

# Protection from Highly Contagious Disease in the ICU

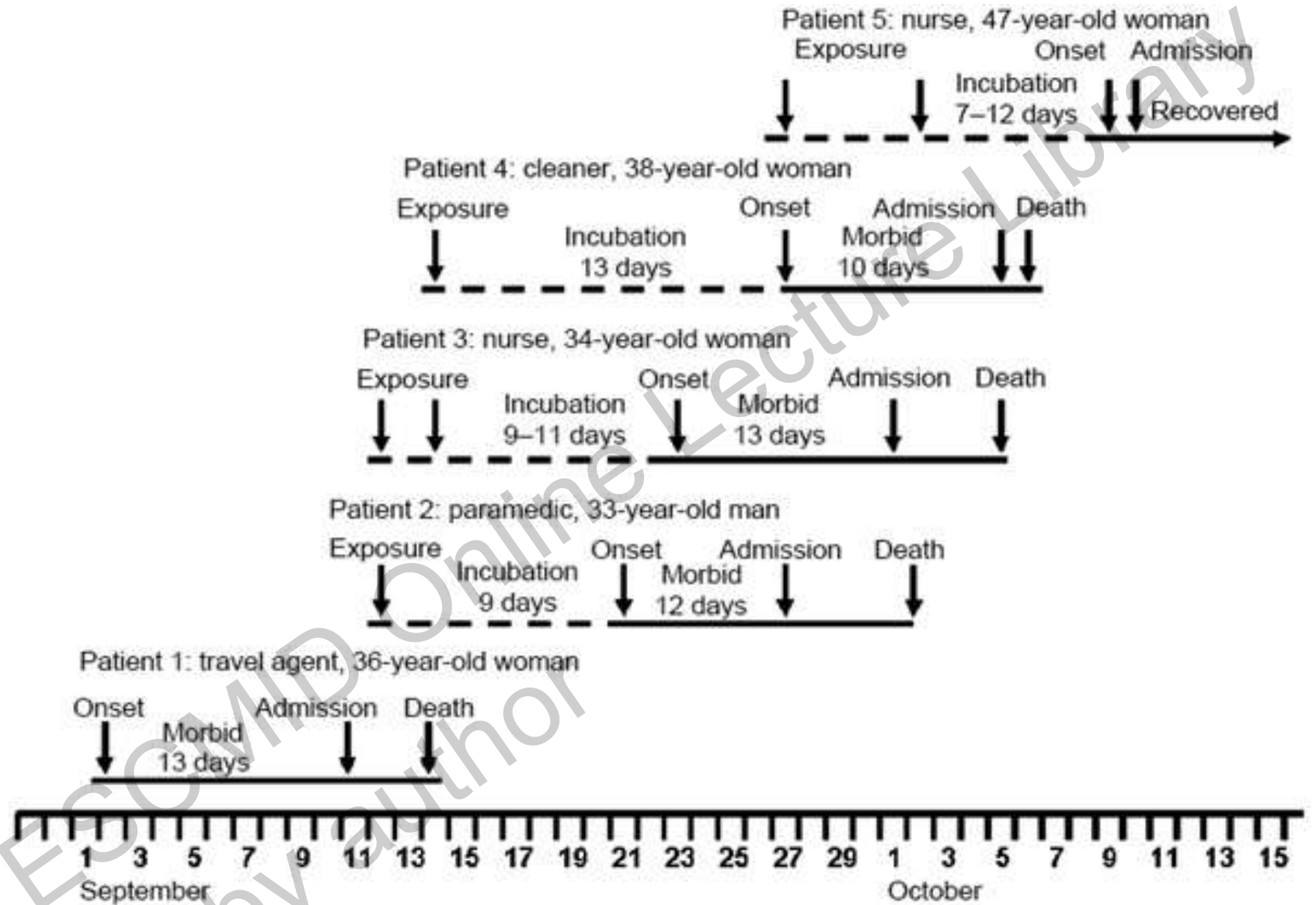
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# What contagious diseases are a threat to ICU patients and workers?

