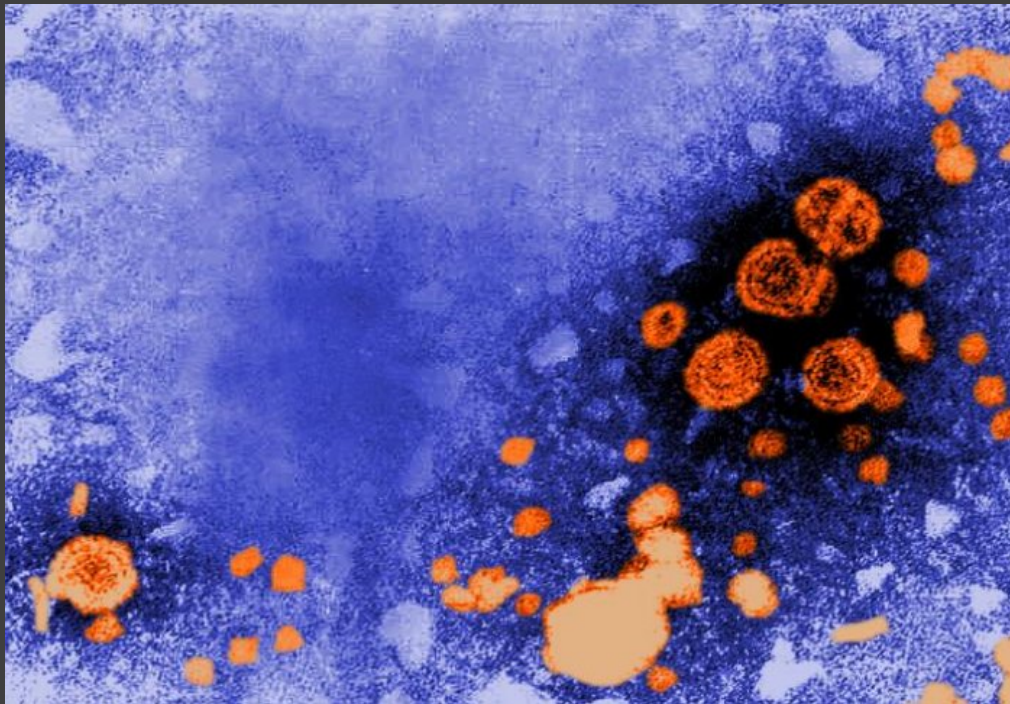


Hepatitis B Virus Surveillance and Epidemiology in Michigan



www.michigan.gov/hepatitis

Oct 8th, 2015

Joe Coyle, MPH – Viral Hepatitis Unit Manager

Outline

- Michigan Communicable Disease Rules
- Michigan Disease Surveillance System
- Hepatitis B Surveillance Framework
- Hepatitis B Epidemiology
- Summary



MI Communicable Disease Rules

Communicable Disease Rules

- Communicable disease reporting is required by Michigan law:
 - ▣ Michigan Public Health Act No. 368 Communicable Disease Rules: R 325.171-3, 333.51113
- Hepatitis B is one of the more than 90 diseases required to be reported in Michigan
- Cases are reported to the Michigan Disease Surveillance System (MDSS)
- Report contents:
 - ▣ Demographic info – name, date of birth, sex, race
 - ▣ Contact info – address, phone number
 - ▣ Disease details – lab results, disease-specific questions

2015: REPORTABLE DISEASES IN MICHIGAN – BY PATHOGEN

A Guide for Physicians, Health Care Providers and Laboratories

Report the following conditions to the Michigan Disease Surveillance System (MDSS) or local health department (see reverse) within 24 hours (unless otherwise noted) if the agent is identified by clinical diagnosis, direct examination, culture, serology, molecular techniques or histopathology.

Report the unusual occurrence, outbreak or epidemic of any disease or condition, including healthcare-associated infections.

Anaplasma phagocytophilum (Anaplasmosis)	Kawasaki Disease (1)
Arboviral encephalitides, neuro- and non-neuroinvasive: California serogroup, Chikungunya, Eastern Equine, Powassan, St. Louis, Western Equine, West Nile	Legionella species (Legionellosis)
Babesia microti (Babesiosis)	Leptospira species (Leptospirosis)
Bacillus anthracis (Anthrax)	Listeria monocytogenes (Listeriosis)
Blastomyces dermatitidis (Blastomycosis)	Measles virus (Measles/Rubeola)
Bordetella pertussis (Pertussis)	Meningitis: bacterial, viral, fungal, and parasitic
Borrelia burgdorferi (Lyme Disease)	Mumps virus
Brucella species (Brucellosis)	Mycobacterium leprae (Leprosy or Hansen's Disease)
Burkholderia mallei (Glanders)	Mycobacterium tuberculosis complex (Tuberculosis) (5)
Burkholderia pseudomallei (Melioiodosis)	Neisseria gonorrhoeae (Gonorrhea) (3)
Campylobacter species (Campylobacteriosis)	Neisseria meningitidis, sterile sites (Meningococcal Disease)
Chlamydia trachomatis (Trachoma, Genital infections, LGV) (3)	Orthopox viruses (including: Smallpox, Monkeypox)
Chlamydia psittaci (Psittacosis)	Plasmodium species (Malaria)
Clostridium botulinum (Botulism)	Poliovirus
Clostridium tetani (Tetanus)	Prion disease (Including: CJD)
Coccidioides immitis (Coccidioidomycosis)	Rabies virus
Coronavirus (SARS, MERS-CoV)	Rheumatic fever (1)
Corynebacterium diphtheriae (Diphtheria)	Rickettsia species (Spotted Fever and Typhus Group)
Coxiella burnetii (Q Fever)	Rubella virus
Cryptosporidium species (Cryptosporidiosis)	Salmonella species (Salmonellosis)
Cyclospora species (Cyclosporiasis)	Salmonella typhi (Typhoid Fever)
Dengue virus	Shigella species (Shigellosis)
Ehrlichia species (Ehrlichiosis)	Staphylococcus aureus, (MRSA), outbreaks only
Encephalitis, viral or unspecified	Staphylococcus aureus, vancomycin intermediate/ resistant (VISA/VRSA)
Entamoeba histolytica (Amebiasis)	Streptococcus pneumoniae, sterile sites
Escherichia coli, O157:H7 and all other shiga toxin positive serotypes (4)	Streptococcus pyogenes, group A, sterile sites, including Streptococcal Toxic Shock Syndrome (STSS)
Francisella tularensis (Tularemia)	Toxic Shock Syndrome (non-Streptococcal) (1)
Giardia species (Giardiasis)	Treponema pallidum (Syphilis)
Guillain-Barre Syndrome (1)	Trichinella spiralis (Trichinellosis)
Haemophilus ducreyi (Chancroid)	Varicella virus (Chickenpox)
Haemophilus influenzae, sterile sites only; submit isolates for serotyping for patients <15 years of age	Vibrio cholera (Cholera)
Hantavirus	Vibriosis (Non-Cholera species)
Hemolytic Uremic Syndrome (HUS)	Viral Hemorrhagic Fever
Hepatitis, viral:	Yellow fever virus
Hepatitis A virus, (Anti-HAV IgM)	Yersinia enterocolitica (Yersiniosis)
Hepatitis B virus, (HBsAg, HBeAg, anti-HBc IgM, HBV DNA Nucleic Acid Tests (PCR), HBV genotype), <i>especially in pregnant women</i>	Yersinia pestis (Plague)
Hepatitis C virus, (Anti-HCV, HCV RNA Nucleic Acid Tests (PCR), HCV genotype)	
Hepatitis D virus, (HDsAg, anti-HDV IgM)	
Hepatitis E virus, (Anti-HEV IgM)	
Histoplasma capsulatum (Histoplasmosis)	
HIV, (Tests indicative of HIV infection including reactive immunoassays (e.g. WB, EIA, IA), detection tests (e.g. VL, NAAT, p24), CD4 counts/percents, genotypes, and all tests related to perinatal exposures) (2)	
Influenza virus (Weekly aggregate counts)	
Pediatric mortality, report individual cases	
Novel Influenza viruses, report individual cases	

