University of Michigan Hospitals and Health Centers
Infection Control & Epidemiology

OUTBREAK INVESTIGATION – CASE STUDY

Steps to follow in an investigation	Case Study Example
Confirm that an outbreak exists	The Infection Control Professional (ICP) reviews her culture reports and identifies what appears to be an increase in cardiac surgery surgical site infections (SSI). Among May and June surgeries there were 5 cases of SSI. Three of the 5 cases were associated with positive cultures for *Rhodococcus bronchialis*. Of the 3 Rhodococcus cases, 2 are associated with May surgeries and 1 is associated with a June surgery. The service averages about .5 infections per month with an average rate of .75 per 100 procedures. The rate of infection appeared to begin to rise around December. May's SSI rate was 5.7 and June's rate was 1.4. There was no past record of SSI caused by Rhodococcus.
Verify the diagnosis of cases; identify the agent	The ICP looks up the Genus Rhodococcus in her desk copy of Bergy's Manual of Systemic Bacteriology. She found that rhodococcus species are gram-positive bacillary aerobic actinomycetes found in soil, sewage, fresh water and feces of some animals.
Communicate initial information	The ICP discussed the initial concern with appropriate medical, nursing, and administrative staff. She asked if there were any new practices, equipment or solutions. She asked staff to notify her of any new infections.
Search for additional cases; collect critical data and specimens	Although the ICP will focus on Rhodococcus, she wants to keep the definition broad. The initial case definition is, "Any patient developing a surgical site infection following cardiac surgery performed in the past six months." The ICP called the micro lab and asked for two reports: one screening for sternal wound cultures and another screening for any positive Rhodococcus cultures from 1996 – current. She also set up a notification system with the lab whereby they would contact her if they identified further positive cultures for Rhodococcus.
Characterize the cases by person, place and time	All charts were reviewed using a data collection tool developed by the ICP. Two additional SSIs were identified related to July surgeries. Rhodococcus caused one of the infections. 4/7 cases were performed in O.R. 17. Cardiac surgery only uses two O.R.s: 17 & 12. Surgeon X is associated with 4/7 total cases and 3 of 4 Rhodococcus cases. Nurse A, a circulating nurse, is on 4/5 known cases and 3/3 known Rhodococcus cases.
Formulate tentative hypotheses (best guess) [Root causes]	It was decided to narrow down the case definition to: A sternal wound infection that is culture positive for Rhodococcus in a patient who has undergone Cardiac Surgery in the last 6 mos. The tentative hypothesis is that patients are being exposed to Rhodococcus in the Operating Room. The ICP knows that a number of solutions are able to support the growth of microorganisms. She decides to have all multi-patient use solutions from ORs 17 & 12 pulled and cultured.

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OUTBREAK INVESTIGATION – CASE STUDY (Continued)

Steps to follow in an investigation	Case Study Example
Communicate tentative findings	General information regarding the findings to date was shared with appropriate staff.
Institute appropriate control measures	Multiuse solutions are to be dated so they can be discarded every month.
Test hypotheses	The ICP notes that Surgeon X was involved in 3 of the 4 Rhodococcus cases and that Nurse A was involved in all 4 Rhodococcus cases. She decides to determine if their presence in these surgeries is significant. From May – July, there were 141 cardiac surgeries performed. Surgeon X performed 58 of these surgeries. Nurse A was involved in 27 of the 141 surgeries. Fisher Exact test on Surgeon X: not significant; and Nurse A: significant. Nurse A may be a significant exposure factor for Rhodococcus. The ICP reviewed perioperative and intraoperative care by interviewing surgeons and other operating room personnel and by observing a CABG procedure performed by Surgeon X in O.R. 17 where both nurse A and Nurse B were circulating. Circulating nurses performed activated clotting-time tests at the beginning of the surgical procedures and at 30 minute intervals while the patient was on cardiac bypass. The test was performed by incubating a test tube of the patient's blood for three to six minutes in a water bath located several feet from the operating table. During the procedure, the ICP observed Nurse A and Nurse B perform the clotting test. • Nurse A held the tube with both hands, wetting her hands with the water remaining on the test tube after its removal from the water bath. • Nurse B held the tube by its cap with only one hand, without wetting her hands Water from the water bath grew *R. bronchialis.*
Evaluate efficacy of control measures	The ICP recommended a change in procedure as per Nurse B. In addition, changes were made to the water bath policy. There were no additional cases.
Communicate findings	All staff was informed of findings and the procedure change.
Write final report	A written summary of findings was distributed to appropriate staff.