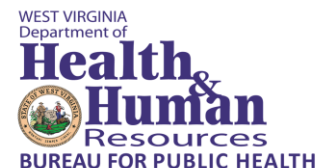


Hepatitis B Then and Now Immunization Summit 2016

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Division of Infectious Disease Epidemiology
Bureau for Public Health

West Virginia Department of Health and Human Resources



Objectives

- **Hepatitis B Virus (HBV) Overview**
- **The History of HBV**
- **HBV and West Virginia**
 - Immunization Recommendations
 - Immunization Policy and Law
- **HBV Prevention and Surveillance in West Virginia**

Hepatitis B Overview

Hepatitis B in the United States (U.S.)

- 46k new infections each year
- 1.4 million with chronic HBV

Hepatitis B Worldwide

- 350 million infected
- >500k die each year of HBV complications

Hepatitis B in West Virginia

- Highest rate of HBV in the U.S.
- 14.7/100,000 population



Hepatitis B Overview

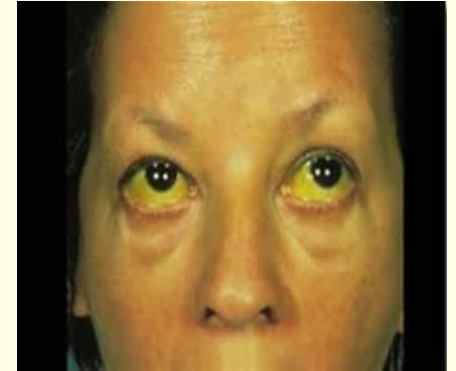
- **Hepatitis B Infection**
 - Acute
 - Chronic
- **Transmission**
- **Incubation period**
- **Risk Factors**



Hepatitis B Overview

Symptoms:

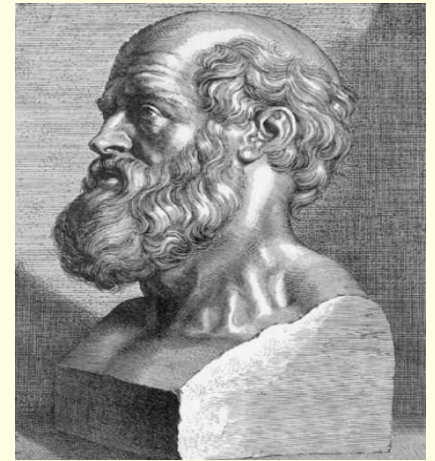
- Abdominal pain
- Dark urine
- Nausea and vomiting
- Weakness and fatigue
- Loss of appetite
- Joint pain
- Yellowing of the skin and eyes (jaundice)



The History of Hepatitis B

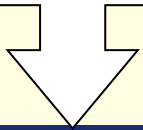
Hippocrates (400 B.C.)

- Epidemic Jaundice
- Father of modern medicine
- Infectious nature suggested



Hippocrates

Hippocrates
"Epidemic
Jaundice"



400 B.C.

1865

1883

1909

1939

1947

1955

1968

1981

The History of Hepatitis B

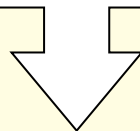
Serum hepatitis (1883)

- Outbreaks following smallpox vaccination in Germany
- 191 of the vaccinated jaundiced
- Employees who received different batches were healthy



A. Lurman

Outbreaks
"Serum
Hepatitis"



400 B.C.

1865

1883

1909

1939

1947

1955

1968

1981

Lurman A (1885). "Eine icterus epidemic". Berl Klin Wochenschr (in German) 22: 20–3. 6

The History of Hepatitis B

20th Century Viral Hepatitis

- Largely descriptive, only the causes of jaundice identified and hypothesis were not examined or tested
- Hypodermic needles introduced, used, and reused

