

**Institute of Liver & Biliary Sciences**

**A Deemed to be University**

*Dedicated to Excellence in Patient Care,  
Teaching & Research in Liver & Biliary  
Diseases*



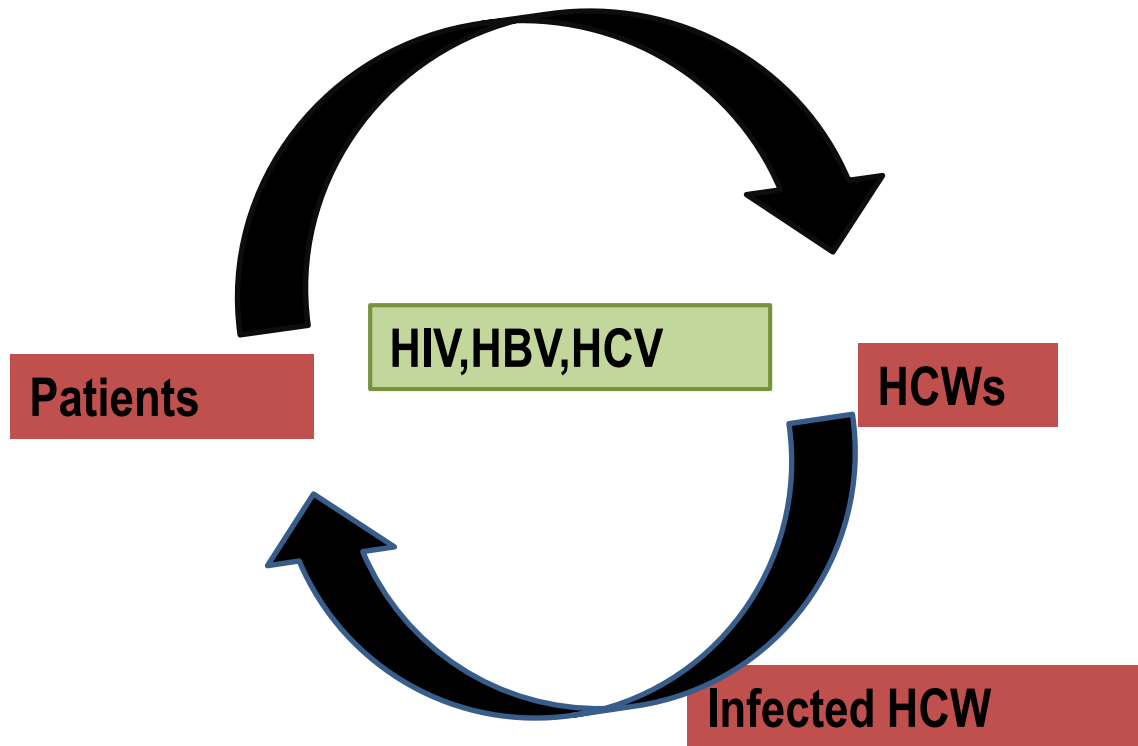
**New Delhi, India**  
**[www.ilbs.in](http://www.ilbs.in)**

# **Health Care workers Safety Blood borne Viruses**

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# HCW and BBVs



## Health care worker Safety

1. Prevention from infection ( pre exposure and post exposure).
2. Management of infection : screening ,care and treatment.

# Pre exposure prevention

- Universal work precautions.
- Safe disposal of sharps.
- Prevention from Needle stick injuries
- HBV vaccination.



# UWP : awareness but poor compliance

	Doctors (%)	Nurses (%)	Total (95% CI)	P value
UPs effective	100	84	92 (84.8–96.5)	0.006*
UPs categorize all body fluids as infective	100	86	93 (86.1–97.1)	0.012*
Masks required for protection from splash	100	80	90 (82.4–95.1)	0.001*
Eye protection required for protection from splash	100	74	87 (78.8–92.9)	0.000*
Perceive own risk of HIV as high	40	66	53 (42.7–63.1)	0.016*
Perceive own risk of HCV as high	50	44	47 (36.9–57.2)	0.717
UPs required only if patient is HIV positive	0	42	21 (13.5–30.3)	0.000*
Mandatory routine testing of all patients undergoing surgery	80	84	82 (73.1–88.9)	0.795
Reporting splashes and NSIs	86	36	61 (50.7–70.1)	0.000*
Ensure self-protection regardless of patient diagnosis	70	74	72 (62.1–80.5)	0.757
Always putting needles in sharps containers	90	82	86 (77.6–92.1)	0.014*

