

Accidental blood exposure surveillance: assessment of a tool for temporal trends



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Health care workers (HCW) are exposed to the risk of viral infection. ABE surveillance is among the priorities of nosocomial infections (NI) control implemented in France in 1995.

ABE incidence express the level of risk

- per total HCW and for each category
- per at-risk procedures

The exact number of at-risk situations (denominator) is often difficult to record. Some surrogate, routine indicators could be used to replace it.

OBJECTIVES

To evaluate the progression of ABE incidence over a 4 years period

To evaluate the incidence of ABE for various HCW occupational categories

To test surrogate indicators for measuring procedure-related risk of ABE

Denominator to be documented	Surrogate data (routine, denominator)
number of venous access placements	peripheral venous catheters purchased
blood sampling	blood cell counts, ionograms, blood cultures performed or vacuum-tube purchased
SC injections	SC syringes or needles purchased
arterial blood sampling	Arterial blood syringes purchased or arterial blood gases performed

METHODS

Data from the CCLIN ABE surveillance network

Study period: 1997 to 2000

Prospective surveillance of ABE in participating centers

Routinely collected surrogate indicators recorded

- ✓ Administrative data: number of acute-care beds or admissions
- ✓ Staff expressed in full-time equivalent, per category
- ✓ Medical devices purchased by the procurement department
- ✓ Biological analysis performed

Progression of the annual incidence

- ✓ per 10,000 admissions
- ✓ per 100 beds
- ✓ per 100 FTE staff /year
- ✓ Total staff, registered nurses, nursing students, nurses aides, physicians, surgeons, residents, midwives
- ✓ per 100,000 units medical devices purchased
- ✓ SC syringes and needles, arterial blood gas syringes, peripheral venous catheters, vacuum-tube holders, Huber needles
- ✓ per 100,000 biological analyses performed

Blood cell count, blood chemistry, blood cultures, arterial blood gases

Comparison : χ^2 for trend

RESULTS

Number of participating hospitals

1997	1998	1999	2000
38	38	60	46

25 participated for the whole study period

Denominator data available for the study period

- 15 centers (registered nurses staff)
- 10 centers (total staff)

Global indicators

- ABE/10,000 admissions
- Significant decrease
- No significant variation
- AT-risk population indicators
- Significant decrease
- ABE/100 staffs
- ABE/100 physicians
- ABE/100 nurses
- ABE/100 residents
- ABE/100 surgeons
- ABE/100 nurses aides
- ABE/100 nursing students
- ABE/100 midwives

AT-risk procedure indicators

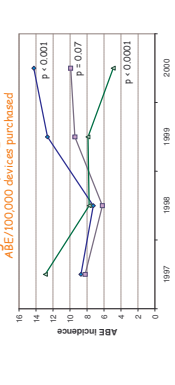
- Significant increase
- ABE/100,000 SC needles purchased
- No significant variation for other indicators

Significant decrease

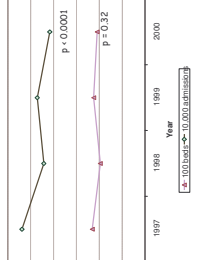
- ABE/100,000 Penipheral venous catheters purchased
- Blood cell count performed

Significant increase

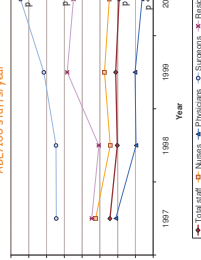
- ABE/100,000 SC needles purchased
- No significant variation for other indicators



Progression of Global ABE incidence Related to 100 beds and to 10,000 admissions



Progression of ABE incidence ABE/100 staffs/year



DISCUSSION

Epidemiology of ABE risk differs across HCW categories

- ✓ Differences between at-risk procedures
- ✓ Observed decrease in global ABE incidence

Routinely collected denominators

- ✓ Show a parallel decrease in tasks or tests and devices purchased (correlation)
- ✓ Comparable trends can therefore be shown using routinely collected indicators
- ✓ But insufficient for epidemiological studies
- ✓ May be sufficient for routine surveillance and monitoring trends in the daily clinical setting

From the research...