Outbreaks
Hypodermic
needles



400 B.C.

1865

1883

1909

1939

1947

1955

1968

1981

The History of Hepatitis B

Outbreaks during World War II

- >50,000 cases of jaundice were recorded among American troops

Outbreaks
WWII



400 B.C.	1865	1883	1909	1939	1947	1955	1968	1981
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400 B.C.

1865

1883

1909

1939

1947

1955

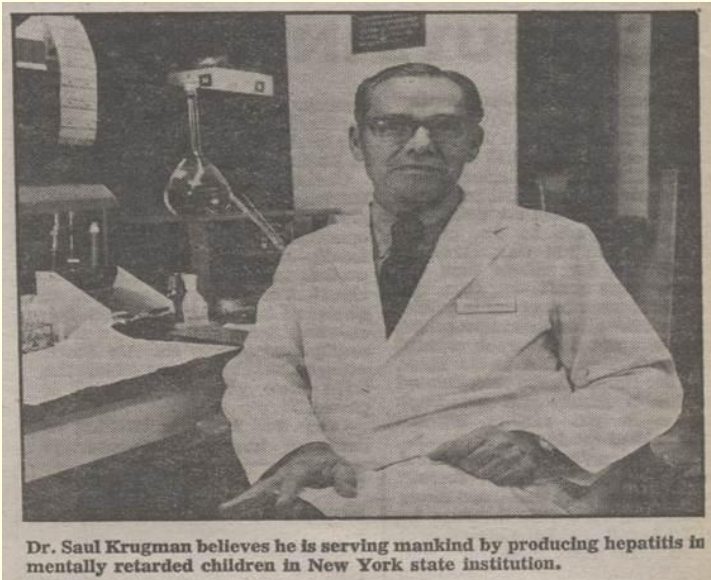
1968

1981

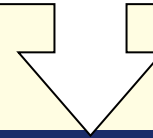
The History of Hepatitis B

Willowbrook Hepatitis Experiments

- Some patients inoculated with protective antibodies and some with viral hepatitis to monitor both studies
- Proved the transmissibility from person to person



Willowbrook
Hepatitis
Experiments



400 B.C.

1865

1883

1909

1939

1947

1955

1968

1981

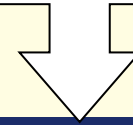
The History of Hepatitis B

Dr. Baruch S. Blumberg (1925-2011)

- Discovered the virus
- Australia Antigen



Blumberg
Discovers
HBsAg



400 B.C.

1865

1883

1909

1939

1947

1955

1968

1981

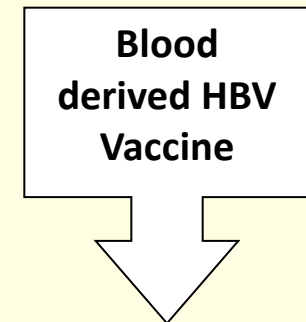
The History of Hepatitis B

Maurice Hilleman

- First to inactivate the HBV

Blood derived HBV vaccine

- Vaccinate by injecting with HBV surface protein
- Blood from gay men and Intravenous drug users (IDU) to collect “surface protein”
- Did the samples contain HIV?
- Confident the vaccine was safe
- Vaccine was approved for use in 1981



1865

1883

1909

1939

1947

1955

1968

1981

1986

The History of Hepatitis B

Pablo DT Valenzuela

- Replicated the HBV surface antigen in yeast
- Invented the world's first recombinant vaccine

Recombinant HBV vaccine

- *Saccharomyces cerevisiae*, 1883
- Yeast produces the noninfectious surface protein
- Removes the risk of HBV DNA exposure

