

INFECTION PREVENTION EXPECTATIONS DURING ASSISTED MONITORING OF BLOOD GLUCOSE

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The findings and conclusions in this presentation are those of the author and do not necessarily represent the official position of the Centers for Disease Control and Prevention

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Outline

- ❑ Define “assisted monitoring of blood glucose” (AMBG)
- ❑ Bloodborne pathogen transmission during blood glucose monitoring – indirect contact transmission
- ❑ HBV infection outbreaks during AMBG
- ❑ CDC infection prevention recommendations

Assisted monitoring of blood glucose (AMBG)

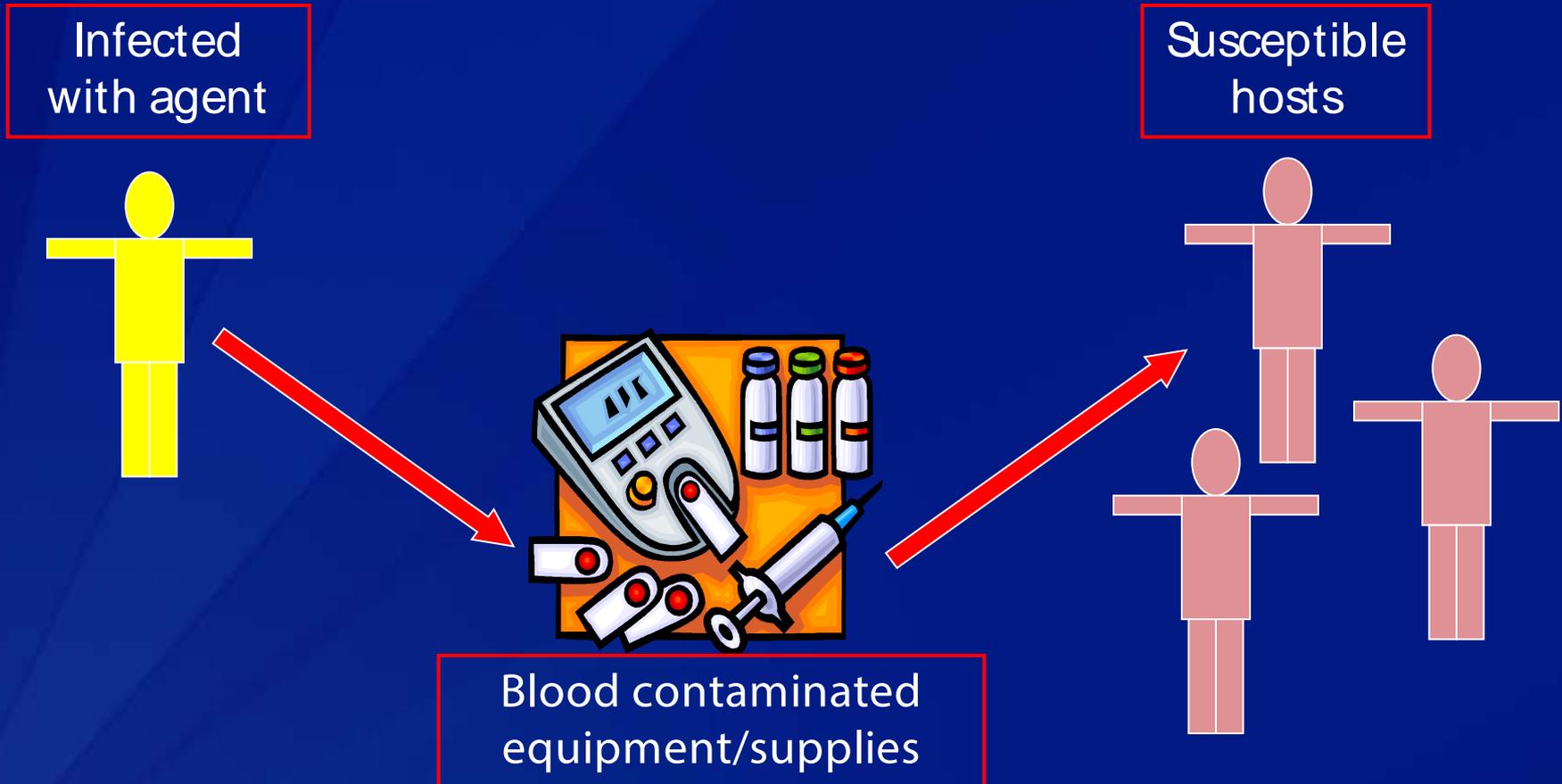
- ❑ Blood glucose monitoring that is performed for one or more persons by either a healthcare provider or other caregiver
- ❑ Typically performed serially for multiple persons
- ❑ Risk of infection transmission (e.g., HBV) if those performing AMBG fail to select the appropriate equipment and follow basic infection control