LEGEND

- (1) Reporting within 3 days is required.
 - (2) Reporting within 7 days is required.
 - (3) Sexually transmitted infections for which expedited partner therapy is authorized. See www.michigan.gov/hivstd for details.
 - (4) An isolate, if available, or the non-culture positive broth and/or stool specimen must be submitted to MDHHS laboratory
 - (5) All preliminary tuberculosis test results are to be reported to appropriate local health department and isolates submitted to MDHHS laboratory.
- Blue Bold Text** = An isolate, diagnostic specimen, or serum sample, where appropriate, must be submitted to MDHHS or other laboratory designated by MDHHS.

□ To be reported by healthcare providers and laboratories

□ To local health department or MDSS

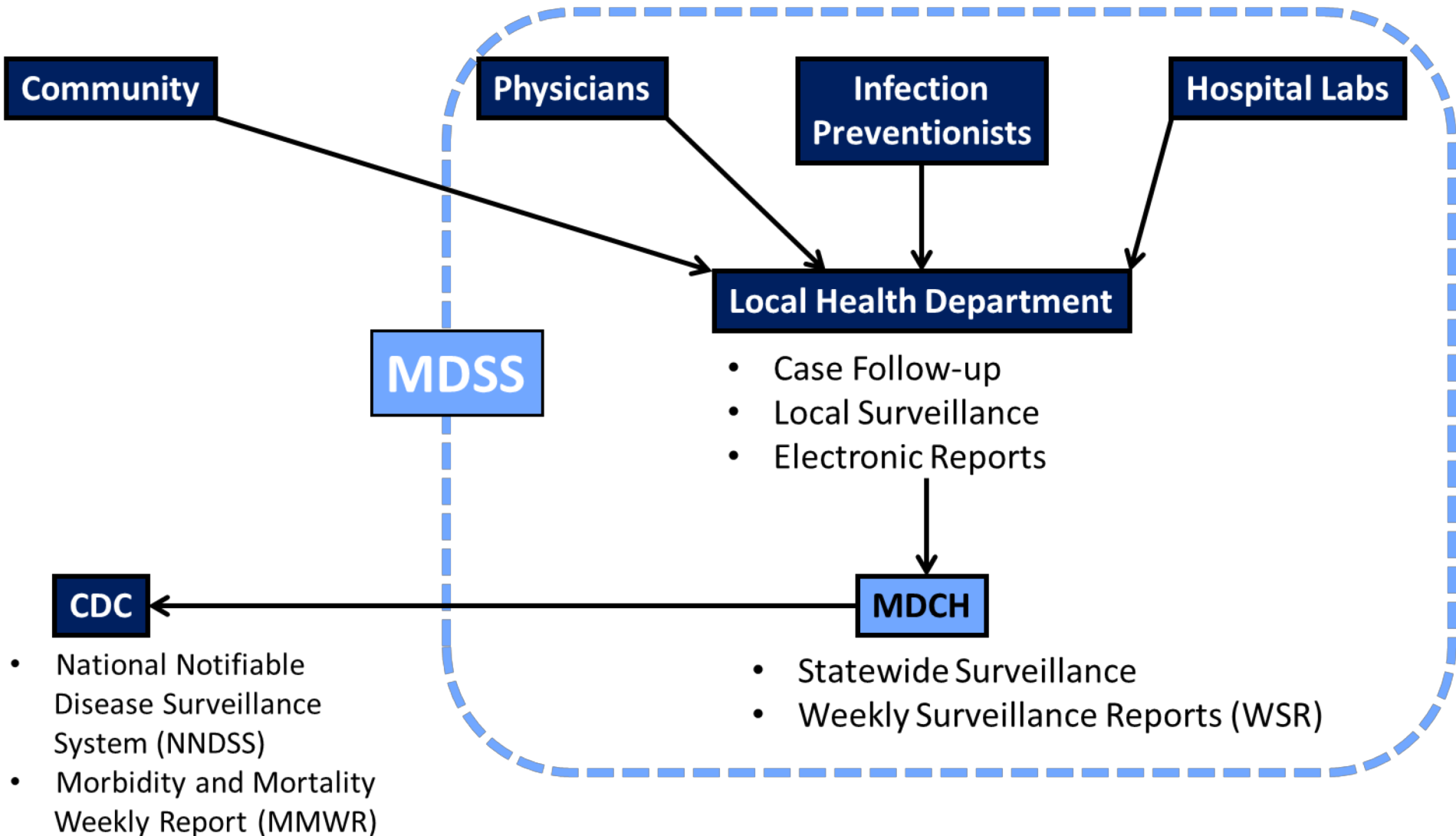
Hepatitis B virus, (HBsAg, HBeAg, anti-HBc IgM, HBV DNA Nucleic Acid Tests (PCR), HBV genotype), *especially in pregnant women*

□ Upon diagnosis, culture, serology, examination, histopathology, or molecular technique





Michigan Disease Surveillance System

MDSS Reporting Framework



MDSS Case Entry

**Department of Community Health**


[Case Investigation](#) | [Administration](#) | [Messages](#) | [Reports](#) | [Logout](#)

[Cases](#)
[New Case](#)
[New Aggregate Cases](#)
[Searches](#)
[New Search](#)
[New Aggregate Search](#)
[Disease Specific Search](#)
[Search Field Records](#)
[Case Definitions](#)
[Alert Rules](#)
[Display Supplemental Forms](#)
[User Profile](#)
[User Directory](#)

Investigation Information

Reportable Condition*: **Case Status*:**

Patient Information



Patient Status*: **Patient Status Date* (mm/dd/yyyy):** 


First*: **Last*:** **Middle:**

Street:

City: **County:** **State:** **Zip:**

Home Phone (###-###-####): **Ext:** **Other Phone (###-###-####):** **Ext:**

Onset Date (mm/dd/yyyy):  **Referral Date (mm/dd/yyyy):** 

Diagnosis Date (mm/dd/yyyy): 

**indicates required items*

[Michigan.gov Home](#) | [Site Map](#) | [State Web Sites](#) | [Contact Michigan](#) | [FAQ](#)
[Privacy Policy](#) | [Link Policy](#) | [Accessibility Policy](#) | [Security Policy](#) | [MDSS Support](#) | [HIV Security and Training Info](#)
v 4.2.1 | Last update: 6/17/2015 1:44 pm EDT | Logged in: JOSEPH R COYLE
Copyright © 2001-2003 State of Michigan

MDSS Case Detail Form

Viral Hepatitis Case Report

Chronic Hepatitis B

Patient Information

Patient ID <input type="text"/>	First <input type="text"/>	Last <input type="text"/>	Middle <input type="text"/>
------------------------------------	-------------------------------	------------------------------	--------------------------------