Recombinant
HBV Vaccine

1865

1883

1909

1939

1947

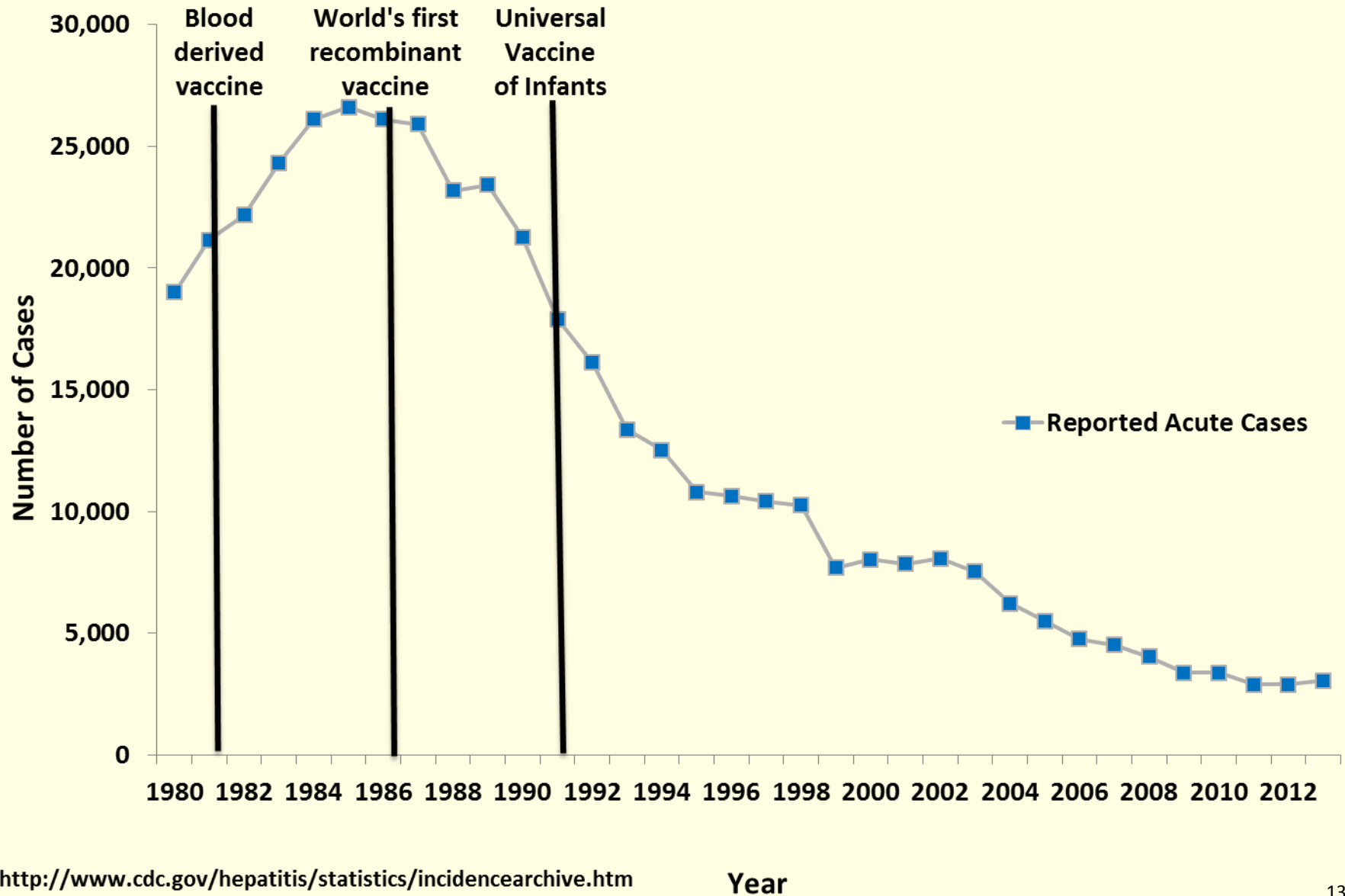
1955

1968

1981

1986

Reports of Acute Hepatitis B – United States 1980-2012

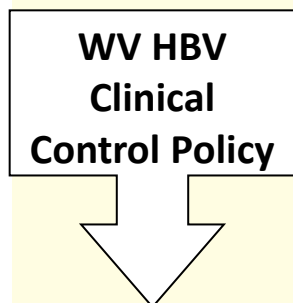


Hepatitis B Policy in West Virginia

Dr. Loretta Haddy PhD, MS

Dr. Mary Skinner

- West Virginia Department of Health and Human Resources Hepatitis B Clinical Control Services Policy 3220 written in 1986