Category	Use of gloves (%)	Hand washing (%)	Use of apron (%)	Use of eye protect (%)	Use of mask (%)	No needle recap (%)	Correct disposal (%)	Wiping spills (%)	Cover broken skin (%)
	Always	Always	Always	Always	Always	Always	Always	Always	Always
Doctors	90	40	50	0	60	60	90	40	50
Nurses	80	64	20	0	48	38	88	74	62
Total (95% CI)	85 (76.5–91.4)	52 (41.8–62.1)	35 (25.7–45.2)	0	54 (43.7–64.0)	49 (38.9–59.2)	89 (81.2–94.4)	57 (46.7–66.9)	56 (45.7–65.9)
P value	0.161	0.011*	0.005*		0.469	0.000*	0.004*	0.003*	0.452

- Training (initial and periodic).
- Adequate supply of PPE.
- Provision of hepatitis B vaccination.
- Development of appropriate infection control and injury surveillance programs.
- Institutional policy for HCWs safety

# Definition

A **needlestick injury, percutaneous injury** is the penetration of skin by a needle or other sharp object, which was in contact with blood, tissue, or other body fluid before the exposure.

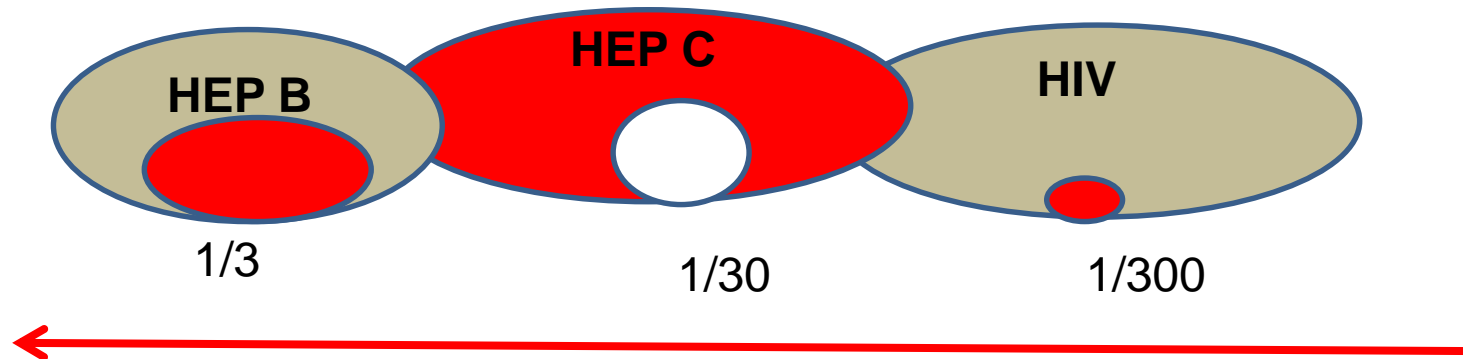
# Needle stick injuries & HCWs

- HCWs are at a high risk of exposure to blood borne pathogens.
- **HBV, HCV & HIV** are the three most common BBVs associated.
- Globally 3 million NSI in HCWs : 37% HBV,39% HCV & 5% HIV new infections.
- Risk of transmission is directly related to work place and practices.
- **Surgeons, emergency doctors and laboratory professionals** have been identified as having the highest risk of exposure.

# Risk of transmission

**HBV > HCV > HIV**

Virus	Range	Minimal blood
HBV	22-31% (HBeAg positive)	0.0004 ml
HBV	1-6%(HBeAg negative)	-
HCV	0-7%	-
HIV	0.3-0.4%	0.1 ml