Street Address <input type="text"/>
--

City <input type="text"/>	County <input type="text"/>	State <input type="text"/>	Zip <input type="text"/>
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Home Phone ### ## #### <input type="text"/>	Ext. <input type="text"/>	Other Phone ### ## #### <input type="text"/>	Ext. <input type="text"/>
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Parent/Guardian (required if under 18)

First <input type="text"/>	Last <input type="text"/>	Middle <input type="text"/>
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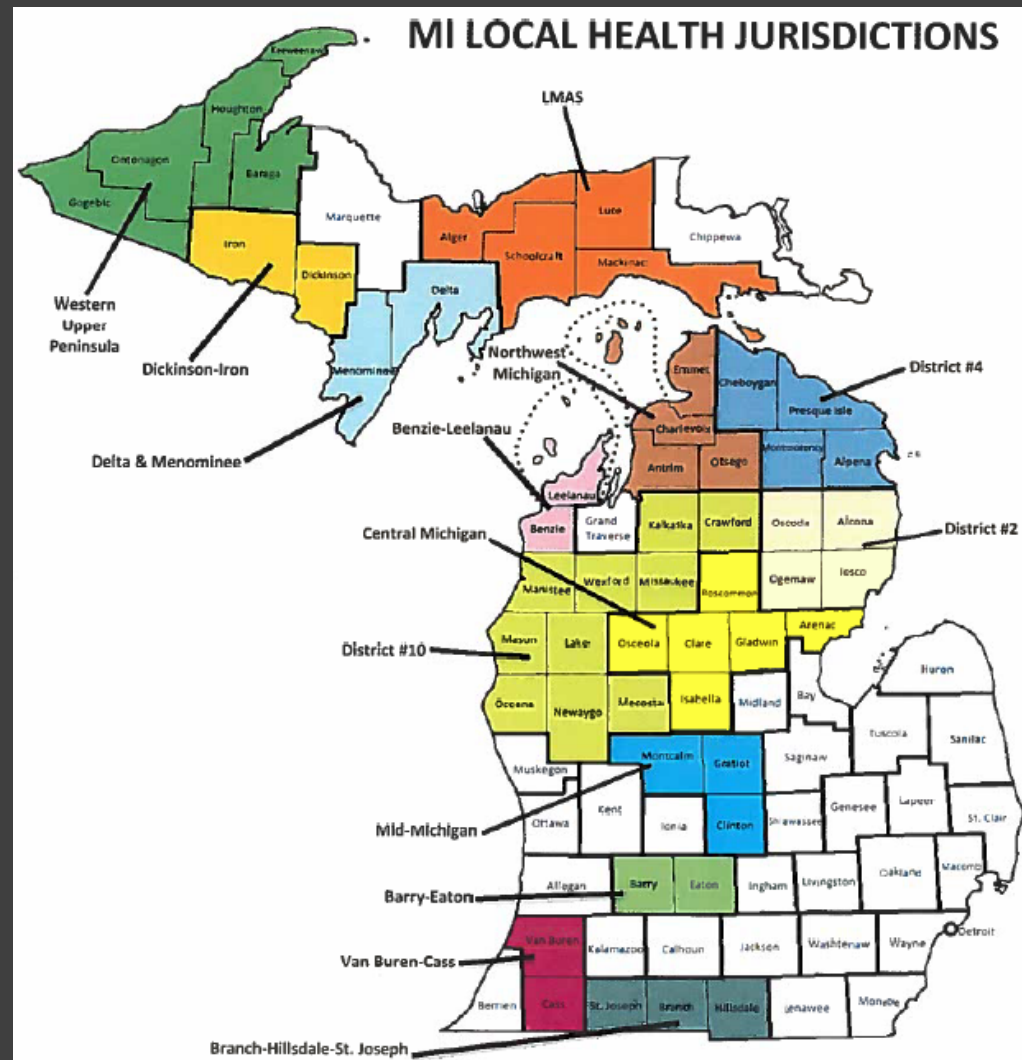
Demographics

Sex <input type="radio"/> Male <input type="radio"/> Female <input type="radio"/> Unknown	Date of Birth mm/dd/yyyy <input type="text"/>	Age <input type="text"/>	Age Units <input type="radio"/> Days <input type="radio"/> Months <input type="radio"/> Years
--	---	-----------------------------	--

Race (Check all that apply) <input type="checkbox"/> Caucasian <input type="checkbox"/> African American <input type="checkbox"/> American Indian/Alaska Native <input type="checkbox"/> Hawaiian/Pacific Islander <input type="checkbox"/> Asian <input type="checkbox"/> Unknown
--

Home Rule State

- The primary role of MDHHS in communicable disease control is to provide expert consultation, reference level diagnostic laboratory services and support as needed to Michigan's LHJs



- Local health departments function as administratively autonomous units, separate from the MDHHS. As such, they set their own priorities for how they allocate the resources available to them

CDC/CSTE Case Definitions

- A case definition is set of uniform criteria used to define a disease for public health surveillance
- Case definitions enable public health to classify and count cases consistently across reporting jurisdictions (**not clinical definitions**)
- Case information is collected using standardized forms from CDC: www.cdc.gov/hepatitis/pdfs/hepatitiscrf-20130508.pdf



Viral Hepatitis Surveillance

- Acute, Chronic, and Perinatal HBV are nationally notifiable
- Current surveillance operates under an incident disease paradigm:
 - ▣ Tracking new diagnoses
 - ▣ Not necessarily tracking clinical progression/outcomes
- Chronic cases are de-duplicated to reduce redundant reporting
- MDHHS reports cases which meet CDC/CSTE case definitions and utilizes the latest CDC data collection forms



Hepatitis B Epidemiology

Michigan Population

- As of the 2010 Census Michigan was the 8th most populous state in the nation with nearly 10 million residents

	2000 Census		2010 Census		Years 2000-2010	
	Population Count	Percent of Total	Population Count	Percent of Total	Change	Percent Change
White Alone	7,806,691	78.60%	7,569,939	76.60%	-236,752	-3.00%
Black Alone	1,402,047	14.10%	1,383,756	14.00%	-18,291	-1.30%
Hispanic	323,877	3.30%	436,358	4.40%	112,481	34.70%
Asian Alone	175,311	1.80%	236,490	2.40%	61,179	34.90%
Multiracial	163,487	1.60%	190,396	1.90%	26,909	16.50%
Native American Alone	53,421	0.50%	54,665	0.60%	1,244	2.30%
Other Race Alone	11,465	0.10%	9,866	0.10%	-1,599	-13.90%
Pacific Islander Alone	2,145	0.00%	2,170	0.00%	25	1.20%
Total Population	9,938,444	100.00%	9,883,640	100.00%	-54,804	-0.60%