1986

1991

1998

2000

2004

2006

2013

2015

Hepatitis B Immunization Recommendations

Advisory Committee on Immunization Practices

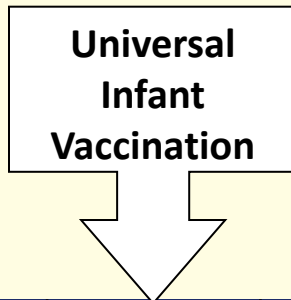
- MMWR: Universal Infant Vaccination, 1991
- All Infants should be vaccinated at birth

Vaccinate

- Provides immunity against the HBV

Effectiveness

- Full immune response in 85- 90% of individuals



1986

1991

1998

2000

2004

2006

2013

2015

Hepatitis B Laws in West Virginia

Nationally Notifiable Disease

- Hepatitis B becomes reportable in West Virginia (1998)

West Virginia Communicable Disease Rule (64CSR7)

- Report Hepatitis B within 24 hours to local health department in the county of the patient's residence

HBV is
reportable in
West Virginia



1986

1991

1998

2000

2004

2006

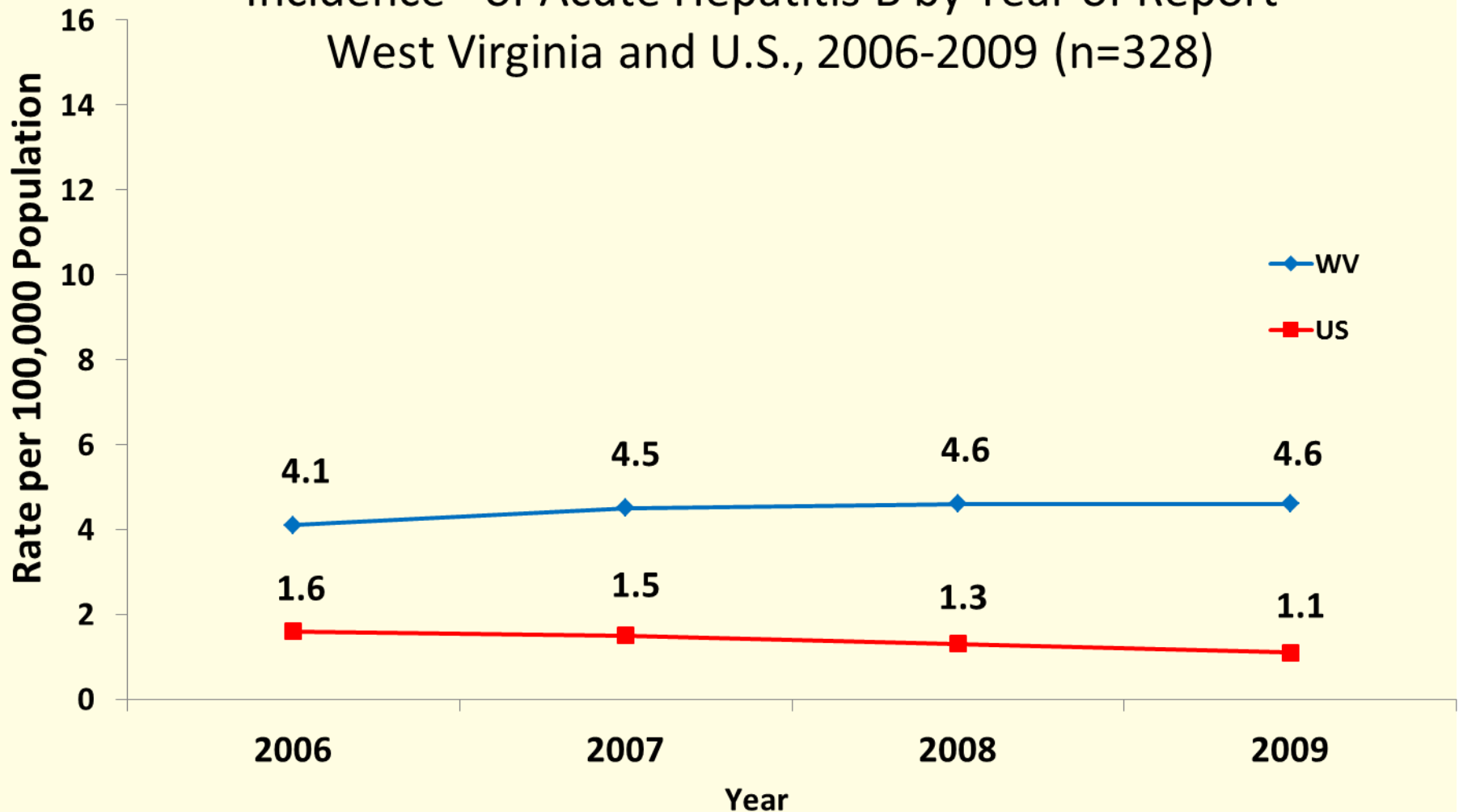
2013

2015

Hepatitis B Surveillance in West Virginia

Acute Hepatitis B - West Virginia

Incidence* of Acute Hepatitis B by Year of Report-
West Virginia and U.S., 2006-2009 (n=328)



Viral Hepatitis Prevention Coordinator (2004)

- Provides hepatitis information to the public on hepatitis prevention, testing, linkage to care

Hepatitis B Epidemiologist (2004)

- Conduct surveillance on the incidence of HBV infection in West Virginia

Perinatal Hepatitis B Case Management (2001)

- Ensure at risk infants receive HBV vaccination

State-level
funded
positions



1986

1991

1998

2000

2004

2006

2013

2015

School Entry Requirement (2008)

- A child may not be admitted or received in any of the schools of the state or a state-regulated child care center until he or she has been appropriately immunized. WV Code § 16-3-4(c)

Vaccination Exemption

- Opting out of recommended and mandated vaccinations for medical, religious or philosophical reasons.

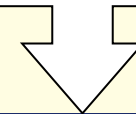
West Virginia *has never* allowed non-medical vaccine exemptions for school entry.

Perinatal Hepatitis B

Immunization Action Coalition launches “Give Birth to the End of Hep B” (2013)

- Protect Newborns, administer HBV vaccine at birth
- Increased risk of chronic HBV, cirrhosis and liver cancer if infected