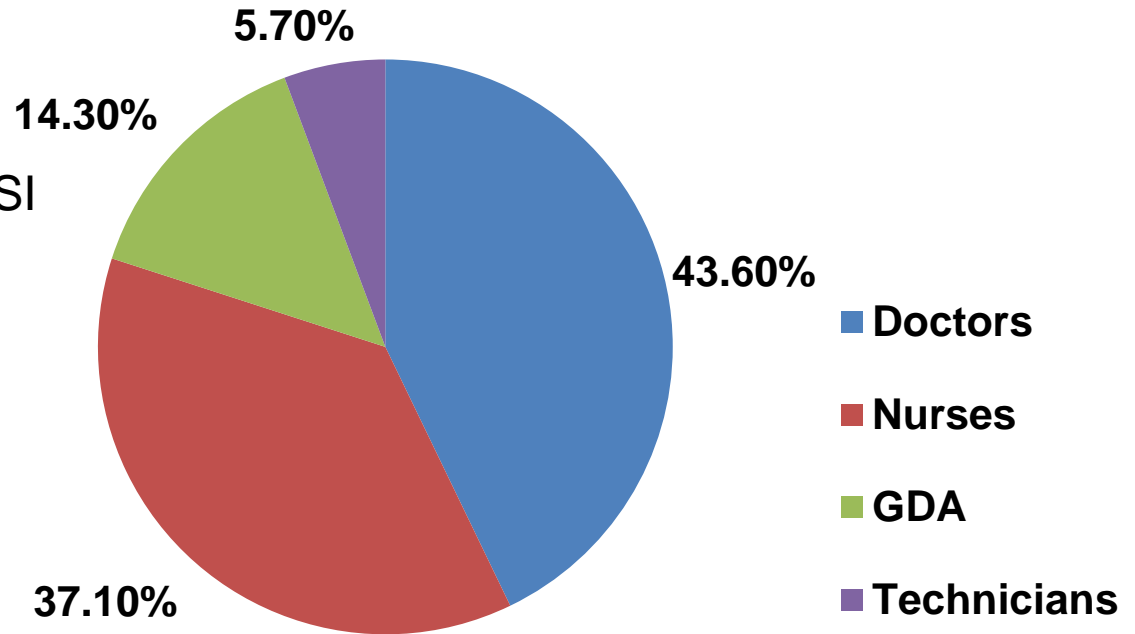
# Potentially infectious body fluids

Exposure to body fluids considered ' <i>at risk</i> '	Exposure to body fluids considered ' <i>not at risk</i> '	<i>unless contain visible blood</i>
Blood	Tear	
Semen	Sweat	
Vaginal secretions	Urine / Faeces	
CSF	Saliva	
Synovial, Pleural, Pericardial, Peritoneal fluid	Sputum	
Amniotic fluid	Vomit	

# NSI in HCWs in India: a significant problem

Place	Sample size	Incidence of NSI(%)	Distribution among HCWs(%)
New Delhi	428	80.1	Doctors 42.7 Nurses 49
Karnataka	441	57	Nurses 81, medical students:13.3
Karnataka	361	47.1	Interns 55,nurses 45.7
Maharashtra	220	49	Nurses 50 Doctors 24
ILBS Study	876	11.7	Doctors 43.6 23.3 Nurses