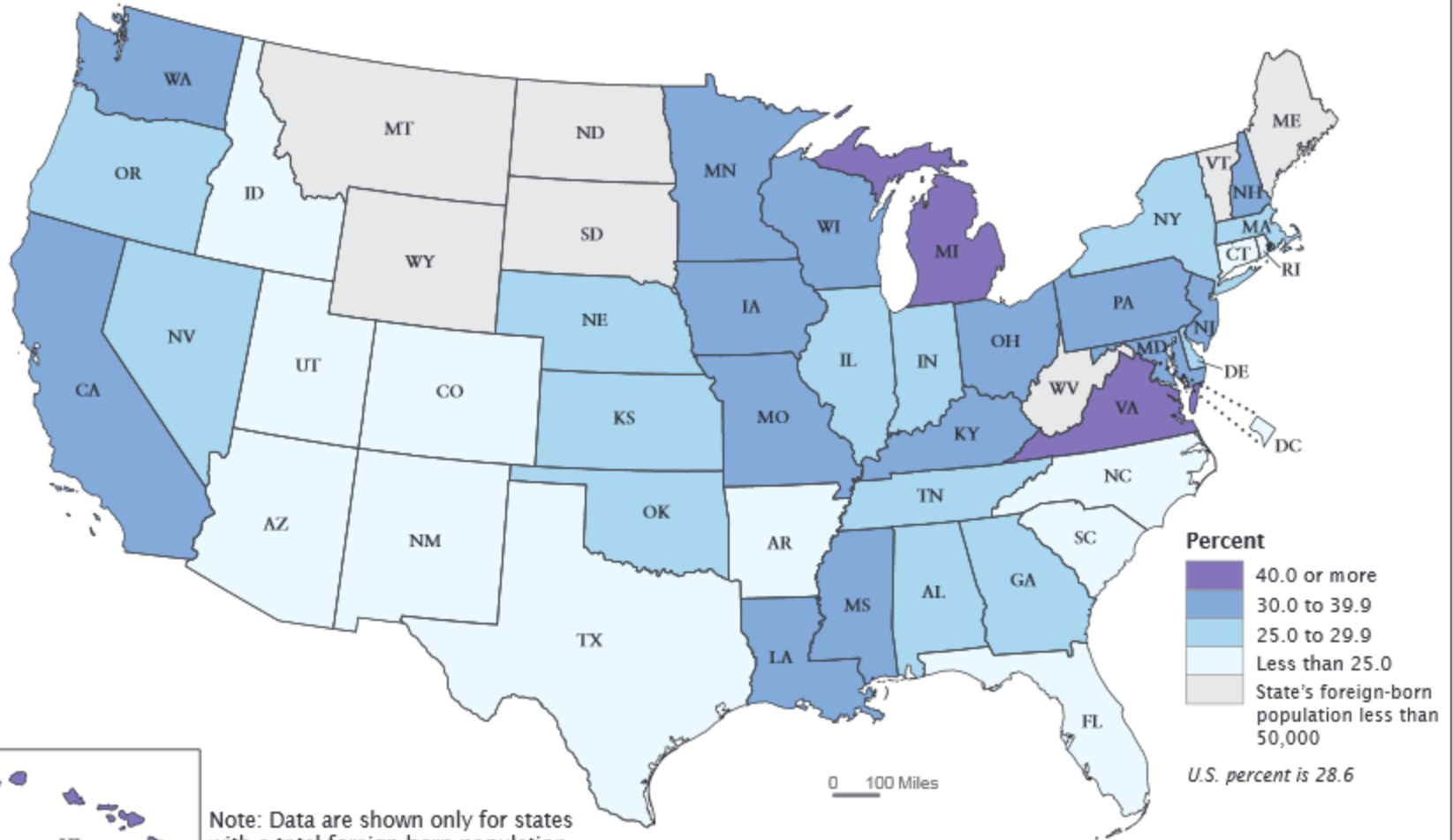
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Figure 2.
**Foreign Born From Asia
 as a Percentage of State's Foreign-Born Population: 2011**



Note: Data are shown only for states with a total foreign-born population of 50,000 or more.

Source: U.S. Census Bureau, 2011 American Community Survey.

Percent

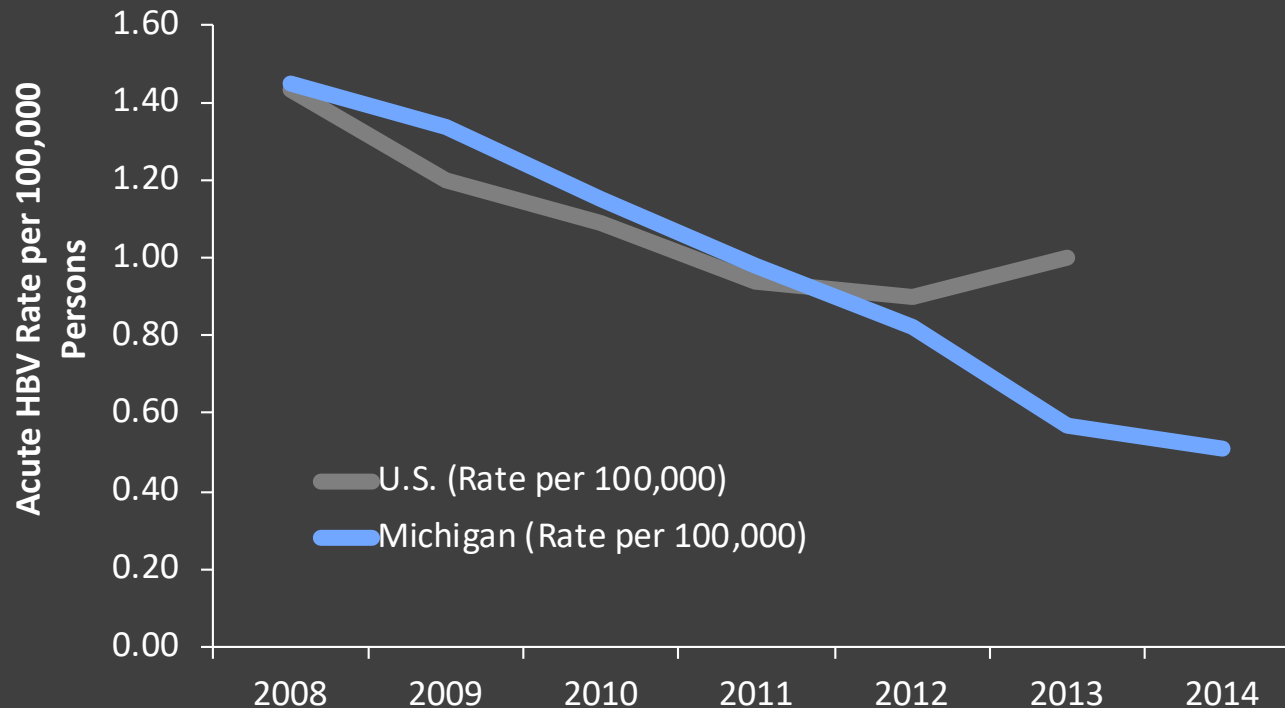
- 40.0 or more
- 30.0 to 39.9
- 25.0 to 29.9
- Less than 25.0
- State's foreign-born population less than 50,000