Give Birth to the
End of Hep B



1986

1991

1998

2000

2004

2006

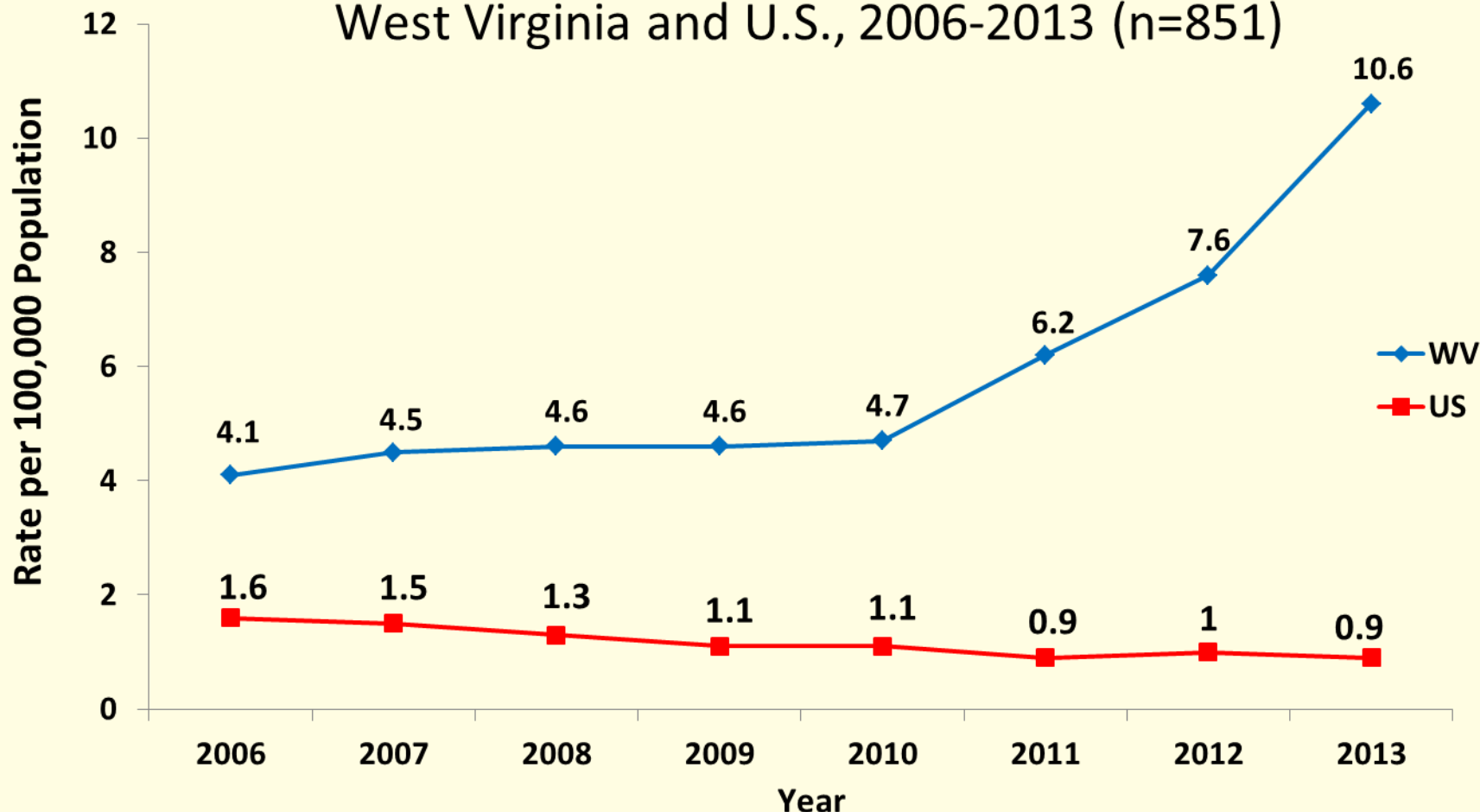
2013

2015

Hepatitis B Surveillance in West Virginia

Acute Hepatitis B - West Virginia

Incidence of Acute Hepatitis B by Year of Report-
West Virginia and U.S., 2006-2013 (n=851)



West Virginia has ranked #1 in the incidence of Acute Hepatitis B in the US from 2007 to 2014

Hepatitis B Pilot Project

Hepatitis B Pilot Project

- Decrease the incidence of new infections of HBV by vaccinating high-risk populations (2013)

17 participating vaccination centers

- Implemented standing orders
- Provided hepatitis B education
- Vaccinated all adults who reported risk for HBV infection

The Drug Epidemic in West Virginia

President Obama visits West Virginia in response to increased drug abuse and drug overdoses (2015)

Harm Reduction - Syringe Access in West Virginia

- To combat viral hepatitis B and C infection among injection drug users.
- Cabell, Kanawha, and Ohio County