- Ebola
- Other viral hemorrhagic fevers
  - Crimean Congo HF, Marburg, Lassa, Lujo....
- MERS
- Tuberculosis (MDR/XDR)
- Influenza with MRSA (or MSSA)
- Measles
- HIV
- Hepatitis C
- Group A streptococcus
- Respiratory viruses

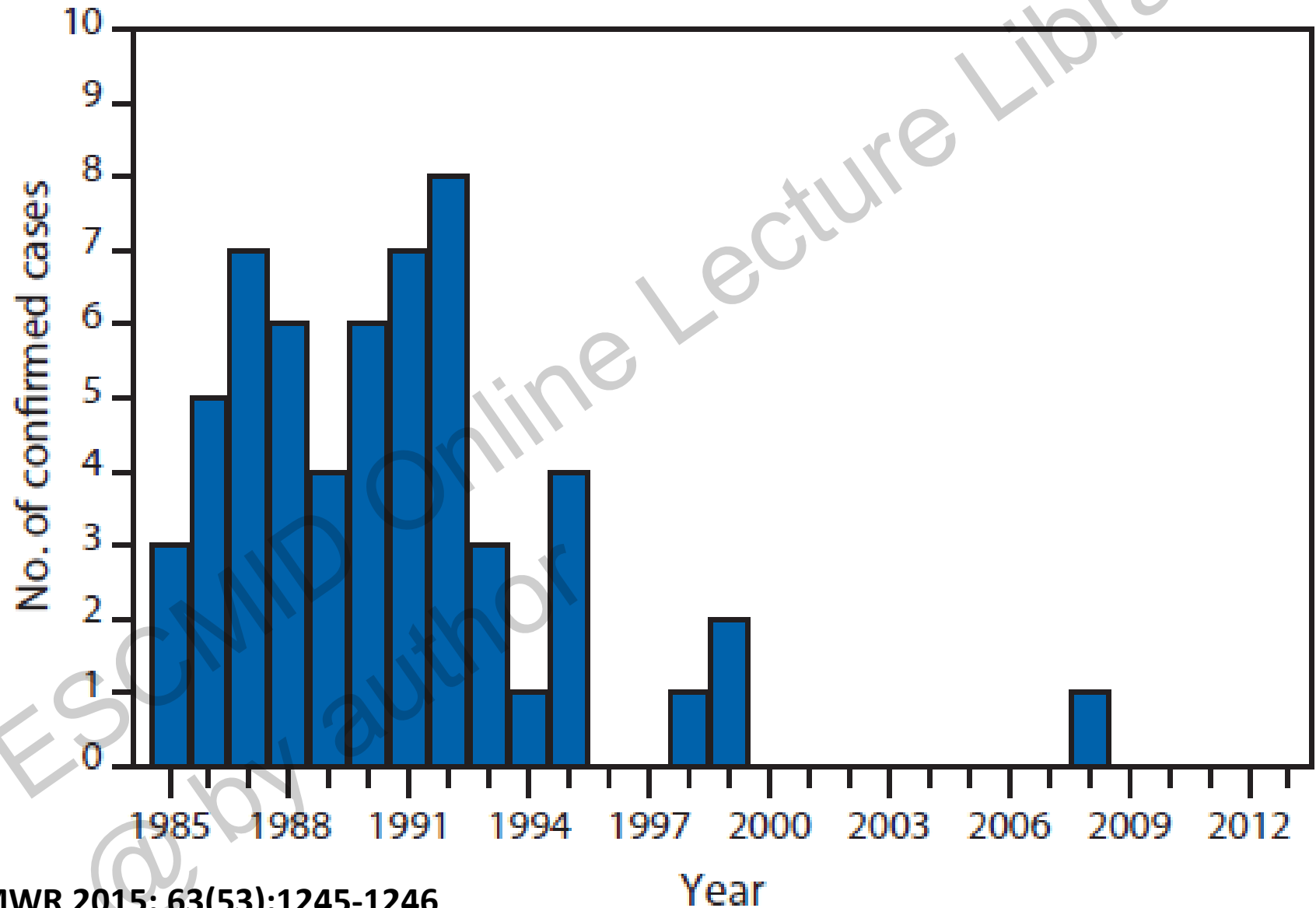


Sewlall NH, Richards G, Duse A, Swanepoel R, Paweska J, et al. (2014) Clinical Features and Patient Management of Lujo Hemorrhagic Fever.