Indirect contact transmission

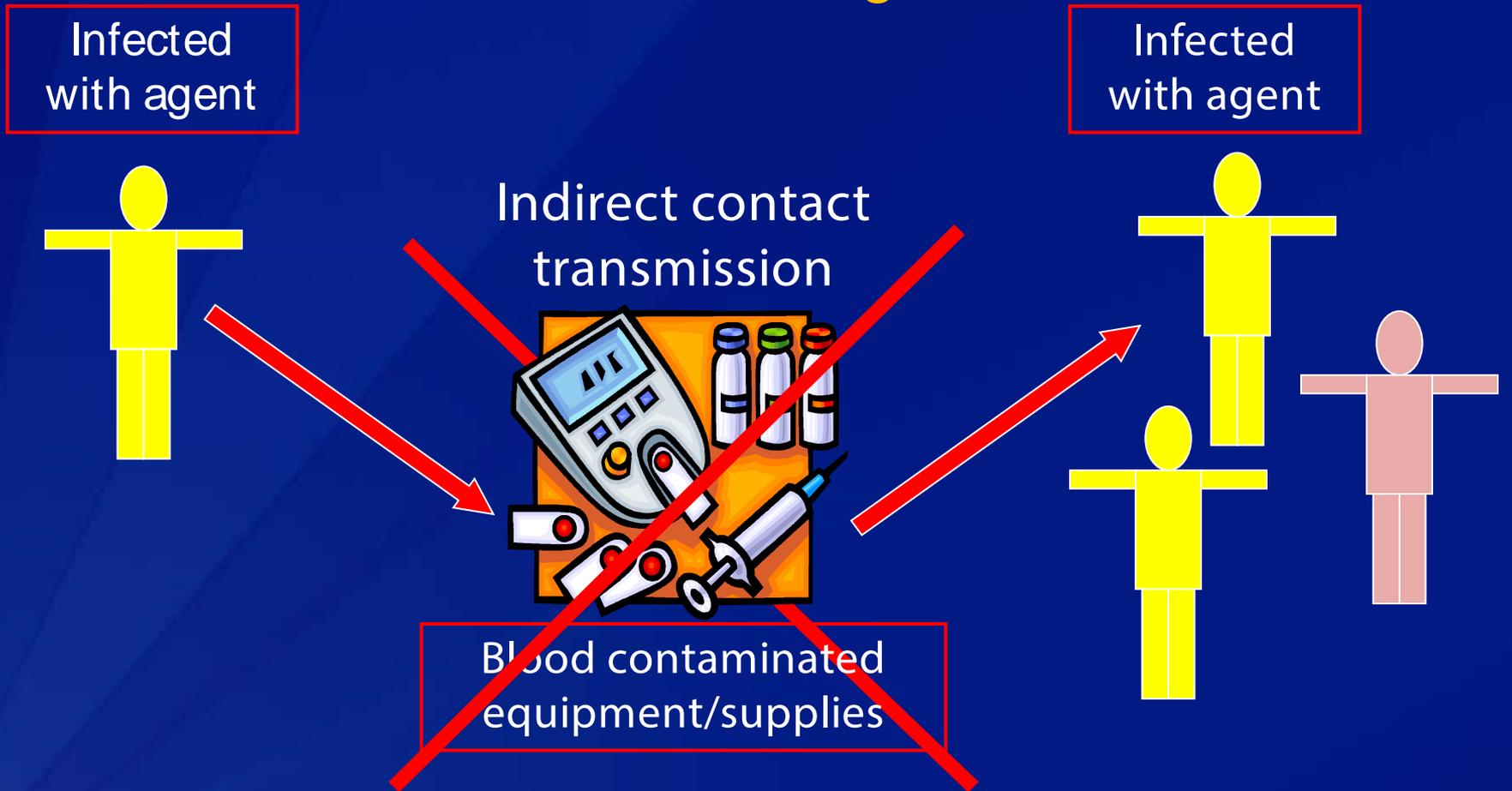
- ❑ The transfer of an infectious agent (e.g., HBV) from one patient to another through
 - A contaminated intermediate object
 - blood glucose meter
 - reusable fingerstick devices
 - Or person
 - healthcare personnel hands