Hepatitis B rates rising

- Increased drug abuse
- High numbers of overdose deaths

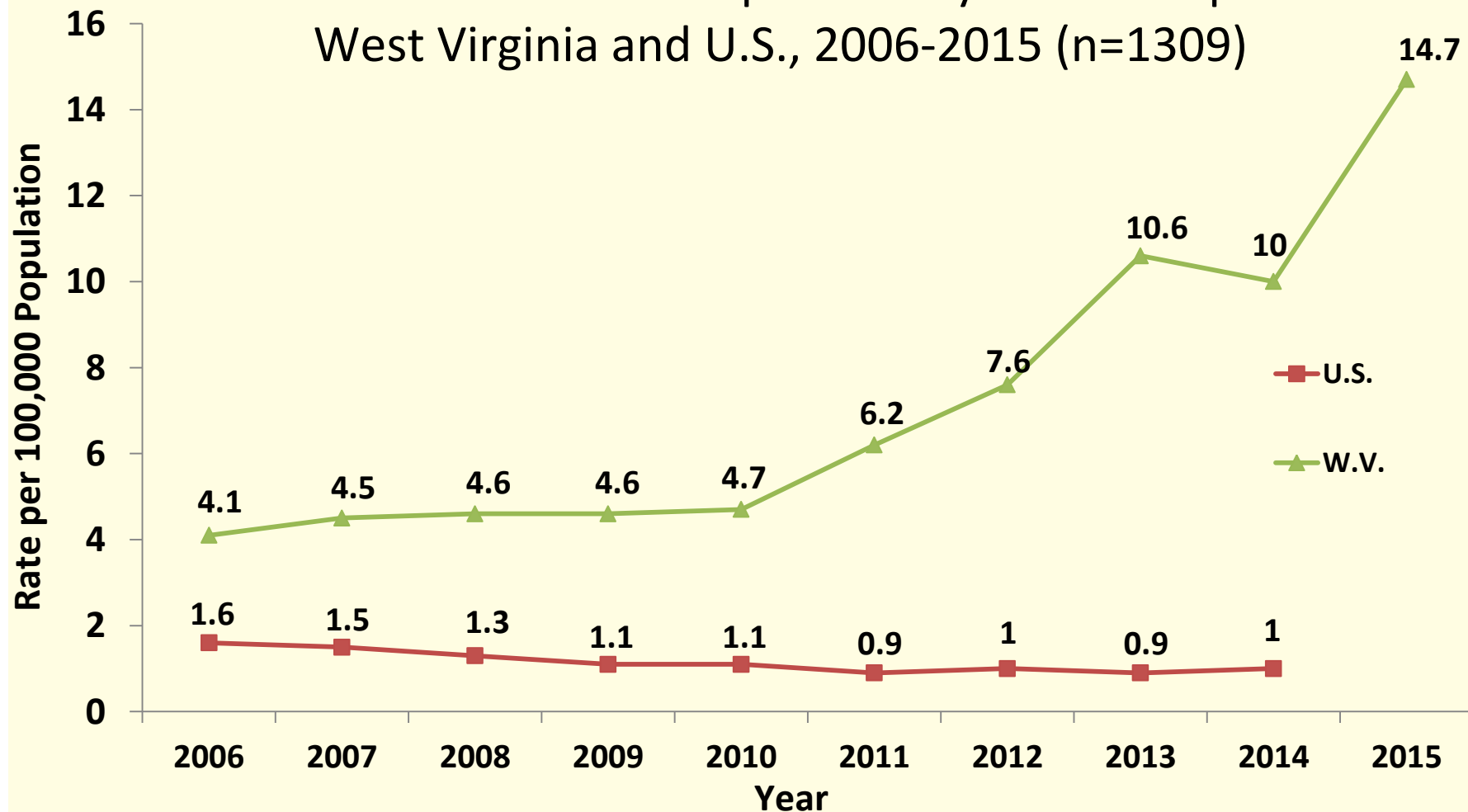


President of the United States, Barack Obama, speaks about opioid addiction in West Virginia

Hepatitis B Surveillance in West Virginia

Acute Hepatitis B - West Virginia, 2015

Incidence* of Acute Hepatitis B by Year of Report-
West Virginia and U.S., 2006-2015 (n=1309)