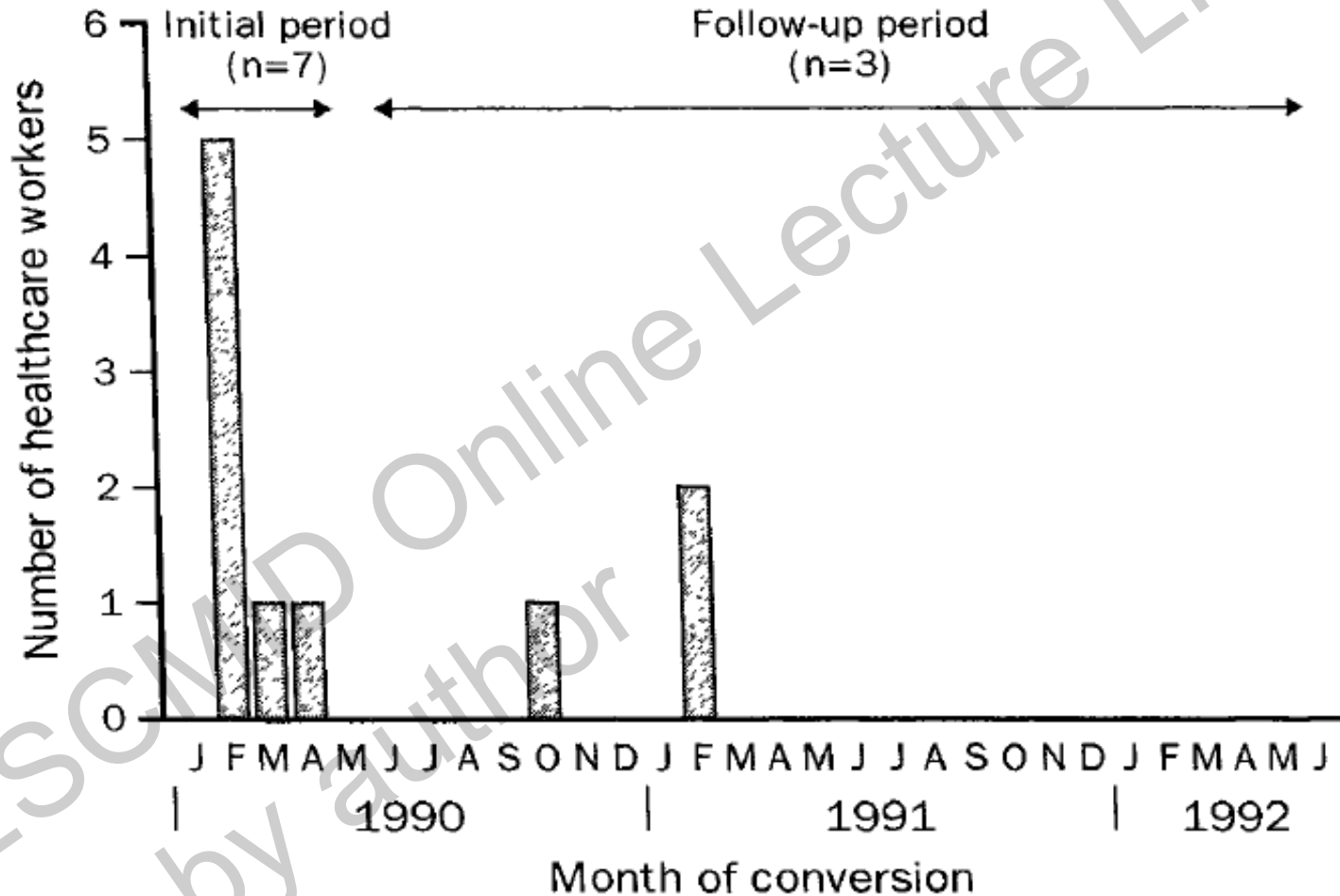
PLoS Negl Trop Dis 8(11): e3233. doi:10.1371/journal.pntd.0003233

<http://127.0.0.1:8081/plosntds/article?id=info:doi/10.1371/journal.pntd.0003233>