# ILBS data: Incidence of NSI



In last 10 years :148 reported NSI

HBV:37

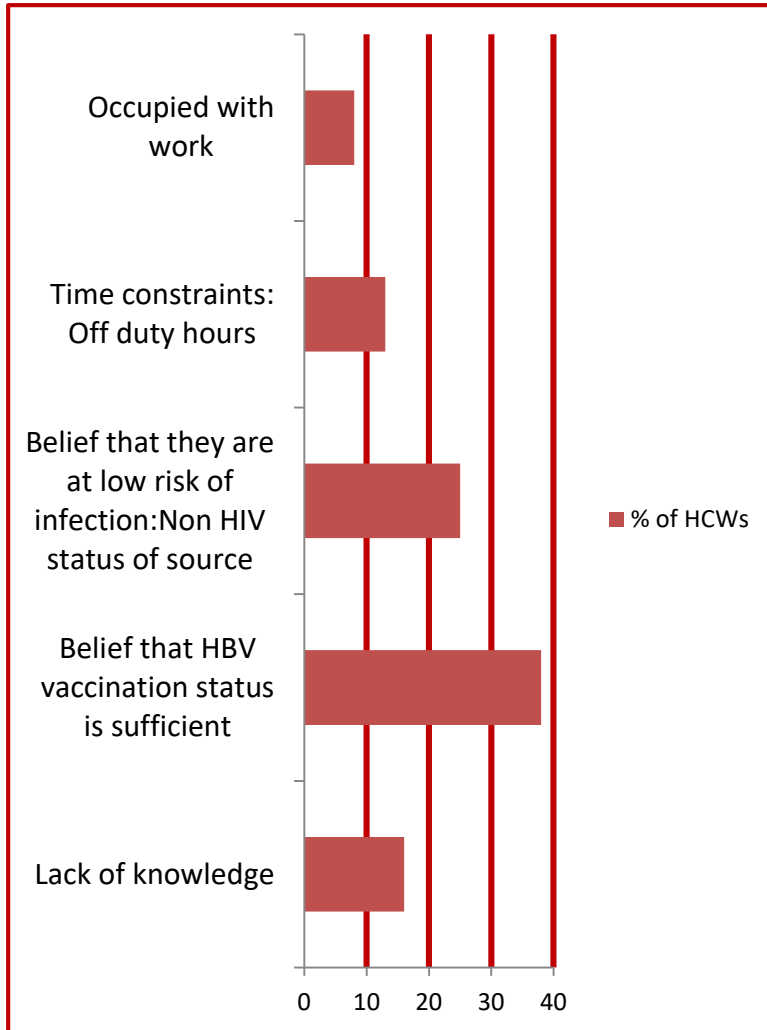
HCV:22

**Maximum exposure (43.6%) in Doctors**

**Mostly due to recapping**



# Possible reasons for non-reporting among HCWs experiencing NSI



Measure	NSI in HCWs n = 103 (%)	OR	95% CI
Access to SED	37(36.8)	0.41	0.21–0.73
Access to PPE	76(73.7)	0.83	0.49–2.74
Awareness of UWP	46(44.6)	0.63	0.38–1.05
Adherence to infection control policy	64(62.1)	0.72	0.36–2.03
Training in injection safety and appropriate work practices	83(78.3)	0.87	0.46–1.53
>10 Years of experience of HCW	36(34.9)	0.23	0.02–0.71
Available written protocol for prompt reporting of NSI	87(45.5)	0.92	0.48–2.96

ILBS data, under publication



# Management of NSI

- Do not panic
- Encourage bleeding from the skin wound and wash injured area under running water with soap, DO NOT squeeze. (Do not use antiseptics).
- Report and document.
- Assess: **exposure** and status of **source**.

# Blood testing required

- **Patient [Source]** - HBsAg
  - Anti-HCV
  - Anti-HIV 1&2
  
- **HCW [Exposed]** - HBsAg
  - Anti-HCV
  - Anti-HIV 1&2 [HIV 1&2 Ag-Ab]
  - Anti-HBs (titers)

***As early as possible ,if reports more than 15 days old  
do fresh tests***

# CATEGORIES OF EXPOSURES

CATEGORY	DEFINITION & EXAMPLE
<b>MILD EXPOSURE</b>	Mucus membrane/ non-intact skin with small volumes E.g. superficial wound with a plain/low calibre needle, or contact with eyes/mucous membranes
<b>MODERATE EXPOSURE</b>	Mucus membrane/ non-intact skin with large volumes OR Percutaneous superficial exposure with solid needle E.g. cut/ NSI penetrating gloves
<b>SEVERE EXPOSURE</b>	Percutaneous with large volume E.g. Accident with high calibre needle (>18 G) visibly contaminated with blood, deep wound, transmission of significant volume of blood, NSI with material previously used intravenously/intra-arterially