U.S. percent is 28.6

Acute Hepatitis B

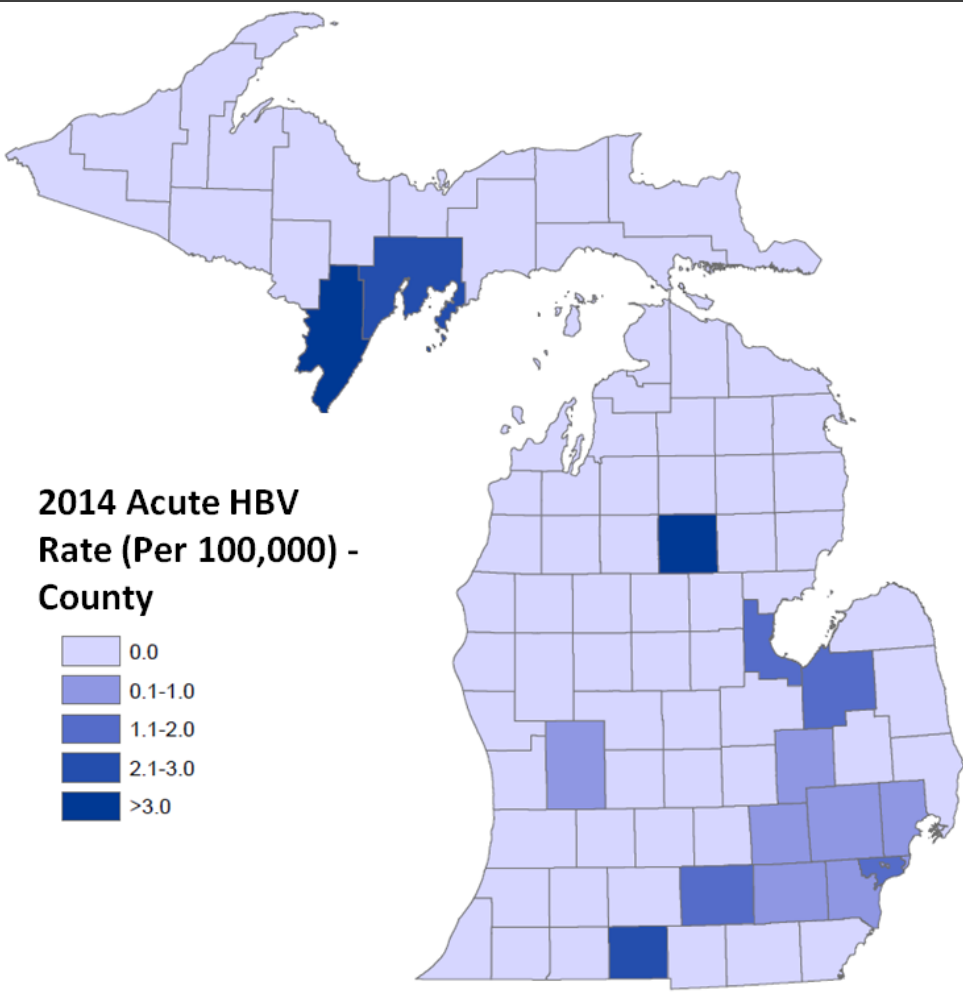
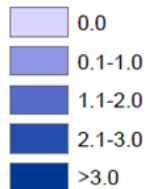
Acute Hepatitis B

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Michigan Cases	238	168	141	115	144	133	114	97	81	56	50
Michigan (Rate per 100,000)	2.39	1.69	1.42	1.16	1.45	1.34	1.15	0.98	0.82	0.57	0.51
U.S. (Rate per 100,000)	2.21	1.95	1.69	1.61	1.43	1.20	1.09	0.94	0.90	1.00	N/A



Acute Hepatitis B, 2014

**2014 Acute HBV
Rate (Per 100,000) -
County**



Age (n=50)		
Mean		46 years
Median		46 years
Range		28 - 71 years
Sex (n=50)		Rate per 100,000
Male	25 (50%)	0.52
Female	25 (50%)	0.50
Race (n=49)		Rate per 100,000
Caucasian	31 (63%)	0.40
African American	16 (33%)	1.08
Asian	1 (2%)	0.42
American Indian	1 (2%)	1.83

Acute Hepatitis B, 2014

In the 6 weeks to 6 months prior to onset of symptoms did the patient ever....

Risk Behavior	Yes	No
Injection Drug User	5/39 (13%)	34/39 (87%)
Used Street Drugs	6/36 (17%)	30/36 (83%)
Hemodialysis	0/41 (0%)	41/41 (100%)
Received Blood Products	5/40 (13%)	35/40 (87%)
Received a Tattoo	13/38 (34%)	25/38 (66%)
Accidental Needle Stick	0/37 (0%)	37/37 (100%)
Contact of Person with Hepatitis B	3/20 (15%)	17/20 (85%)
Other Surgery	10/38 (26%)	28/38 (74%)
Oral Surgery or Dental Work	12/37 (32%)	25/37 (68%)
Employed in Medical Field	3/41 (7%)	38/41 (93%)
Employed as Public Safety Officer	1/40 (3%)	39/40 (97%)
Incarceration Longer than 6 Months	3/39 (8%)	36/39 (92%)
Any Part of Body Pierced (other than ear)	5/38 (13%)	33/38 (87%)

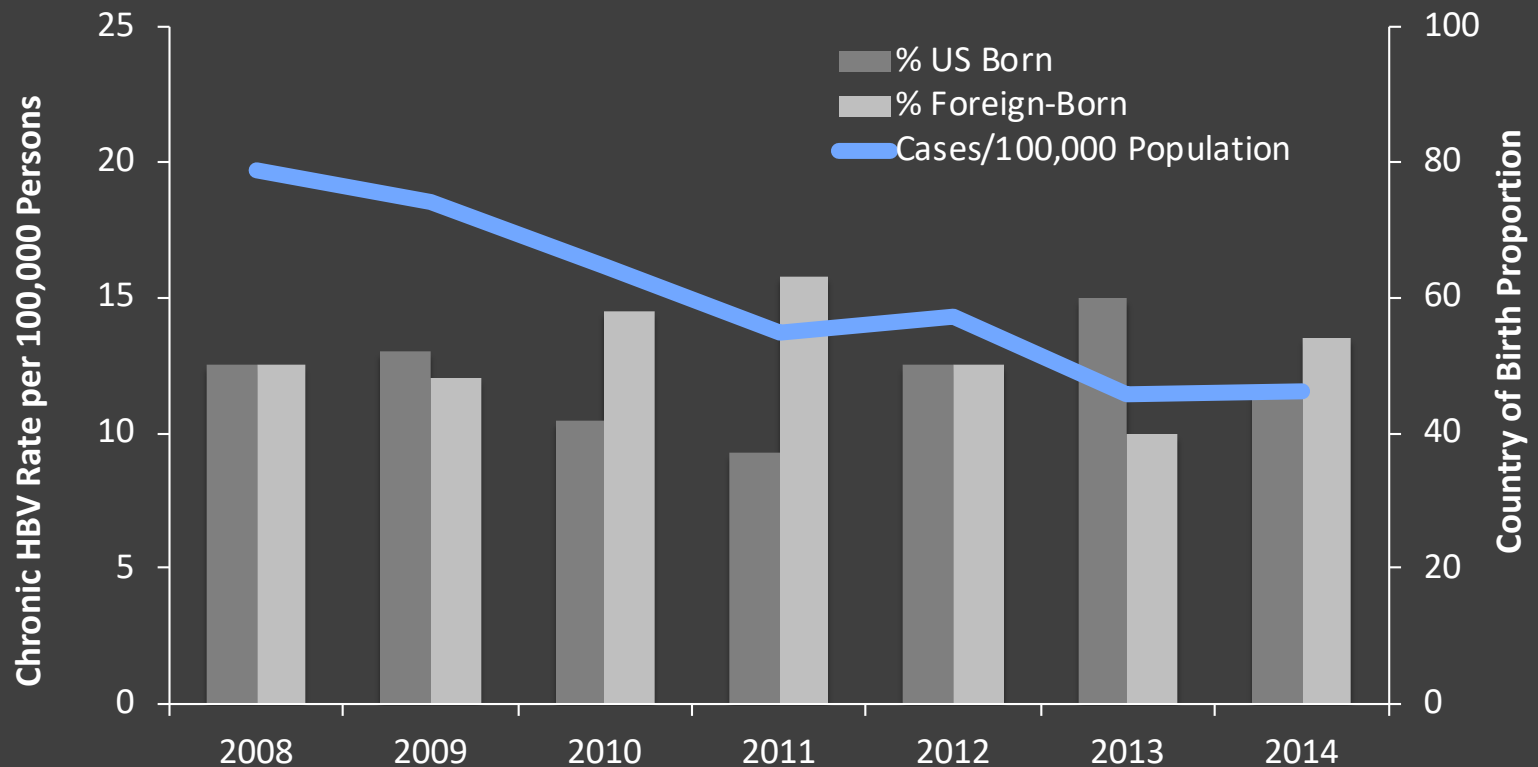
- Country of birth: USA 36, Other (Germany, Vietnam, Yugoslavia, Israel) 4, Unknown 10
- 36/40 (90%) patients hospitalized; 1 death
- 32/33 (97%) of patients without full vaccine coverage