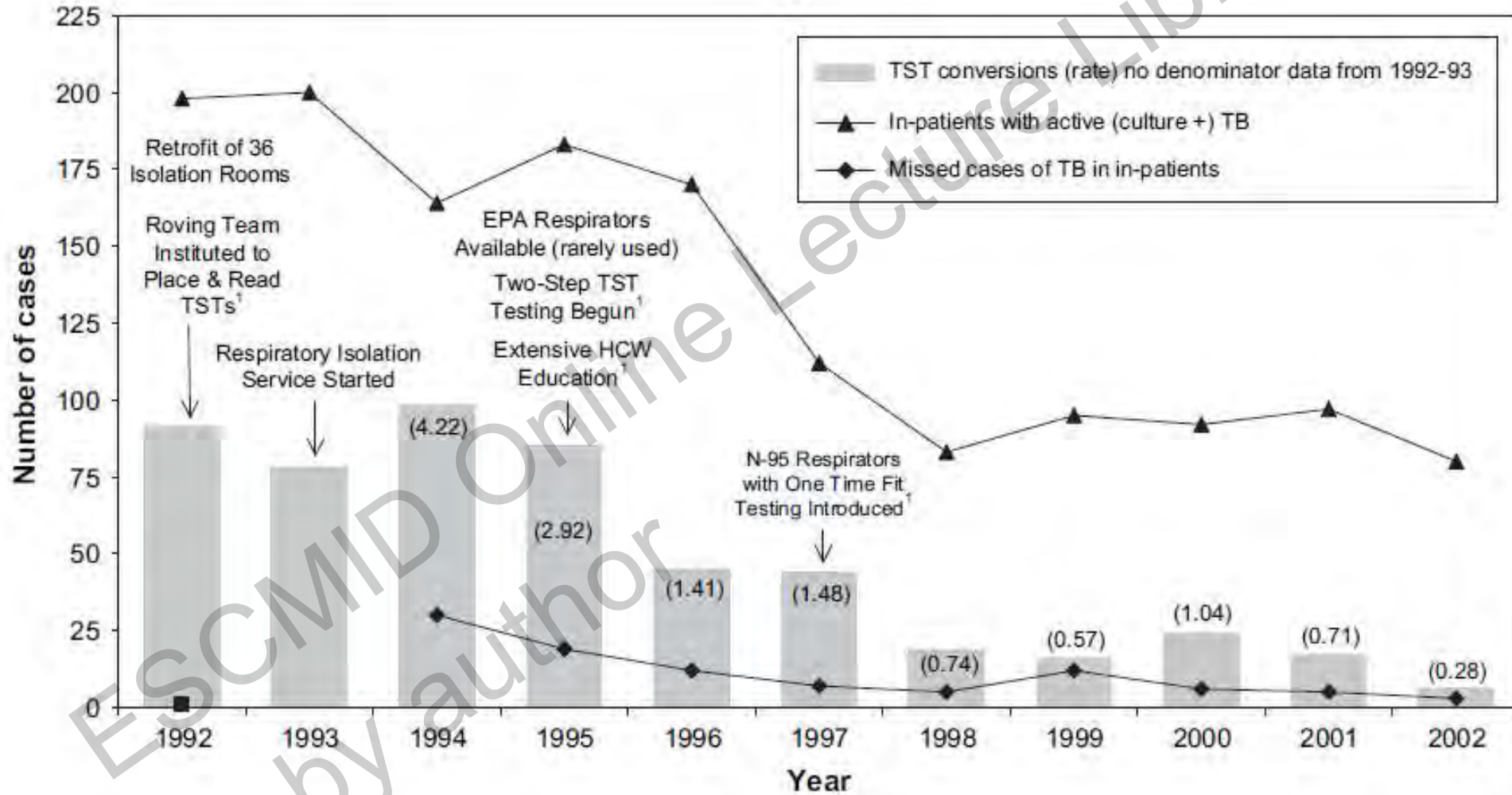
# Occupationally Acquired HIV Infection Among Health Care Workers — United States, 1985–2013