**If source is HIV positive.....**

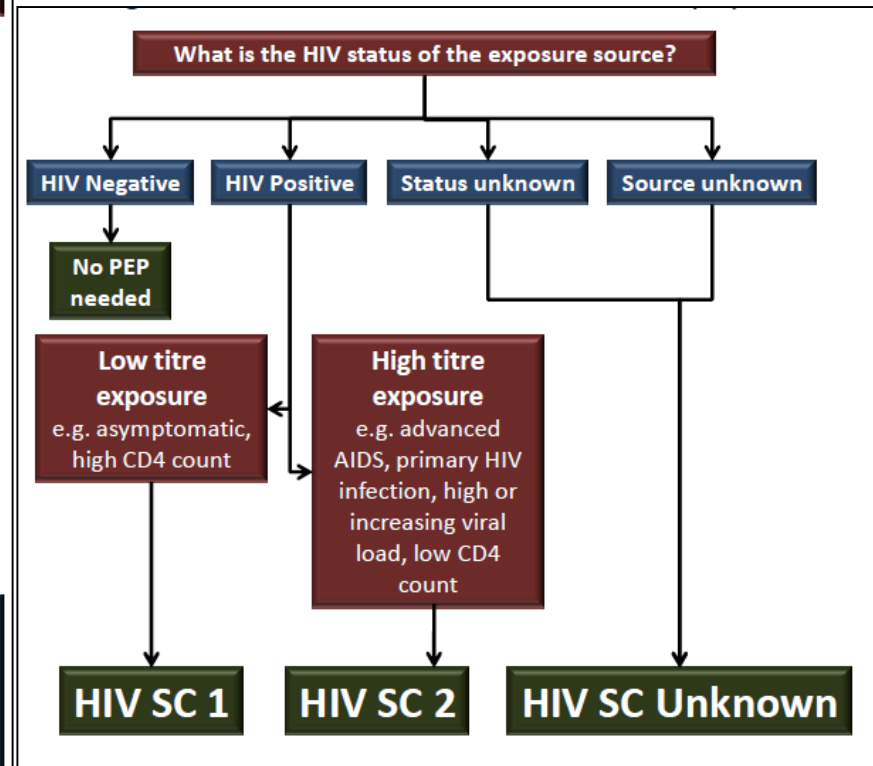
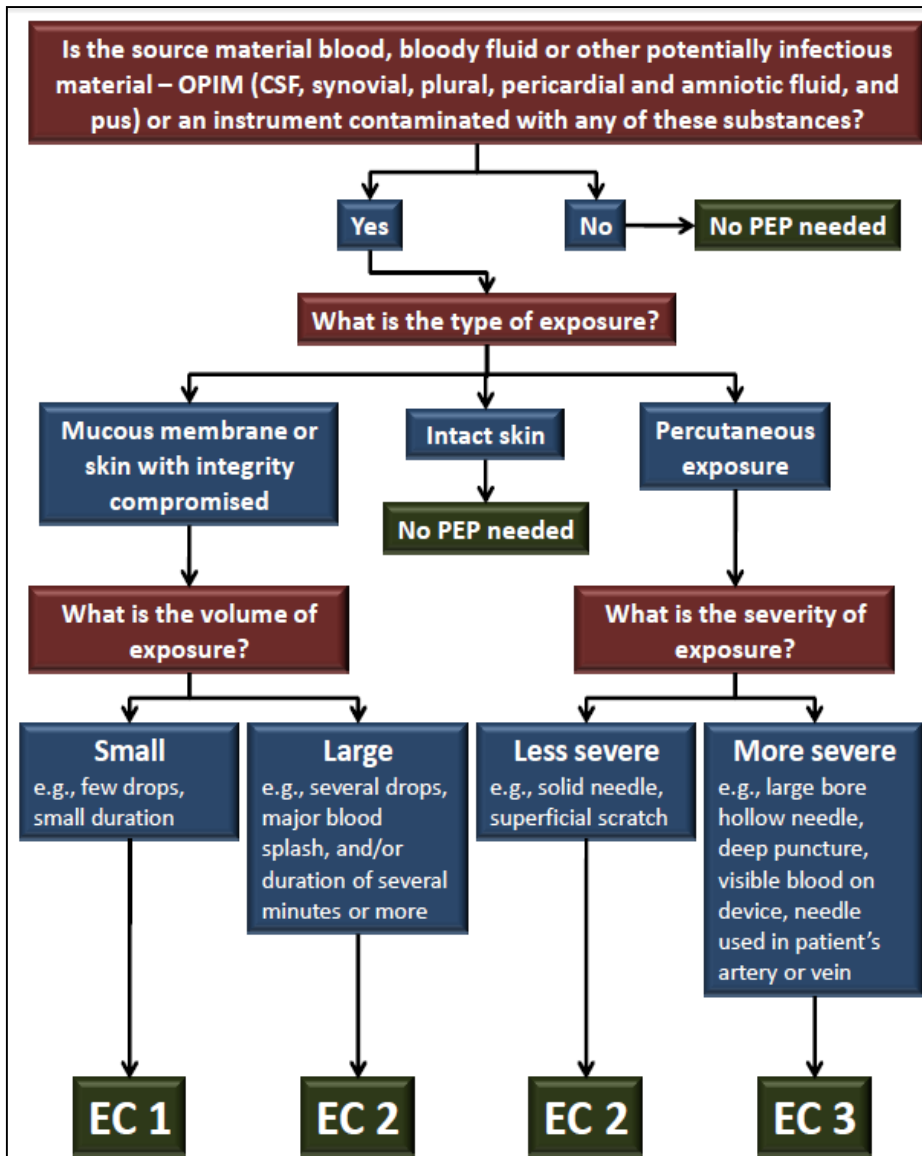




- In case the source is HIV positive (or, unknown source status)
- Ideally, prophylaxis should begin **within 2hrs** of exposure or within 72hrs.
- Informed consent & counseling.

**2 hrs -72 hrs are crucial**

# Determine EC and SC



# PEP in occupational exposure of HIV

Exposure Code	Source Code	Recommendation for PEP	Duration
1	1	Not warranted	
1	2	Recommended PEP	PEP is recommended for 28 Days
2	1		
2	2		
3	1 or 2		
2/3	Unknown	Consider PEP if HIV prevalence is high in given population and risk categorization	28 days

Dosages of the drugs for PEP for adults	Recommendation for PEP	Duration
Tenofovir (TDF) 300 mg + Lamivudine(3TC) 300 mg One Tab (FDC) once daily (1-OD)	One tab Immediately within 2 hours of accidental exposure, either at day time or at night time	Next day one tab once OD, continue for 4 weeks
Lopinavir (200 mg) + Ritonavir (50 mg) Two Tab (FDC) twice daily (2-BD)	Two Tab Immediately within 2 hours of accidental exposure, either at day time or at night time	Next day two-tab BD, continue for 4 weeks

