Figure 2. Use of a moving average statistical process control (SPC) chart for early detection of a pseudo-outbreak of Mycobacterium avium complex (MAC) that occurred at a bronchoscopy suite. The chart analyzes cases of MAC isolated from bronchoalveolar lavage cultures. CL, center line; LCL, lower control limit; UCL, upper control limit.
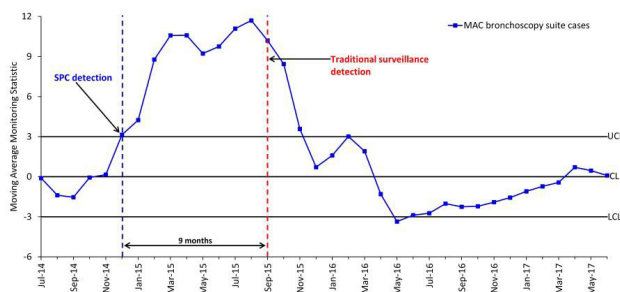

Table. Estimated cases of hospital-associated nontuberculous mycobacteria that would have been prevented by prospective surveillance with a moving average statistical process control (SPC) chart.

Outbreak	Pulmonary MABC (Outbreak #1)[a]	Cardiac Surgery MABC (Outbreak #2)[a]	Bronchoscopy Suite MAC (Outbreak #3)[b]
Case rate from month after SPC detection through month of traditional surveillance detection (A)	2.13	1.48	8.17
Case rate during 12-month post-outbreak time period (B)	0.48	0.54	1.79
Case rate difference (A-B)	1.66	0.94	6.38
Patient-days (outbreaks #1, #2) or bronchoscopies performed (outbreak #3) from month after SPC detection through month of traditional surveillance detection (C)	117,246	94,342	1,261
Estimated total cases prevented by SPC surveillance ([A-B]*C)	19.4	8.9	80.4

Abbreviations: MABC, *Mycobacterium abscessus* complex; MAC, *Mycobacterium avium* complex.
[a]Cases include hospitalized patients with positive respiratory cultures for MABC (Outbreak #1) or patients with positive non-respiratory cultures for MABC (Outbreak #2); rates are given per 10,000 patient-days.
[b]Cases include patients with positive bronchoalveolar lavage cultures for MAC; rates are given per 100 bronchoscopies performed.

Conclusion. A single MA SPC chart detected 3 HCFA NTM outbreaks an average of 6 months earlier than traditional surveillance. SPC has potential to improve NTM surveillance, promoting early cluster detection and prevention of HCFA NTM.

Disclosures. All Authors: No reported disclosures

878. Antimicrobial Susceptibility of Pathogens Isolated from Surgical Site Infections in Japan: Comparison of Data from Nationwide Surveillance Studies Conducted in 2010, 2014–2015 and 2018-2019

Yoshio Takesue, M.D, Ph.D[1]; Hideaki Hanaki, n/a[2]; Shinya Kusachi, n/a[3]; Hiroshige Mikamo, M.D, Ph.D[4]; Takashi Ueda, PhD[5]; Kazuhiro Tateda, PHD[5]; Hiroshi Kiyota, n/a[6]; [1]Hyogo College of Medicine, Nishinomiya, Hyogo, Japan; [2]Kitasato University Institute, Tokyo, Japan., Tokyo, Tokyo, Japan; [3]Department of Surgery, Toho University Medical Center Ohashi, Tokyo, Japan., Tokyo, Tokyo, Japan; [4]Aichi Medical University, Aichi, Aichi, Japan; [5]Toho University, Tokyo, Not Applicable, Japan; [6]Surveillance Committee of Japanese Society of Chemotherapy (JSC), the Japanese Association for Infectious Disease (JAID) and the Japanese Society for Clinical Microbiology (JSCM), Tokyo, Japan, Tokyo, Tokyo, Japan

Session: P-42. HAI: Surgical Site Infections

Background. A nationwide survey was conducted in Japan from 2018–2019 to investigate the antimicrobial susceptibility of pathogens isolated from surgical site infections (SSI).

Methods. The resulting data were compared with that obtained in earlier surveys, conducted in 2010, 2014–2015, and 2018-2019.

Results. Seven main organisms were collected, and in total 2081 isolates were studied. Although a significant increase of extended-spectrum β-lactamase (ESBL) producing organisms among Enterobacteriaceae was demonstrated in 2014–15 (13.5%) compared with 2010 (5.3%), the incidence remained 6.6% in 2018–19. Only one carbapenemase-producing Enterobacteriaceae isolates were identified in the 2018–2019 study. The geometric mean (GM) MICs for ESBL producing isolates in 2018–2019 were 0.08 μg/mL for meropenem, 2.67 μg/mL for tazobactam/piperacillin, 0.40 μg/mL for tazobactam/ceftolozane, 6.35 μg/mL for cefoxitin, and 1.12 μg/mL for gentamycin. Antibiotic susceptible rate in *Pseudomonas aeruginosa* was 95.5% in meropenem,