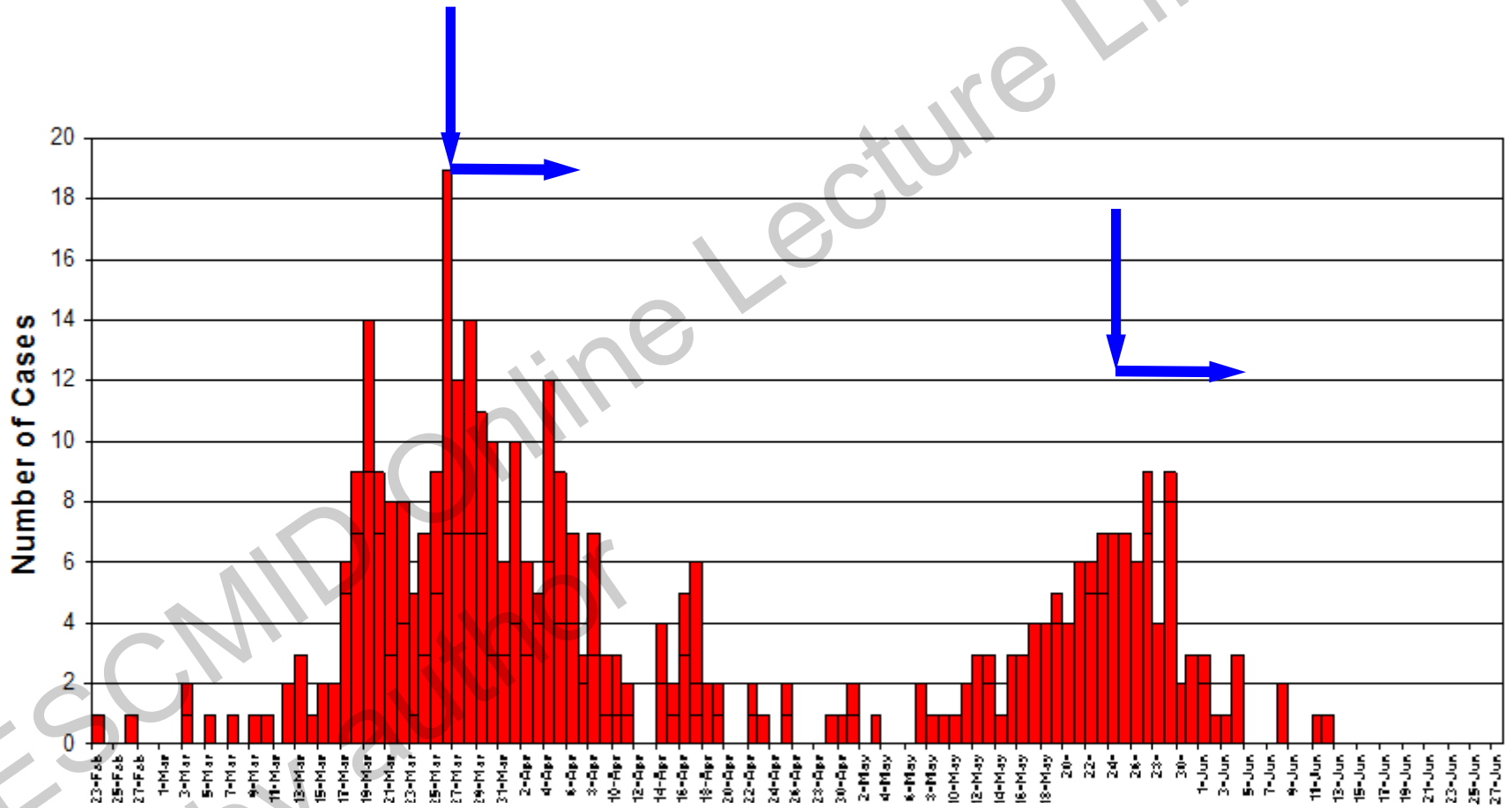
# HCW skin test conversion, HIV ward, USA