**If source is HBV positive....**

# PEP for HBV

HCP status	Postexposure testing		Postexposure prophylaxis		Postvaccination serologic testing
	Source patient (HBsAg)	HCP testing (anti-HBs)	HBIG	Vaccination	
Documented responder after complete series			No action needed		
Documented nonresponder after two complete series	Positive/unknown	—*	HBIG x2 separated by 1 month	—	N/A
	Negative		No action needed		
Response unknown after complete series	Positive/unknown	<10 mIU/mL	HBIG x1	Initiate revaccination	Yes
	Negative	<10 mIU/mL	None	Initiate revaccination	Yes
	Any result	≥10 mIU/mL	No action needed		
Unvaccinated/incompletely vaccinated or vaccine refusers	Positive/unknown	—	HBIG x1	Complete vaccination	Yes
	Negative	—	None	Complete vaccination	Yes

**HCW: should have a documented proof of immunity.**

Adequate anti-HBs is  $\geq 10$  mIU .

Effectiveness of HBIG when administered >7 days after exposure is unknown.

# Monitoring and follow up

- Baseline testing of exposed HCW for HBs Ag, anti HBs and *HB c Total (optional)*.
- **Remember not to test after vaccination or HBIG.**
- HBV vaccine and HBIG to be administered at different anatomical sites.
- For HCW < 10 titre, following exposure from HBsAg positive : follow up test for HBsAg, HBcTotal at 6 months.

# HBV vaccination status in HCWs India

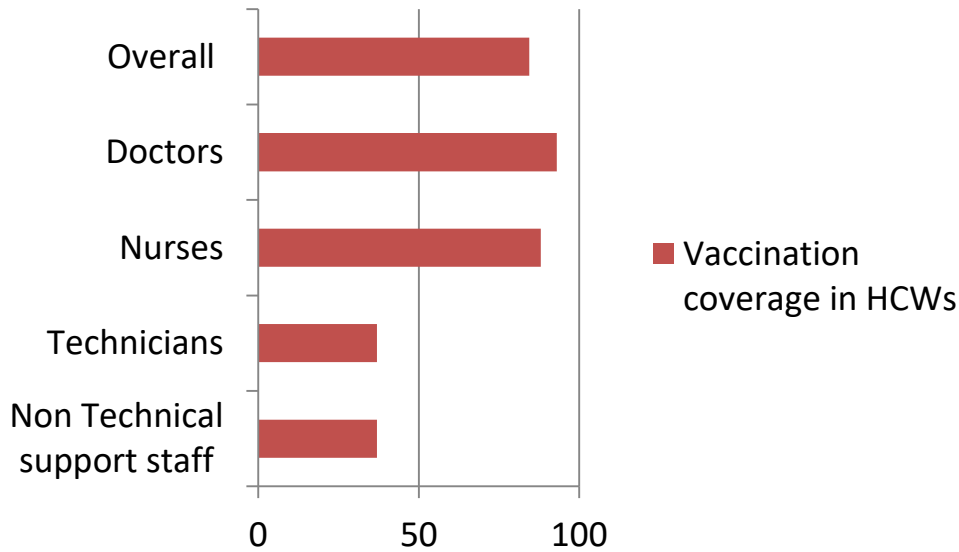
Region, Institute/s	Study size	HBsAg	Anti HCV	Complete Vaccination history	Anti HBs titer (> 10 m IU/ml)
New Delhi, ILBS,UCMS,GB Pant	850	1.1%	0.3%	78.2%	80.8%
New Delhi, GB Pant	2162	1%	0	55.4%	61.7%
New Delhi MAMC (Microbiology lab)	72	1.3%	0	47.3%	73.5%
Chandigarh, PGI	3556	1.7%	0	-	-
Shimla, Indra Gandhi Memorial College	200	5%	0	-	-
New Delhi, AIIMS	446	0.4%	0	56.5%	79%
<b>ILBS data</b>	<b>876</b>	<b>0.2%</b>	<b>0</b>	<b>84.4%</b>	<b>63.6%</b>