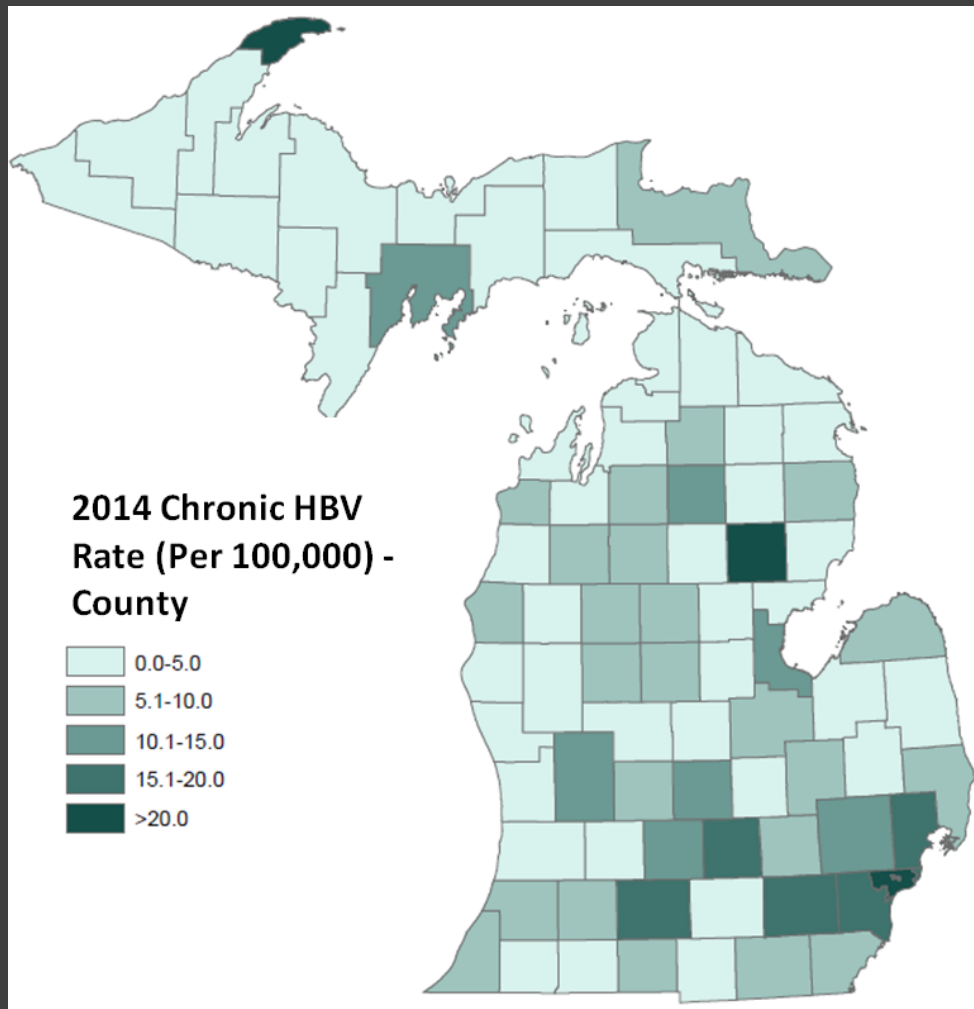
Chronic Hepatitis B

Chronic Hepatitis B

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Michigan Cases	1341	1685	1908	1921	1958	1846	1600	1353	1416	1130	1141
Michigan (Rate per 100,000)	13.5	17.0	19.2	19.3	19.7	18.6	16.2	13.7	14.3	11.4	11.6