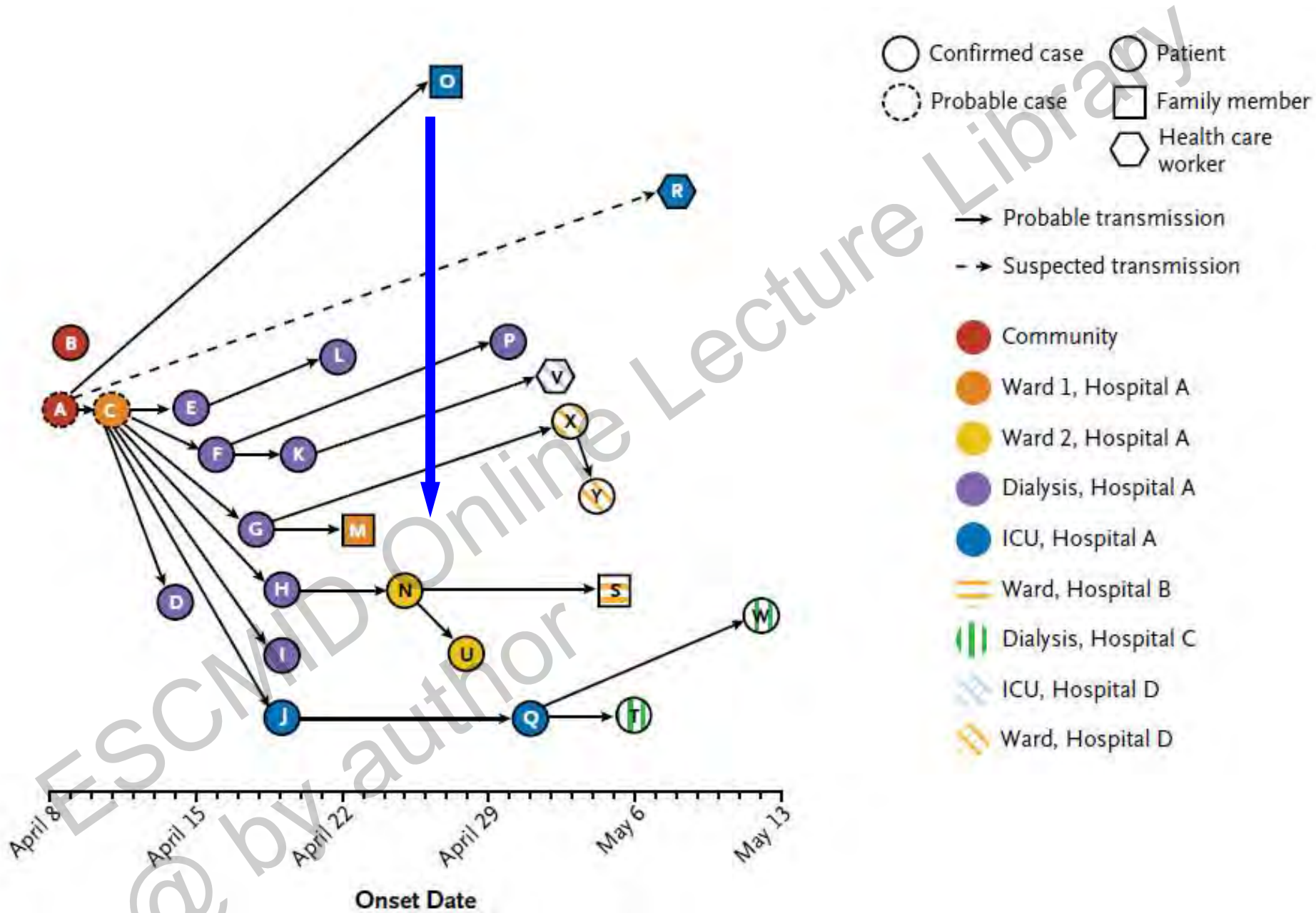


# Interventions to control HCW TB infection, 1992-2002, Cook County hospital



# SARS in Ontario, 2003







# Control of other infections

- SARS outbreak
  - Controlled promptly in all cities/countries
- MERS-CoV outbreaks
  - Controlled when outbreak measures effectively in place
- CCHF – reference hospital in endemic area with 1284 admissions with lab-confirmed CCHF in 10 years – HCW seropositivity=0.57%

# What does it take to protect HCWs and patients?

- Recognition of need
- Multifaceted control program
  - Infrastructure and practice to facilitate response
  - Ensure early recognition and diagnosis
  - Effectively implement additional precautions