93.9% in piperacillin/tazobactam, 100% in tazobactam/ceftolozane, 97.0% in cefepime, 90.9% in ciprofloxacin, and 86.4% in gentamycin. There was no significant difference in methicillin resistance rate of *Staphylococcus aureus* isolates among 3 study periods (72.0% in 2010, 53.4% in 2014–2015, and 63% in 2018-19). MRSA isolates with a vancomycin MIC of 2μg/mL accounted for 9.7% in 2010, 1.2% in 2014–2015, and 3.1% in 2018-19. GM MICs for MRSA isolates were 2.09 μg/mL for linezolid, 0.32 μg/mL for tedizolid, and 0.61 μg/mL for daptomycin. GM MICs in linezolid and daptomycin for the isolates in 2018–19 tended to be increased compared with isolates in 2010 (1.74 to 2.09 and 0.35 to 0.61 μg/mL, respectively). More than 90% of isolates belonging to the *Bacteroides fragilis* group remained susceptible to tazobactam/piperacillin, meropenem, and metronidazole. In contrast, lower levels of susceptibility were observed for moxifloxacin (65.3%), cefmetazole (47.2%) and clindamycin (38.9%). In cefoxitin, non-*fragilis Bacteroides* isolates had lower rates of antibiotic susceptibility compared with *B. fragilis*. (51.3% vs. 81.8%).

Conclusion. Overall, the surveillance data clarified trends in antimicrobial susceptibility for organisms commonly associated with SSI.

879. Artificial Neural Networks to Predict Infection in the Surgical Site in Patients over 70 Years Old

Flávio Henrique Batista de Souza, n/a[1];
Braulio Roberto Gonçalves Marinho Couto, n/a[1];
Felipe Leandro Andrade da Conceição, n/a[1];
Gabriel Henrique Silvestre da Silva, n/a[1]; Igor Gonçalves Dias, n/a[2];
Rafael Vieira Magno Rigueira, n/a[2]; Gustavo Maciel Pimenta, n/a[2];
Maurilio B. Martins, n/a[2]; Júlio César O. Mendes, n/a[2];
Guilherme Brangioni Januário, n/a[2]; Rayane Thamires Oliveira, n/a[2];
Laura Ferraz de Vasconcelos, n/a[2]; Laís L. de Araújo, n/a[2];
Ana Clara Resende Rodrigues, n/a[2]; Camila Morais Oliveira E Silva, n/a[2];
Eduarda Viana De Souza, n/a[2]; Júlia Faria Melo, n/a[2]; Maria Cláudia Assunção De Sá, n/a[2]; Walquíria Magalhães Silva, n/a[2]; Bárbara Baptista Bastos, n/a[2];
Daniela Girundi Teles, n/a[2]; José Victor Barrancos, n/a[2];
Júlia Teixeira De Souza Junqueira, n/a[2]; Lívia Véo Garcia, n/a[2];
Maria Thereza Alves Brito, n/a[2]; [1]Centro Universitário de Belo Horizonte, Belo Horizonte, Minas Gerais, Brazil; [2]Centro Universitário de Belo Horizonte UNIBH, Belo Horizonte, Minas Gerais, Brazil

Session: P-42. HAI: Surgical Site Infections

Background. Between July 2016 and June 2018, a survey was carried out in five hospitals on surgical site infection (SSI) in patients over 70 years old, who underwent surgery procedures, in the city of Belo Horizonte, a city with more of 3,000,000 inhabitants. The general objective is to statistically evaluate such incidences and enable an analysis of the predictive power of SSI, through MLP (Multilayer Perceptron) pattern recognition algorithms.

Methods. Through the Hospital Infection Control Committees (CCIH) of the hospitals involved in the research, data collection on SSI was carried out. Such data is used in the analysis during your routine SSI surveillance procedures. Thus, three procedures were performed: a treatment of the database collected for use of intact samples; a statistical analysis on the profile of the collected hospitals and; an evaluation of the predictive power of five types of MLPs (Backpropagation Standard, Momentum, Resilient Propagation, Weight Decay and Quick Propagation) for SSI prediction. The MLPs were tested with 3, 5, 7 and 10 neurons in the hidden layer and with a division of the database for the resampling process (65% or 75% for testing, 35% or 25% for validation). They were compared by measuring the AUC (Area Under the Curve - ranging from 0 to 1) for each of the configurations.

Results. From 11277 records, 3350 were complete for analysis. It was found that: the average age is 79 years (from 74 to 84 years); the average surgery time is 123 minutes; the average hospital stay is 58 days (with a maximum of 114 days), the death rate reached 7.1% and that of SSI 2.59%. A maximum prediction power of 0.642 was found.

Conclusion. There was a loss of almost 70% of the database samples due to the presence of noise, however it was possible to evaluate the hospitals profile. The predictive process, presented configurations with results that reached 0.642, what promises the use of the structure for the monitoring of automated SSI for patients over 70 years submitted to surgeries. To optimize data collection, enable other hospitals to use the prediction tool and minimize noise from the database, two mobile application were developed: one for monitoring the patient in the hospital and another for monitoring after hospital discharge. The SSI prediction analysis tool is available at www.nois.org.br.

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880. Artificial Neural Networks to Predict Surgical Site Infection in Aorta Artery Aneurysm Correction

Flávio Henrique Batista de Souza, n/a[1];
Braulio Roberto Gonçalves Marinho Couto, n/a[1];
Felipe Leandro Andrade da Conceição, n/a[1];
Gabriel Henrique Silvestre da Silva, n/a[1]; Igor Gonçalves Dias, n/a[2];