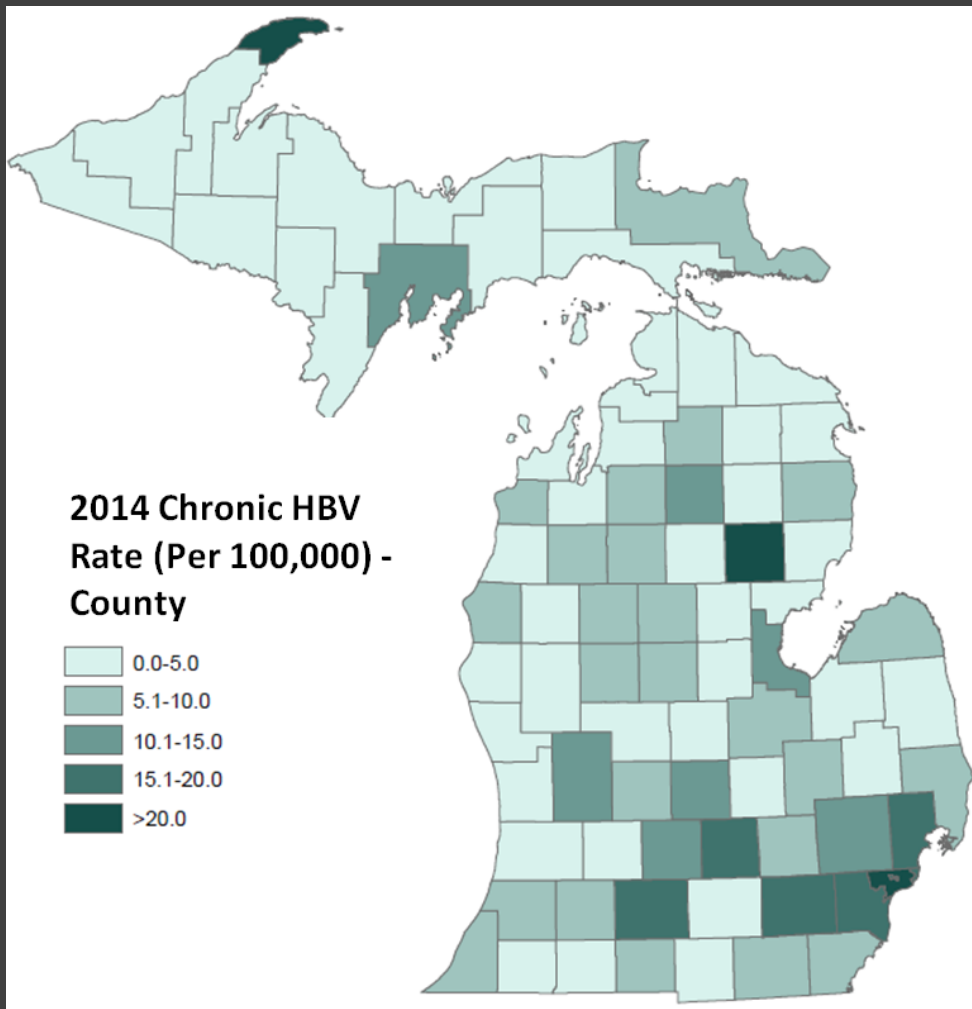


Chronic Hepatitis B, 2014



Age (n=1141)		
Mean	46 years	
Median	46 years	
Range	2 - 93 years	
Sex (n=1140)		Rate per 100,000
Male	645 (56.6%)	13.3
Female	495 (43.4%)	9.8
Race (n=757)		Rate per 100,000
Caucasian	285 (37.6%)	3.8
African American	208 (27.5%)	15.2
Asian	259 (34.2%)	110.4
American Indian	5 (0.7%)	11.0

Chronic Hepatitis B, 2014



Age (n=1141)		
Mean	46 years	
Median	46 years	
Range	2 - 93 years	
Sex (n=1140)		Rate per 100,000
Male	645 (56.6%)	13.3
Female	495 (43.4%)	9.8
Race (n=757)		Rate per 100,000
Caucasian	285 (37.6%)	3.8
African American	208 (27.5%)	15.2
Asian	259 (34.2%)	110.4
American Indian	5 (0.7%)	11.0

Chronic Hepatitis B, 2014

Has the patient ever....

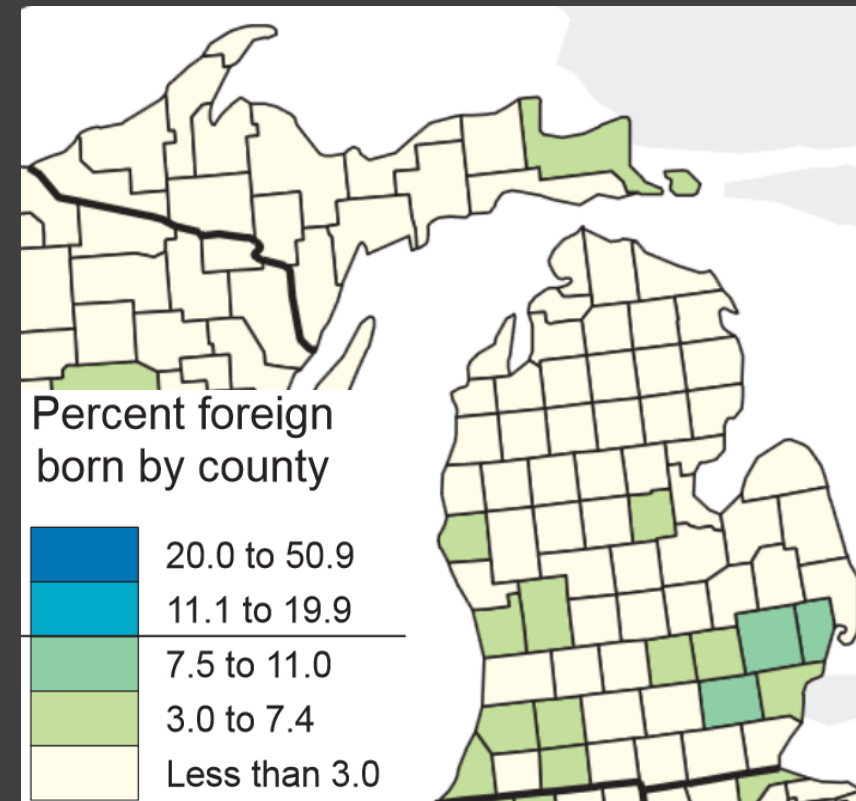
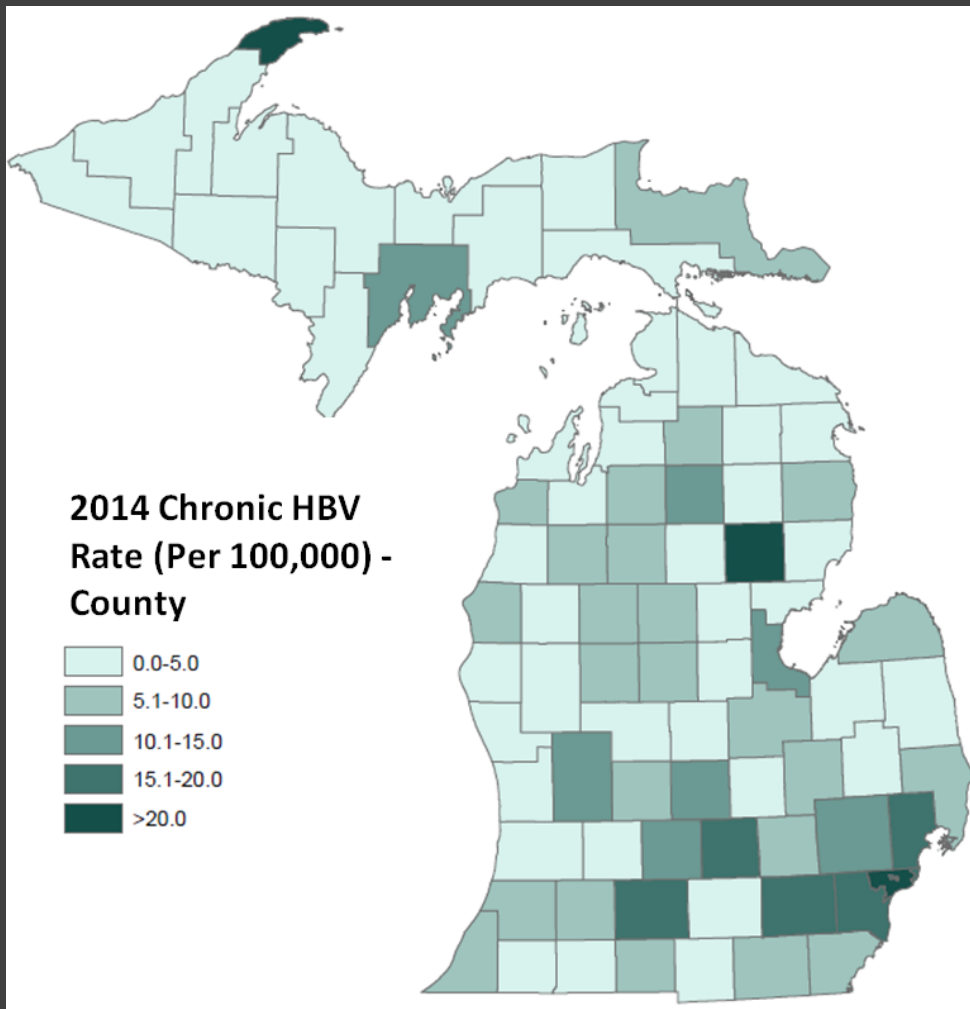
Risk Behavior	Yes	No
Clotting factor before 1987	6/372 (2%)	366/372 (98%)
Hemodialysis	21/437 (5%)	416/437 (95%)
Injection Drug User	51/390 (13%)	339/390 (87%)
Contact of Person with Hepatitis B	95/250 (38%)	155/250 (62%)
Employed in Medical Field	33/393 (8%)	360/393 (92%)
Incarceration Longer than 6 Months	75/368 (20%)	293/368 (80%)
Treated for a STD	61/329 (19%)	268/329 (81%)
Patient receiving medication	50/426 (12%)	376/426 (88%)

- 98/799 (12.3%) patients hospitalized; 2 deaths
- 257/564 (46%) US born
- 307/564 (54%) foreign born

Chronic Hepatitis B, 2014

- Most common foreign born countries:
 - China – 55
 - Vietnam – 28
 - Burma/Myanmar – 27
 - Albania – 11
- By Race:
 - Caucasian – 38/154 (25%) foreign born
 - African-American – 31/135 (23%) foreign born
 - Asian – 170/178 (95%) foreign born

Chronic HBV vs Foreign-born population



Source: U.S. Census Bureau, Census 2000 Summary File 3. American Factfinder at factfinder.census.gov provides census data and mapping tools.