# Challenges - I

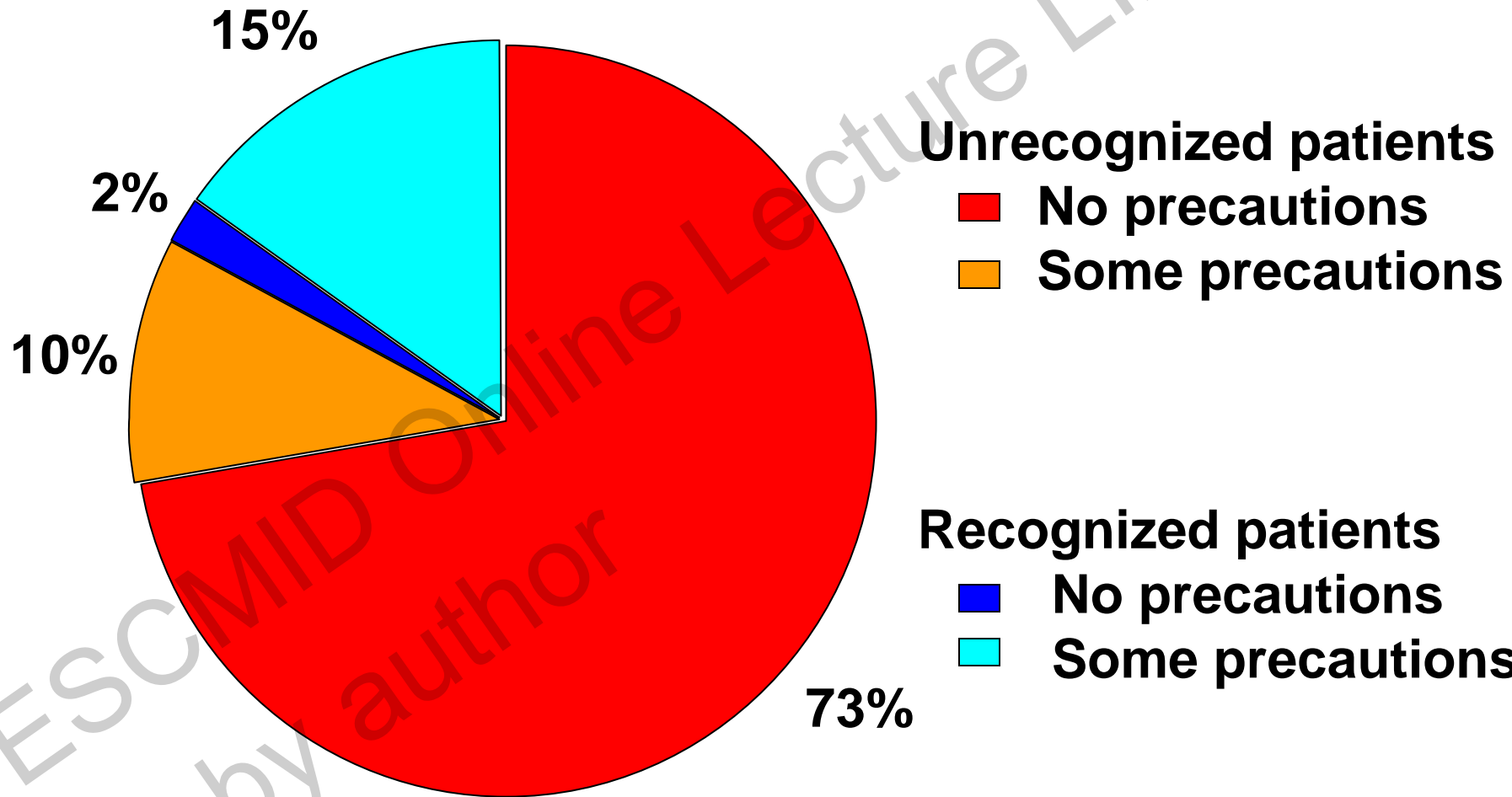
- Infrastructure: administrative and environmental support
  - University referral hospital, Sweden, 2009
    - No routine TB skin testing HCWs, inadequate contact tracing, failure to recommend INH to HCWs
  - Hospital measles outbreak, Sardinia, 2014
    - 80 cases; 44 nosocomial: 15 HCWs + 29 pts/visitors; plus 10 cases in HCW families
    - No recommendations or records of vaccination