Lack of National Guidelines/Institutional policy for HBV vaccination

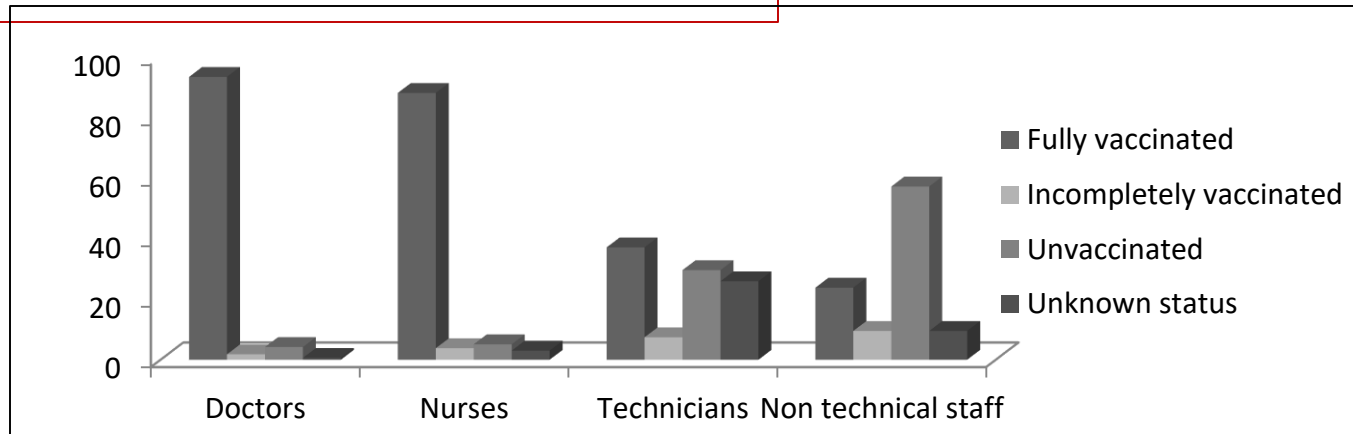


# ILBS data :HCW HBV vaccination

Vaccination coverage in HCWs

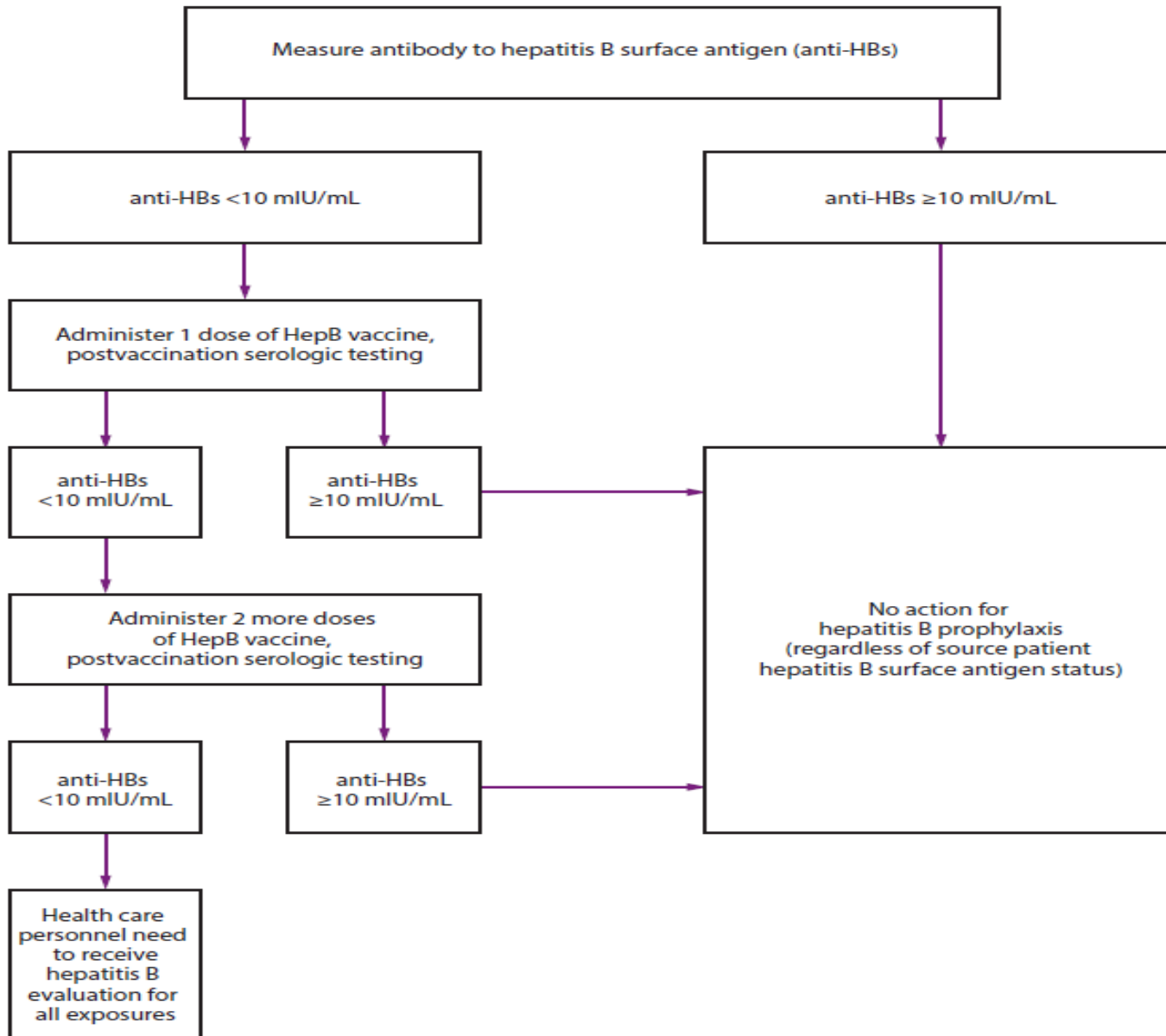


	Knowledge			Attitude	Practice
	HIV	HCV	HBV		
Nurses	66%	58%	66%	72%	86%
GDA	65%	53%	41%	51%	73%
Lab. Tech (n=29)	75%	70%	77%	68%	84%





# Pre-exposure evaluation for HCW previously vaccinated with complete, $\geq 3$ -dose Hep B vaccine



# HBV vaccination : Interrupted Schedules

- Do not restart the vaccine series.
- If the series is interrupted after the first dose, give 2<sup>nd</sup> and 3<sup>rd</sup> dose separated by an interval of at least 8 weeks.
- If only the 3<sup>rd</sup> dose has been delayed, it should be administered as soon as possible.
- Anti HBs titer can come > 10 after Inadequate doses or doses received with shorter-than-recommended dosing interval, they are associated with less robust antibody response.
- Complete the vaccination series, using the correct dosage or schedule.

**If source is HCV positive....**



# HCV post exposure prophylaxis

No PEP only monitoring

Baseline test of HCW recommended:

HCV RNA can be done as early as 15 days.

Anti-HCV antibodies by 6 -8 weeks.

Follow up anti-HCV at 6 months.

**Symptoms of a viral illness compatible with acute HCV at any point up to 6 months post-exposure should prompt immediate evaluation.**

# PEP with DAA

- PEP of HCV with DAA is not recommended.
- ✓ Reason is :
  - ✓ If HCV occurs post exposure ,treat it like acute HCV.
  - ✓ Lack of understanding of the pathogenesis of early HCV infections.
  - ✓ Lack of evidence that universal PEP is cost effective.
  - ✓ Lack of evidence that infection can be prevented as DAA targets post entry processes.

# Turning the table : if HCW is infected

# If HCW is infected with HIV/HBV /HCV

	SHEA ,2010	CDC ,2012	UK ,2014
HIV viral load	HIV $\geq 5 \times 10^2$ copies/ml: Restrict conducting EPP	Any VL restrict conducting EPP	Viral load >1000 copies/ml: Restrict conducting EPP
HBV /HCV viral load	<2000 IU/mL	<1000 IU/mL	<2000 IU/mL
