were an isolated threat but were a substantial hazard to the information on a computer. They indicated in their risk assessment that vulnerability of systems to this type of virus is high because most computer users are not in the habit of scanning documents. Documents are much more mobile than executable files, passing from machine to machine. Word macro viruses replicate themselves by infecting Microsoft Word's "normal template," so that when a new document is created, the new document has the virus. The macro viruses were not detected by earlier anti-virus software, but most anti-virus scanners now include macro virus detection.

The SPICE surveyed infection control professionals in 169 hospitals in North Carolina to determine the extent of computer viruses detected by them and the level of use of virus protection programs. There were 111 responders to the survey, 9 of whom were not computer users.

Of the 102 computer users, 80 had a personal computer, 20 had access to a departmental computer, and 1 had access only to a secretary's computer. Computers were used primarily for word processing (93%), surveillance data (76%), and policies and procedures (86%). Twenty-six had experienced a computer virus, and 8 had files lost or damaged. Seventy-one acknowledged having a virus protection program installed (eg, F-Prot, Norton Anti-virus, McAfee, Microsoft Anti-virus, VirusScan). Only 23% scanned every floppy before using it; 45% had updated their virus protection program; 24% of the users knew that their programs had been updated within the last 6 months. Of those who had experienced a computer virus, 77% knew the source. The source for 90% was a floppy disk from either their facility or outside the facility.

After completing the questionnaire, 46 (45%) planned to implement a change or changes (23 will scan disks more frequently, and 23 [79%] of the 29 that did not have a virus protection program installed said they would install one). Although the purpose of the survey was to gather information, the results indicate that it served as a reminder of danger and will produce changes in practice.

Are you at risk? Yes, if you're a computer user, you are at risk and should practice appropriate prevention and control: (1) install virus detection software, and use it regularly (eg, scan when computer reboots each morning); (2) update the virus protection program regularly; (3) never use a disk on file from someone else unless you scan it first for viruses; (4) back up your computer on a regular basis, so that when it crashes—and sooner or later, for one reason or another, it *will* crash—you will have copies of your documents.

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False-Positive Tuberculin–Skin-Test Results Caused by Dosing Error

To the Editor:

A major screening tool for contact investigation in a tuberculosis (TB) control program is the Mantoux tuberculin skin test.[1] However, false-positive tuberculin test results causing pseudoepidemics of tuberculous infection are being reported. We read with interest the report of a pseudo-outbreak of tuberculin test conversions caused by dosing error during routine annual tuberculin testing among residents of an adult facility.[2] A similar problem occurred recently during routine annual employee testing.[3] The approximate cost for these pseudo-outbreaks was estimated at several thousand dollars. We would like to report an additional outbreak of false-positive conversions due to dosing error occurring during contact investigation of a presumptive case of TB in our facility. Infection control policy of our 750-bed Veterans' Affairs hospital requires health employees to undergo a yearly tuberculin test unless they have a history of a previous positive test result. A dose of five TU of purified protein derivative (PPD) is applied intradermally on the volar aspect of the forearm with subsequent reading of results at 48 to 72 hours by trained healthcare workers. Tuberculin testing also is required for all individuals with possible workplace TB exposure. In June 1993, one newly admitted patient was found to have chest radiograph findings suggestive of TB. He was placed on isolation precautions in an environmentally sound room. While awaiting sputum results, contact investigation was initiated with tuberculin testing of all exposed employees. Of 11 subjects, all with prior negative tests, three (27%) had positive skin tests greater than 10 mm induration. However, after 4 weeks of incubation, *Mycobacterium szulgai* was isolated from the patient's sputum. Given the low prevalence of TB in our institution, the findings of an increased incidence of tuberculin converters was unexpected. None of the recent tuberculin converts had known exposure to TB. The unexpected high incidence of tuberculin converters prompted an investigation including a review of the testing procedure. It was found that the testing had been performed with a 250 TU solution of PPD (Tubersol, Connaught Laboratories, Swiftwater, PA) instead of the standard dose of 5 TU. It was felt that the dosing error was the reason for the unexpected increase in tuberculin conversions among our employees. No chest radiographs were done, and no isoniazid prophylaxis was initiated. During a 6- to 10-month period, all three subjects with positive PPD with 250 TU were retested with 5 TU and found to have a negative test with induration less than 10 mm. After 1 year, repeated testing with 5 TU remained negative.