CDC : Preventing transmission of infectious agents in healthcare settings, 2007
<http://www.cdc.gov/hicpac/2007IP/2007isolationPrecautions.html>

Person-to-person transmission of bloodborne viruses (or other pathogens) during blood glucose monitoring



Person-to-person transmission of bloodborne viruses (or other pathogens) during blood glucose monitoring



Indirect transmission of HBV during diabetes care

Stable in environment
for at least 7 days

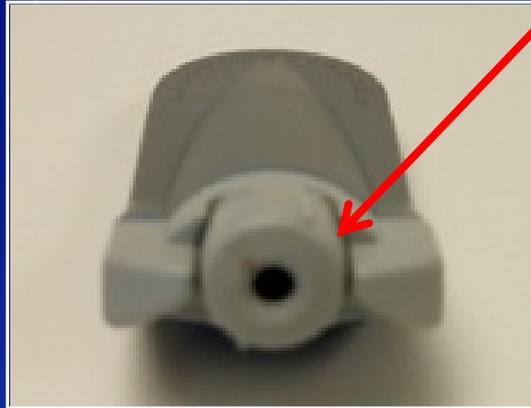
High viral titer: virus
present in absence
of visible blood

Transmission via
contaminated
surfaces/equipment

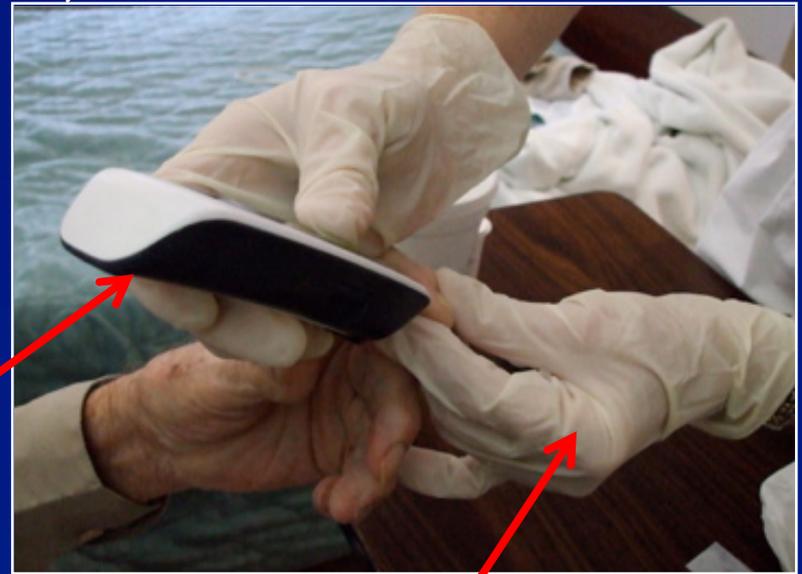
Bond et al. Lancet 1981; 8219:550-1.
Shikata et al. J Infect Dis 1977;136:571-76.

Practices associated with HBV transmission during assisted monitoring of blood glucose