To the daily clinical setting



Denominator	1997	1998	1999	2000
100,000 admissions	20.9 (19.3-23.1)	22.1 (20.7-23.6)	22.6 (21.2-24.1)	20.8 (19.1-22.6)
100,000 beds	10.7 (9.5-12.1)	11.2 (10.1-12.4)	11.3 (10.3-12.3)	10.6 (9.3-12.0)
At risk population indicator				
- Total staff	4.9 (4.5-5.3)	4.0 (3.7-4.4)	4.2 (3.9-4.6)	3.9 (3.6-4.2)
- Physicians	18.2 (16.8-19.8)	18.2 (16.8-19.8)	18.2 (16.8-19.8)	18.2 (16.8-19.8)
- Nurses	4.2 (3.8-4.6)	3.9 (3.5-4.3)	4.1 (3.7-4.5)	3.8 (3.4-4.2)
- Residents	1.9 (1.6-2.2)	1.9 (1.6-2.2)	1.9 (1.6-2.2)	1.9 (1.6-2.2)
- Surgeons	1.9 (1.6-2.2)	1.9 (1.6-2.2)	1.9 (1.6-2.2)	1.9 (1.6-2.2)
- Nursing students	1.9 (1.6-2.2)	1.9 (1.6-2.2)	1.9 (1.6-2.2)	1.9 (1.6-2.2)
- Midwives	1.9 (1.6-2.2)	1.9 (1.6-2.2)	1.9 (1.6-2.2)	1.9 (1.6-2.2)
- Penipheral venous catheters	1.9 (1.6-2.2)	1.9 (1.6-2.2)	1.9 (1.6-2.2)	1.9 (1.6-2.2)
- Blood cell count	1.9 (1.6-2.2)	1.9 (1.6-2.2)	1.9 (1.6-2.2)	1.9 (1.6-2.2)

At-risk procedures indicators	1997	1998	1999	2000
Purchased devices	8.2	7.2	6.2	9.4
100,000 SC syringes	8.7	7.3	6.3	9.7
100,000 SC needles	8.6 (8.6)	8.3 (8.3)	8.9 (8.9)	8.9 (8.9)
100,000 PVC	11.6 (11.6)	11.2 (11.2)	10.5 (10.5)	13.1 (13.1)
100,000 vacuum tube holders	14.4	9.9	9.9	15.1
100,000 arterial blood syringes	2.4 (2.4)	2.4 (2.4)	2.4 (2.4)	2.4 (2.4)
100,000 respirators per needles	30.1	0.0	29.8	26.0
Biological analysis performed				
- 100,000 arterial blood sampling	11.7	15.0	18.9	17.3
- 100,000 blood cultures	8.3 (8.3)	7.9 (7.9)	8.0 (8.0)	8.2 (8.2)
- 100,000 ionograms	19.1	13.4	16.6	12.7
- 100,000 penipheral venous catheters	16.8 (16.8)	17.5 (17.5)	16.3 (16.3)	11.3 (11.3)
- 100,000 blood cell count	18.7 (18.7)	21.3 (21.3)	25.9 (25.9)	20.0 (20.0)

CONCLUSION

Variations in global ABE incidence

Variations between different HCW categories

Increase for residents

Variations according to at-risk procedures

- ➔ PVC and blood sampling related ABE
- ➔ SC injections-related ABE

Prevention needs to be targeted to HCW categories or at-risk procedures

Some data collected routinely in the clinical setting (devices procured) are effective surrogate markers for some procedures

Hospitals may reliably estimate ABE trends using routine data

Abstract

Introduction. Health care workers (HCW) daily face with ABE risk. However the risk may differ according to the various HCW categories. The objective of this study was to evaluate about the potential ABE incidence rates in the setting of a routine surveillance network.

Methods. The regional center for nosocomial infection control (CCLIN) Paris, France, is a tertiary care center. In order to follow ABE incidence, participating centers were asked to provide number of beds, number of patients admissions, and number of HCWs. The number of invasive devices purchased and biological analyses performed (including ionograms, blood cell count, arterial blood sampling) were also asked to surrogate for blood sampling or relevant procedures.

Results. The ABE incidence rates were 20.9 (19.3-23.1) in 1997, 22.1 (20.7-23.6) in 1998, 22.6 (21.2-24.1) in 1999, and 20.8 (19.1-22.6) in 2000, whereas ABE/100 beds and per 100,000 admissions were 10.7 (9.5-12.1), 11.2 (10.1-12.4), 11.3 (10.3-12.3), and 10.6 (9.3-12.0) respectively. The ABE/100,000 SC syringes and needles, ABE/100,000 SC needles, ABE/100,000 penipheral venous catheters incidence decreased from 8.7 (8.7) to 8.9 (8.9), 8.6 (8.6) to 8.3 (8.3), and 8.9 (8.9) to 8.9 (8.9) respectively. The ABE/100,000 arterial blood syringes, ABE/100,000 vacuum tube holders, ABE/100,000 ionograms, ABE/100,000 blood cell count, ABE/100,000 penipheral venous catheters incidence increased from 11.6 (11.6) to 13.1 (13.1), 14.4 (14.4) to 9.9 (9.9), 19.1 (19.1) to 16.6 (16.6), 16.8 (16.8) to 11.3 (11.3), and 18.7 (18.7) to 20.0 (20.0) respectively.

Conclusion. Overall ABE incidence markedly decreased among HCWs. However, control efforts should be made for some particular practices.

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