Skin testing with PPD has been standardized at 5 TU, but currently tuberculin is also available in concentrations of both 1 TU and 250 TU per 0.1 mL of solution. Given the labeling similarities between 5-TU and 250-TU vials, a dosing error cannot always be excluded as a possibility. In our hospital, the testing error was discovered rapidly due to the prompt action of the infection control nurses in a setting with low TB incidence and low prevalence of positive tests among employees. However, dosing errors can be overlooked easily in a population with high prevalence of TB, especially because persons with positive tuberculin results usually are not retested. As in the two previous reports,[2,3] such false-positive tests may lead to unnecessary chest radiographs and inappropriate initiation of chemoprophylaxis with a potential for adverse reactions and costly diversion of healthcare resources for follow-up of these patients. We agree with the authors and question the necessity of having the 250 TU/0.1 mL

https://doi.org/10.1086/647713 Published online by Cambridge University Press

solution available in clinical settings, especially when current Centers for Disease Control and Prevention guidelines state that only solutions of PPD containing 5 TU/0.1 mL should be used.[1] We have discontinued the 250 TU formulation in our institution. We urge caution in the interpretation of tuberculin tests and suggest careful examination of the strength of the solution before administration.

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Prevention of Intravascular Catheter-Related Bloodstream Infections

To the Editor:

In his *Lancet* seminar, Raad[1] estimated that 400,000 intravascular catheter-related bloodstream infections (IVCR BSIs) with skinborne microorganisms now occur annually in US healthcare facilities. On the basis of 1995 data, Jarvis[2] summarized that such infections occurred then at a rate >100,000 annually, killed 16.3% to 35% of persons infected, and cost $40,000 per survivor.[2] Pearson[3] estimated that there were over 200,000 IVCR BSIs annually in 1996. Using 400,000 for current annual morbidity and 25% for mortality, IVCR BSIs will kill 100,000 Americans in 1998. For prevention, Raad recommended: (1) maximum sterile barriers (hand washing, sterile gloves, large drape, sterile gown, mask, and cap) during insertion and maintenance of intravenous (IV) catheters by specialized infusion-therapy teams; and (2) supplementary cutaneous microbicides, tunneling catheters under skin, ionic silver cuffs, intraluminal antibiotic locks, antibiotic coating of catheters, and antiseptic hubs.

One must add that, during use in patients, each intravascular catheter requires a sterile IV infusion set with a port for reversible attachment to the catheter hub; some 6 feet of trailing tubing; one to three Y-ports for adding small-volume infusates; a trailing spike for repetitively attaching large-volume infusion bags; and added paraphernalia for controlling rates of flow and filtering and for preventing back flow. Depending on the duration of the infusion, soluble medications prescribed, and changes dictated by a patient's condition, the numbers of IV infusion sets, infusion bags, and Y-ports used with each IV catheter vary from several to many, all requiring sterile handling.

Precautions versus spread of bloodborne pathogens in healthcare facilities officially broadcast in 1987, 1988, and 1992[3] had the following side effects: (1) burgeoning use of unsterile examination gloves, to an annual volume of some 10 billion in 1996[4]; (2) a decrease in hand washing before donning examination gloves, to about 25%,[4] (3) use of unsterile exam gloves for handling IV sets and patients[3]; and (4) use of needleless infusion systems employing blunt cannulae instead of sharp needles to service Y-ports.[3] Since 1995, we've seen a 3- to 10-fold increase of IVCR BSIs in patients infused via needleless systems that have Y-port recesses that are suitable for microbial colonization and that require more manipulation than standard systems.[5] Thus, to Raad's recommendations one might add that needleless IV infusion systems should be eliminated, and healthcare workers should use sterile gloves when handling needles and related paraphernalia in standard IV infusion systems.

Supply of IV infusion systems safer for patients and healthcare workers currently is limited by manufacturers, purchasing consortia, and managed-care organizations whose bottom line is profit (*Business Week*, March 16;1998:75; *San Francisco Chronicle,* April 13-15, 1998;A-1). A simple remedy can be found in the Healthcare Worker Protection Act (HR 2754) now under consideration in Congress. The gist is that Medicare (and we, the taxpayers) will not reimburse providers for needles and paraphernalia proven unsafe by qualified experts.

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Pseudo-epidemic in an Acute-Care Teaching Hospital

To the Editor:

Cronin et al's Concise Communication[1] is of importance, not only in showing the unnecessary treatment of false-positive patients but also in demonstrating that pseudo-epidemics are expensive and time-consuming.

We would like to report a pseudo-outbreak of *Pseudomonas putida* in our facility. *Pseudomonas putida* is a common inhabitant of soil, plants, and water. It is infrequently isolated from the hospital environment. It is of low virulence and usually not of clinical significance. Occasionally, it is part of the normal oropharyngeal flora. *P putida* usually is regarded as an environmental contaminant.

P putida was isolated between February 7 and March 25, 1991, from urine of 23 patients in an acute-care, 400-bed community teaching hospital located in Virginia (Table). These cases were from medical and surgical units, an outpatient clinic, emergency room, and nursery. Patients were admitted with various diagnoses. The cases were distributed in all age groups from <1 to >90 years of age, in both genders and from both catheterized and noncatheterized patients. In each case, the implicated organism had an identical antibiotic susceptibil-

https://doi.org/10.1086/647713 Published online by Cambridge University Press