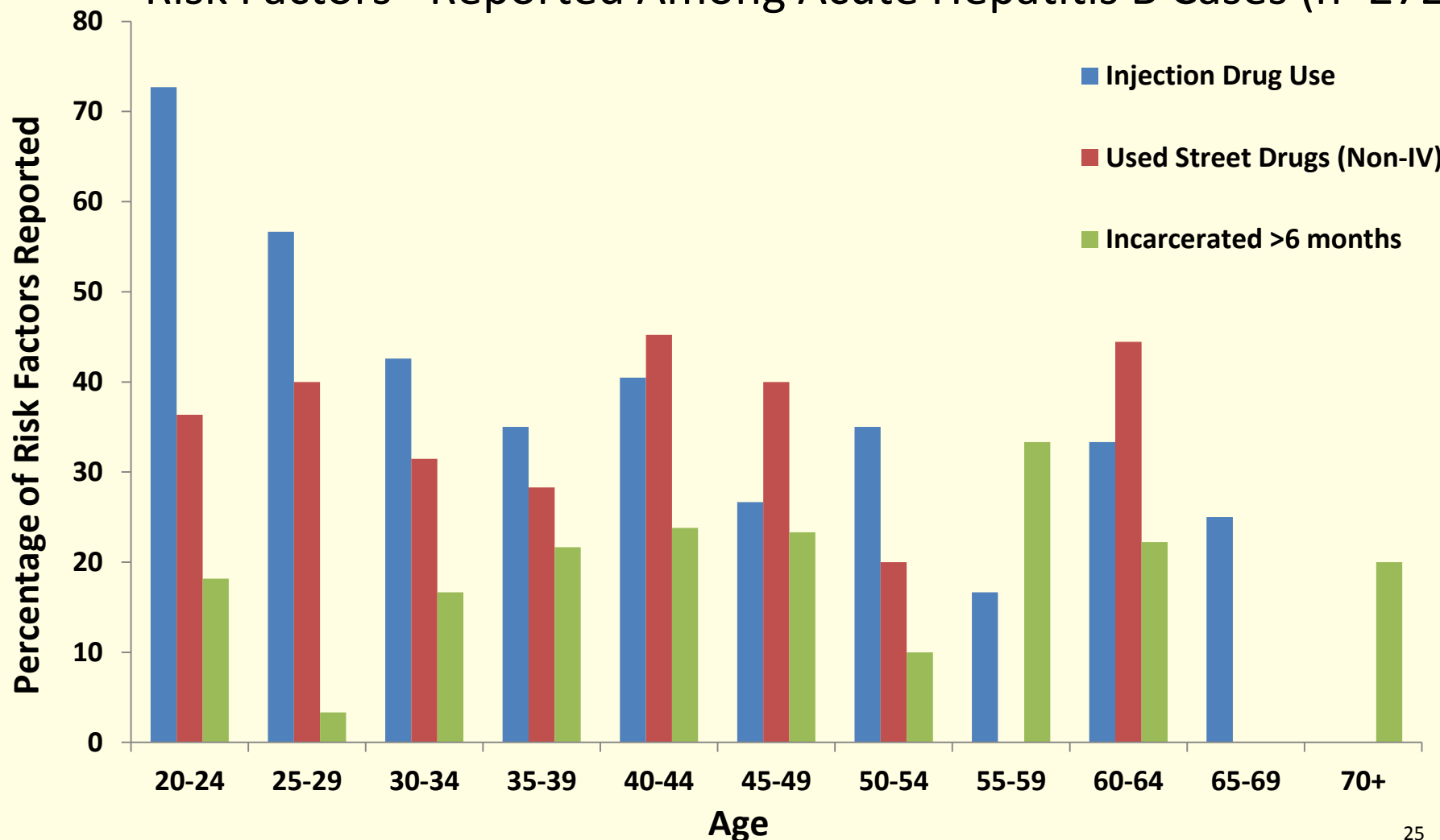
*2015 West Virginia data is provisional as of 3/22/2016

West Virginia has ranked #1 in the incidence of Acute Hepatitis B in the US from 2007 to 2014

Hepatitis B Surveillance in West Virginia

Acute Hepatitis B - West Virginia, 2015

Risk Factors* Reported Among Acute Hepatitis B Cases (n=272)



Hepatitis B Virus

- A serious liver infection that can cause short term or life long infection

HBV History

- The infectious nature of the disease has been noted since 400 B.C.
- Several breakthroughs, and scientific discoveries have led to the HBV vaccine that we still use today

West Virginia

- There are epidemic amounts of HBV infection in West Virginia
- IDU has directly affected the high rates of HBV infection in West Virginia

Acknowledgements

- **Steve Blankenship, MS, *Cancer Epidemiologist***
- **Maria Del Rosario MD, MPH, *Director of Surveillance***
- **Sandra Graham, RN, *Viral Hepatitis Prevention Coordinator***
- **Brett Armstrong, *Programmer Analyst***
- **Miguella Mark-Carew, PhD, *Zoonotic Disease Epidemiologist***
- **Suzanne Wilson, MPH *Director of Tuberculosis Prevention***
- **Leena Anil, PhD *Electronic Laboratory Capacity Epidemiologist***

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