1. Use of reusable fingerstick devices on multiple persons, even if the lancet is changed



2. Failure to clean and disinfect blood glucose testing meters between each use



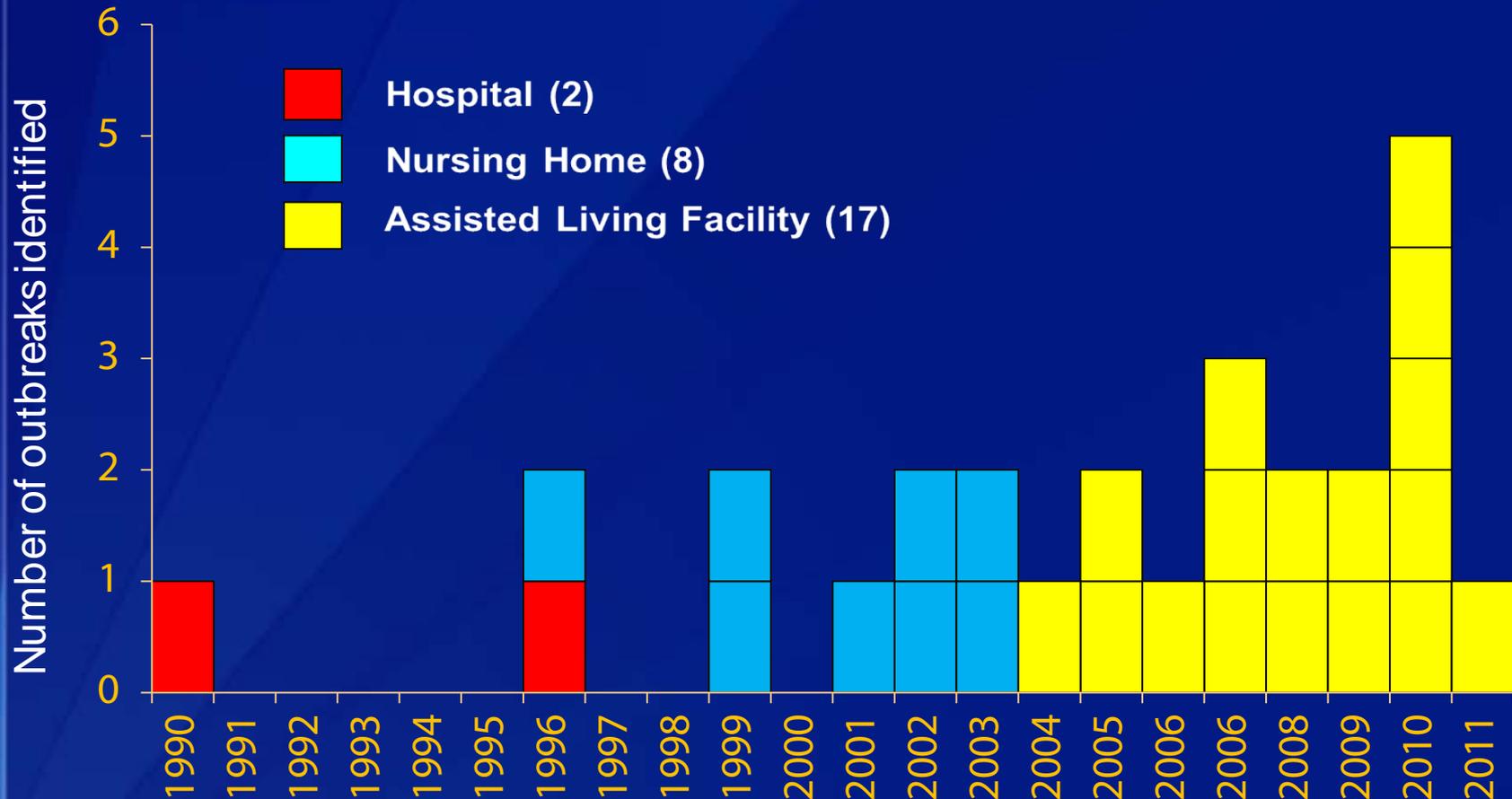
3. Failure to change or use gloves, or perform hand hygiene between procedures

CDC. MMWR 2005;54:220-23.

http://www.cdc.gov/injectionsafety/providers/blood-glucose-monitoring_faqs.htm

HBV infection outbreaks during
assisted monitoring of blood glucose

Outbreaks of HBV infection associated with blood glucose monitoring - 1990 to 2011, US



Thompson *J Diabetes Sci Technol* 2009; 3:283-88. Thompson *JDST* 2011;5:1396-1402.
<http://www.cdc.gov/hepatitis/Outbreaks/HealthcareHepOutbreakTable.htm>

Reported outbreaks: the tip of an iceberg

- ❑ Under-reporting of cases
 - Long incubation period for HBV (up to 6 months)
 - Most (50-70%) infections are asymptomatic
 - Many persons go undiagnosed
- ❑ Under-recognition of healthcare as a risk for viral hepatitis
 - Traditionally, thought to be rare events in the US
- ❑ Older adults have multiple healthcare exposures
 - Identification of a single healthcare encounter as the venue of transmission is difficult
- ❑ Under-investigation of cases
 - Limited resources at health department level
 - Time consuming, expensive (patient notification, screening)