Perinatal Hepatitis B

Perinatal Hepatitis B

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Michigan Cases	1	3	3	2	2	0	0	1	2	1	2

- Total of 17 cases since 2004:
 - 12/15 (80%) mothers of Asian race
 - 10/11 (91%) mothers born outside of US
 - 17/17 (100%) mothers confirmed HBsAg+ prior to birth
 - 17/17 (100%) infants received HBV vaccination
 - 15/16 (94%) infants received HBIG
- Did have one infant die from fulminant HBV at 3 months of age

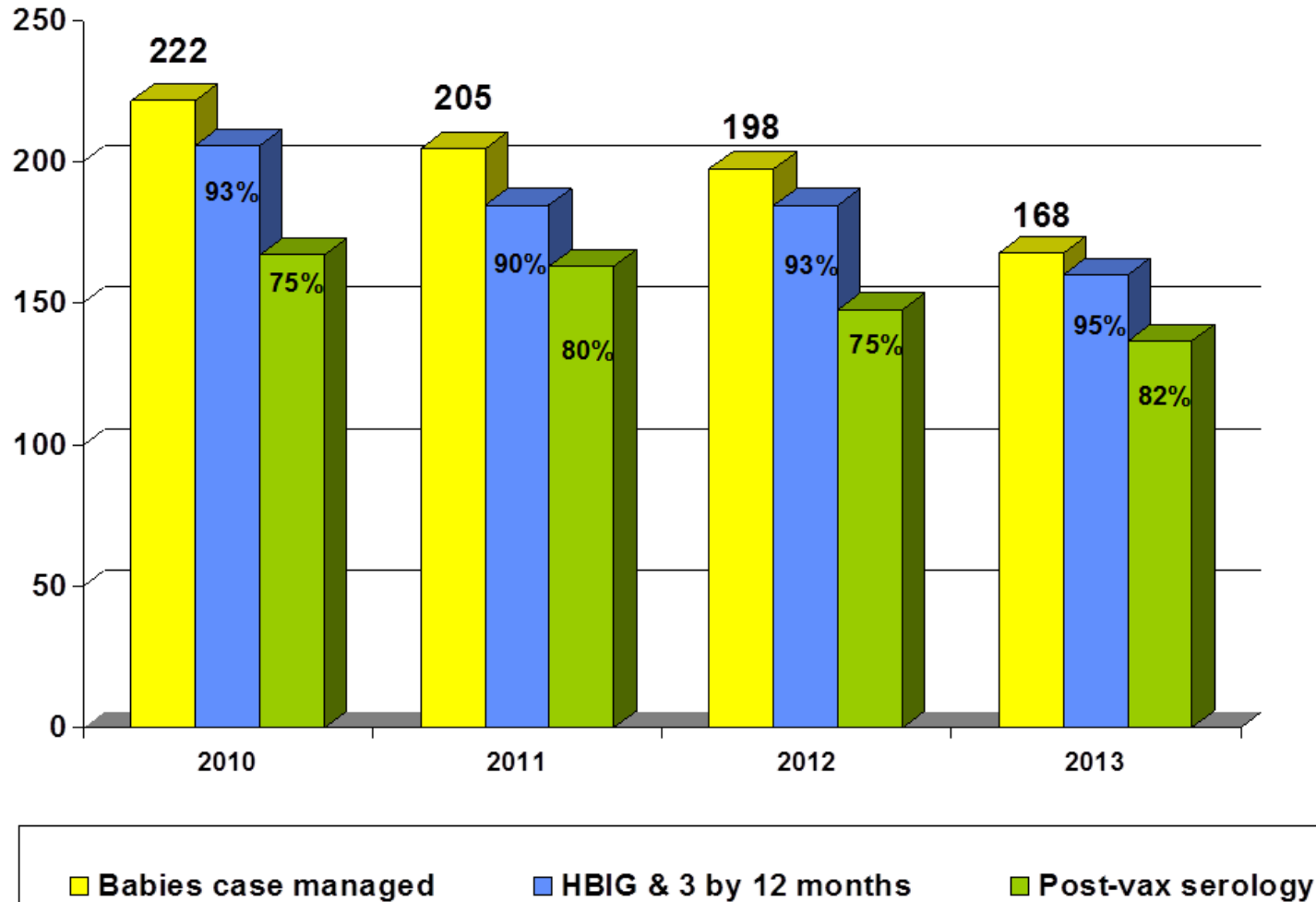
Preventing Perinatal HBV

- LHJs should verify pregnancy status on all women of childbearing age (10-60 years old) reported to be HBV+
- If pregnancy is confirmed case is referred to MDHHS Perinatal Hepatitis B Prevention Program
- CDC estimates that there are 348-547 births to HBV+ women in Michigan per year
 - MDHHS identifies about 60% of the lower estimate of HBV+ births per year

Preventing Perinatal HBV

- Michigan law requires all pregnant women to be tested for HBsAg
- Every HBsAg+ result should be reported within 24 hours to LHJ and/or MDSS
- Case should be referred to Perinatal Hepatitis B Prevention Program for follow-up with client, delivering hospital, and physician
- Ensure that infant gets HBV vaccine and HBIG within 12 hours of birth

Preventing Perinatal HBV





Challenges and Summary

Challenges

- Incident disease surveillance paradigm makes it difficult to measure clinical outcomes and monitor individuals over time (women of childbearing age)
- Limited LHJ resources for follow-up and investigation of large volume of cases
- Don't know what you don't know – cases not being reported
- Language barriers encountered by disease investigators (www.voicesforhealth.com)

Summary

- Acute HBV cases have been trending down similar to national statistics
- New Chronic HBV diagnoses have been trending down:
 - ▣ Majority of new diagnoses occurring in foreign-born population
 - ▣ Rate of infection in Asians dwarfs that of other racial groups
- Perinatal HBV cases remain sporadic:
 - ▣ Many HBV+ births are being missed
 - ▣ Those that are captured are receiving proper care

Resources

- MDHHS Viral Hepatitis Annual Report: www.mi.gov/documents/mdch/2014_Hepatitis_B_and_C_Annual_Report_499557_7.pdf
- Viral Hepatitis - www.mi.gov/hepatitis
- Perinatal Hepatitis B - www.mi.gov/hepatitisb
- Communicable Disease - www.mi.gov/cdinfo



Thanks!

Joe Coyle, MDHHS Viral Hepatitis Unit Manger

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