “lab widget”), an Additional Hepatitis Laboratory Results section has been added to the WEDSS Filing Cabinet. Please only use this form to document negative and/or additional test results, if needed, during case management or contact investigations. Use the “LabClinical” tab to document initial laboratory results.

Wisconsin Department of Health Services

Updated Hepatitis B Clinical Data

- The Hepatitis B Clinical Data section is also contained in the “LabClinical” tab, and now includes options to select symptoms consistent with hepatitis infection.
- The question about jaundice is highlighted in red to denote the importance of inquiring if patient had jaundice and/or other signs and symptoms to determine if case meets the acute hepatitis B case definition (especially in the absence of a prior negative HBsAg result).
### Updated Hepatitis B Risk Tab

- Combined risk sections for acute and chronic hepatitis B.
- Now consistent with WEDSS Hepatitis C Risk tab.
- Eliminated duplicate questions.
- Added questions related to drug use and injecting drugs.

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#### Risk Tab Options

- **Yes**
- **No**
- **Refused**
- **Unknown**

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#### Updated Hepatitis B Risk Tab – Continued

- Added options to select “Refused” or “Not asked” for all questions in the Risk tab.
- Added questions about diabetes diagnosis and sharing of diabetic equipment.

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#### Risk Tab Options

- **Yes**
- **No**
- **Refused**
- **Unknown**
Updated Hepatitis B Risk Tab – Continued

The Hepatitis B – Risk Summary section is for state use only and will be used to summarize the detailed data collected at the beginning of the Risk tab to transmit to CDC.

Questions in Current Transmission Risks section are highlighted in red to denote their importance and encourage addressing these questions during public health follow-up.

Accessing Information Contained in Pre-2013 Hepatitis B WEDSS Forms

- This information is still accessible through data query.
- For each hepatitis B disease incident created prior to 2013, the hepatitis B disease-specific tabs (titled LabClinical pre-2013, HepB Risk pre-2013, HepB Intervention pre-2013) can be accessed in the filing cabinet of the corresponding disease incident.
- For cases with episode dates in 2011-2012, any data that was filled in the pre-2013 tabs will be populated in the new forms, but this is expected to take several months (to complete data clean-up and importing).
Upcoming Mediasite Live Presentations by the Wisconsin Immunization Program

Wednesday, February 13, 2013, at 12:00 p.m.

Hepatitis B Surveillance
A review of the updated Perinatal Hepatitis B Prevention Program Manual, which will be distributed to local health departments and birthing hospitals, and will be available on the Immunization Program’s website at: http://dhs.wisconsin.gov/immunization.

Wednesday, February 27, 2013, at 12:00 p.m.

Vaccine Handling and Storage
A review of the updated CDC vaccine handling and storage recommendations


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• WEDSS Forms Workgroup
• Public Health Nurses, Local Health Departments
• Clinicians
• Laboratorians