CDC's infection prevention guidelines

- Evidence-based guidelines developed with input from CDC's Healthcare Infection Control Practices Advisory Committee (HICPAC)
 - Standard of care
 - Evidence for provider and surveyor 'checklists'
 - Evidence for federal and state prevention initiatives

www.cdc.gov/HAI/prevent/prevent_pubs.html

Hand hygiene

- ❑ Wear gloves during blood glucose monitoring (or any other procedure that involves potential exposure to blood or body fluids)
- ❑ Change gloves between patient contacts. Change gloves that have touched potentially blood-contaminated objects or fingerstick wounds before touching clean surfaces.
- ❑ Perform hand hygiene immediately after removal of gloves and before touching other medical supplies intended for use on other patients.

Fingerstick devices

- ❑ Fingerstick devices (including lancet and lancet holder devices) should **NEVER** be used for more than one person



- ❑ Facilities should select and use single-use, auto-disabling lanceting devices for each patient



Blood glucose meters

- ❑ Whenever possible, blood glucose meters should be assigned to an individual patient and **NOT** be shared
- ❑ If blood glucose meters must be shared, the device should be cleaned and disinfected after every use, per manufacturer's instructions
 - Select a device intended for use in healthcare settings and capable of withstanding frequent cleaning and disinfection
 - If the manufacturer does not specify how the device should be cleaned and disinfected then it should not be shared

Can the meter REALLY serve as a source of transmission?

YES!

Blood contamination of meters

- ❑ High prevalence of blood contamination of meters¹
 - Survey of 12 hospitals
 - 609 blood glucose meters tested for presence of hemoglobin
 - 30.2% (range 0 - 60.6%) meters had blood contamination
 - 31.4% for on-meter vs. 26.6% for off-meter test strip dosing

- ❑ HBV demonstrated to remain infectious in dried blood on environmental surfaces for at least 7 days²

- ❑ High number of opportunities to transmit infections³
 - 31-day period in 214 bed hospital
 - 11,665 point-of-care glucose tests performed using 38 meters on 803 patients
 - 80% of tests performed sequentially on different patients – 9,310 opportunities for transmission

1. Louis et al. Point of Care 2005;4:158-163; 2. Bond et al. Lancet 1981;1:550-1; 3. Hellinger et al. AJIC 2011

Shared meters can serve as vectors for transmission

- ❑ Device comes into direct or close contact with the patient's fingerstick wound
 - Subsequent patients exposed to blood when meter is used on them
- ❑ Blood transferred to/from meter via hands of healthcare personnel



Photo courtesy of the Statewide Program for Infection Control and Epidemiology (SPICE) at the University of North Carolina

What about risks from other point-of-care devices?

- ❑ CDC infection prevention guidance extends to additional equipment that can pose similar risk to patients

4. Point-of-Care Testing (e.g., blood glucose meters, INR monitor)	Practice Performed	If answer is No, document plan for remediation
a. New single-use, auto-disabling lancing device is used for each patient <i>(Note: Lancet holder devices are not suitable for multi-patient use.)</i>	Yes No	
b. If used for more than one patient, the point-of-care testing meter is cleaned and disinfected after every use according to manufacturer's instructions <i>(Note: If the manufacturer does not provide instructions for cleaning and disinfection, then the testing meter should not be used for >1 patient.)</i>	Yes No	

<http://www.cdc.gov/HAI/settings/outpatient/outpatient-settings.html>

Summary

- ❑ Shared use of blood contaminated point-of-care testing equipment increases risk of exposure to serious infections
- ❑ Large number of Hepatitis B virus infection outbreaks associated with assisted monitoring of blood glucose
- ❑ Need for basic infection prevention practices no matter where assisted monitoring of blood glucose is performed

CDC infection prevention resources

- Infection Prevention during Blood Glucose Monitoring and Insulin Administration

<http://www.cdc.gov/injectionsafety/blood-glucose-monitoring.html>

- FAQs regarding AMBG and Insulin Administration

http://www.cdc.gov/injectionsafety/providers/blood-glucose-monitoring_faqs.html

- Infection prevention guidelines for healthcare settings

http://www.cdc.gov/HAI/prevent/prevent_pubs.html

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Thank you