# Challenges - II

- Early recognition of cases

# SARS in Toronto, 2003

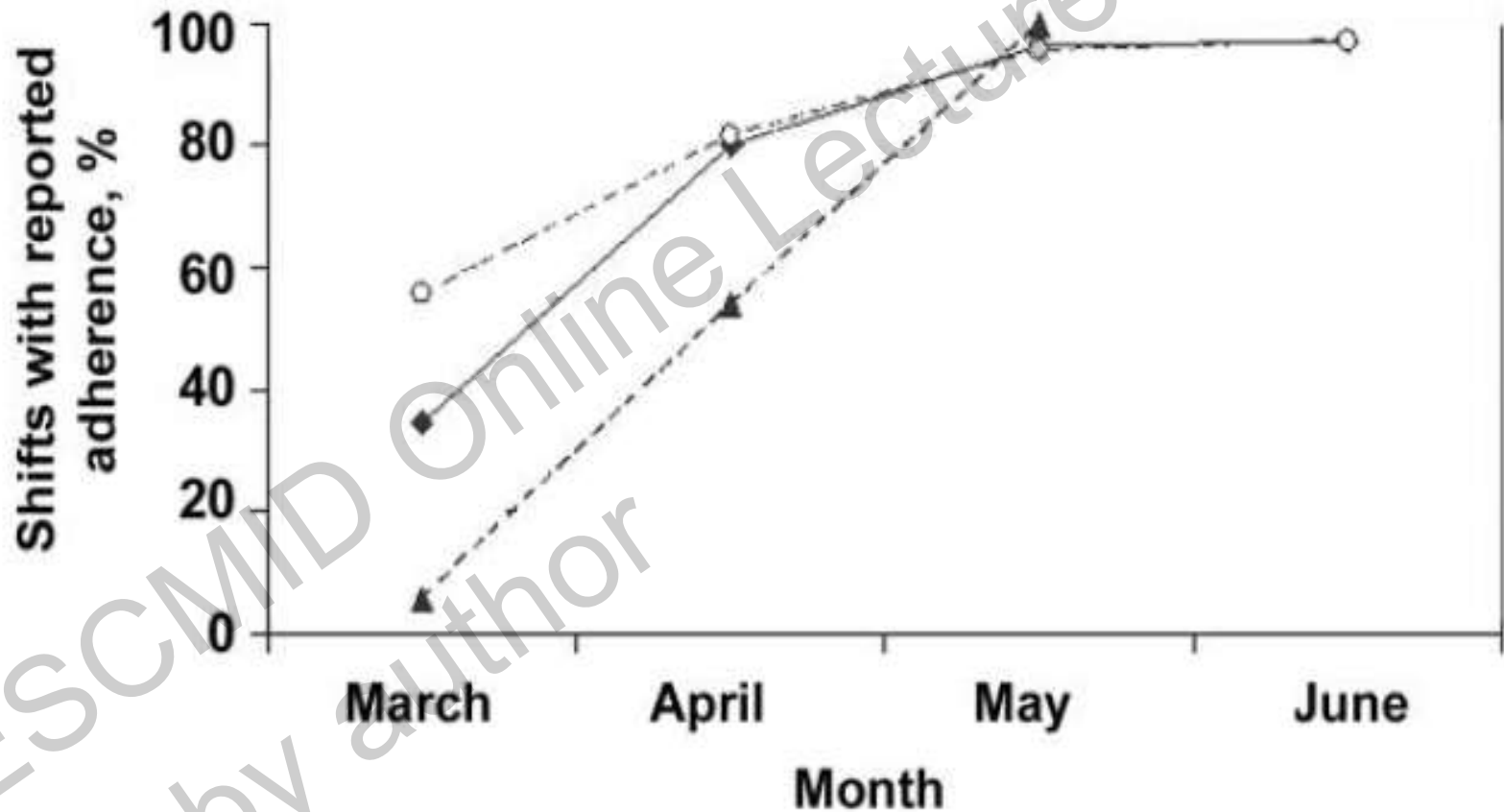
## HCW – source of infection



# Challenges - II

- Early recognition of cases
  - Geography
  - **Laboratory diagnostics**
  - Recognition of epi links
    - Illness in HCWs

# Number of shifts “always” adhered to SARS precautions, by diagnostic certainty



# Challenges - III

- Adherence to routine and additional precautions
  - Canada (droplet contact):
    - 76% adherence to gown + glove + mask
    - 37% adherence to eye protection
  - Turkey (VHF)
    - 94% gowns, 77% gloves, 39% mask



# Adherence to PPE, MSH, Toronto

	Hand hygiene	Gown	Mask/ respirator	Eye protection	Gloves
Contact	44%	81%	N/A	N/A	86%
Droplet/ Contact	58%	83%	78%	48%	88%
Airborne (TB)	38%	N/A	100%	N/A	N/A

# Challenges - IV

- The psychology of fear and risk assessment
  - Human beings are “rationally irrational”
  - Risk perception depends on affect and on cultural belonging

# What increases fear?

- Absence of benefit (“affect-poor” benefit)
- Immediacy
- Perceived lack of control
- Risk imposed rather than voluntary
- “Dread risk”
  - Catastrophic potential which can be visualized
  - Fatal consequences
  - Inequitable distribution of risks and benefits
- “Unknown” factor
  - Hazard is unknown, unobservable, new , “foreign”



# Ebola crisis 'on the same scale as Aids epidemic'

Hunt's shock warning as airport checks come in

# Ebola risk in Germany

- 68% perceived acquiring EVD as possible
- 74% believed airborne transmission of Ebola is possible
- 74% believed that transmission from asymptomatic persons before illness is possible
- If an EVD patient was flown to a hospital near them:
  - 87% would change behavior
    - 16% would avoid using public transportation
    - 75% would increase their hygiene behavior
    - 30% would not visit friends admitted to the same hospital.

# In sum

- Protection in ICUs (and hospitals) from highly contagious disease has repeatedly been shown to be possible (and not that difficult)
- Nonetheless, our systems for protecting staff and patients from such illness fail repeatedly
- Surveillance, a systematic focus on use of diagnostics, and modelling of cost effectiveness may assist in better decisions in future