HBeAg	Not required to be negative	Not required to be negative	required to be negative
Frequency of testing	Twice yearly	Quarterly	Quarterly
Disclosure to patient	NA	NA	NA
Disclosure to Expert panel	Yes	Yes	Yes

**No guidelines in India, no mandatory testing of HCW s**

# Exposure prone procedures (EPP)

**Those invasive procedures where there is a risk that injury to the worker may result in exposure of the patient's open tissues to the blood of the worker.**

These procedures include those where the worker's gloved hands may be in contact with sharp instruments, needle tips or sharp tissues (e.g. spicules of bone or teeth) inside a patient's confined anatomical space where the hands or fingertips may not be completely visible at all times, like open body cavity.

- Most forms of major surgery, including general, orthopedic, neurosurgery, Obstetrical and gynecologic surgery, including cesarean section, vaginal deliveries, forceps delivery etc.
- Episiotomy and any procedure involving hand-guided sharps
- Transplant surgery (except skin and corneal transplantation)



# Summary

- HCWs need to be aware about the possible risks of acquiring infection from these BBVs.
- Prevention is better: UWP, HBV vaccination and know your immune status by testing for anti HBs.
- Following exposure **do not panic**: report and get proper step wise management.
- Need for the formation of National guidelines for HCW safety and in case HCW is infected then management .



## ALL ABOUT NEEDLE STICK INJURIES



### All About Needle Stick Injuries

Needlestick and Sharp Injuries (NSIs) are accidental skin penetrating wounds caused by sharp instruments in a medical setting.



### Upcoming Trainings

NSI will conduct trainings on Prevention of Needle Stick Injuries, Training Schedules will get updated time to time on our website. Click here to see the upcoming trainings



### Report An Incident

If you have been affected with a Needle Stick Injury, please report here and our team of experts will revert in 24 hours.

**Website : [nsi.ilbs.in](http://nsi.ilbs.in)**

**Email: [nsi@ilbs.in](mailto:nsi@ilbs.in)**

**THANK YOU!**

