An Online Training Module in Infection Control for Temporary Clinic Volunteers

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Abstract

The recent increase in healthcare-associated infection (HAI) outbreaks in outpatient settings underscores the need for increased emphasis on infection prevention and control in these settings. Data from outbreak reports reveal a lack of staff knowledge about infection control recommendations and adherence to proven infection control standards. Temporary outpatient clinic settings pose unique challenges in promoting safe infection control practices because they lack the infrastructure and resources to ensure compliance with current practice standards and the staff frequently includes volunteers that lack formal training in infection control. This gap provides the rationale for the educational intervention described in this paper. An online infection control training module was developed and placed on the Training Finder Real-Time Affiliate Integrated Network (TRAIN), a web-based educational platform maintained by the Virginia Department of Health. The narrated module included a review of evidence-based infection control strategies, a post-test and course evaluation. The feasibility of the online training module was evaluated using the five domains of the RE-AIM model: Reach, Effectiveness, Adoption, Implementation and Maintenance. An online infection control training program tailored for temporary clinic volunteers was successfully completed by student participants. Evaluation data obtained from participants indicated the program was successful in addressing the five dimensions of the RE-AIM framework. An online training module is a feasible means of educating temporary clinics volunteers about infection control. There is a need for further research to determine the utility of an online training module in promoting safe infection control practices.

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FINAL CAPSTONE PRODUCT

Section I: Introduction

Healthcare-associated infections (HAIs) are a known and well-documented consequence of hospitalization. Each year approximately one in 20 patients admitted to U.S. hospitals develop a HAI, resulting in over a million infections, 100,000 deaths, and billions spent in healthcare dollars (Klevens, 2007; Scott, 2009). While these statistics are alarming, they only represent a fraction of the patients who are at risk of acquiring a HAI. The shift in healthcare delivery from inpatient hospital settings to outpatient (or ambulatory) clinics has resulted in the creation of thousands of non-hospital settings across the nation including ambulatory surgical centers, dialysis centers, long term care facilities and permanent and temporary medical clinics (Frieden, 2010; Schaefer et al., 2010). As a result of this shift, HAI outbreaks are occurring with increasing frequency in these settings. Data obtained from outbreak investigations reveal a lack of knowledge about and adherence to infection control practices. The purpose of this project is to determine the feasibility of using an online training module to train temporary clinic volunteers about infection control.

Temporary Clinics

Further complicating the healthcare landscape is the utilization of free, temporary ambulatory clinics that provide medical and dental services to those who have limited access to care. Free clinics serve approximately 38% of the population and the demand for them has increased steadily since the recession (Notaro et al. 2012). Temporary clinics are designed to serve large numbers of patients in short periods of time. They are held all over the world in public community settings such as school gymnasiums, auditoriums, fairgrounds, parks, and coliseums. They are generally unregulated and rely heavily on donated resources including space, equipment, supplies and healthcare services (Remote Area Medical [RAM], 2013).

Healthcare services are typically provided by volunteers, many of whom travel long distances to attend the clinics. Temporary clinic volunteers have diverse backgrounds and skill sets and include persons that have not had formal infection control training. Finally, due to the episodic nature of these clinics, most do not have the infrastructure to develop and implement quality improvement programs or provide training to clinic volunteers.

Infection Risks in Temporary Clinics

The risk of HAI infection in these clinics is similar to the risks in other healthcare settings, as many perform the same procedures conducted in hospitals and permanent outpatient clinics and surgical centers. However, historically free clinics have been overlooked and operate outside of the safety net system (Darnell, 2010). The medical services offered in temporary clinics vary from simple health screenings (e.g., blood pressure, blood glucose screenings) to invasive surgical procedures (e.g., biopsies, tooth extractions, root canals). Healthcare-associated infections that result from the care received at these clinics are likely underreported because they occur after patients leave the clinic. Uninsured patients are less likely to seek medical for conditions or symptoms that are not life-threatening so many conditions such as HAIs go undiagnosed.

Healthcare-Associated Prevention Initiatives

While the magnitude of the HAI burden is unknown, there is little disagreement that HAIs are a public health problem worthy of prevention. The majority of HAIs result from breaches in proven infection prevention strategies (Frieden, 2010). In a landmark study conducted by Centers for Disease Control and Prevention (CDC) in the 1970s, known as the SENIC Study, researchers found that at least 30% of HAIs in hospitals are preventable when proven infection control strategies are followed (Haley, Quade, Freeman, & Bennett, 1980).

However, current researchers have shown an even larger margin of error and estimate that at least 50% of HAIs are preventable when evidence-based infection control standards are consistently implemented (Umscheid, Mitchell, Doshi, Agarwal, & Brennan, 2011). Infection prevention is not a novel concept. Programs focused on infection control have been a mainstay in hospitals since the Joint Commission mandated them in the mid-1970s (Smith, Watkins, & Hewlett, 2012). In-patient HAI prevention initiatives spearheaded by the healthcare facilities and state and federal agencies and organizations have shown that prevention programs reduce infection rates of all types (Yoke et al., 2008; Institute for Healthcare Improvement [IHI]; Association for Professional in Infection Control and Epidemiology [APIC], 2010).

The shift in healthcare delivery to outpatient settings and the recent increase in HAI outbreaks reported to the CDC, highlight the need for even more focused infection prevention efforts in these settings (Schaefer, 2010). Data from outbreak reports reveal a lack of knowledge about infection control recommendations and adherence to basic practice standards for infection control. HAI outbreaks have occurred in ambulatory settings of all types including dialysis centers, pain clinics, temporary clinics and health fairs, dermatology clinics, pediatric, primary care, and surgery and oncology clinics; and most involve common medical procedures such as medication preparation and administration, and blood glucose monitoring. A recent report published by the CDC (2013) documented 35 outbreaks of viral hepatitis in outpatient settings from 2008 to 2012. Almost half (17 out of 35) of the infections occurred in outpatient medical clinics, including one in a temporary dental clinic held in a school gymnasium. The temporary dental clinic outbreak resulted in the transmission of hepatitis B infection to both clinic volunteers and patients. The exact cause of this outbreak is still unknown; however, the

investigation revealed a lack of written infection control polices and protocols and adherence to basic infection control practice standards.

In an effort to address infection prevention and control in outpatient settings, the CDC has launched a HAI website dedicated to the prevention of infections in ambulatory care settings (CDC, 2011). The website provides resources for outpatient facilities including; a list of outbreaks and notification events, infection prevention guidelines and checklist, model infection control plan for oncology settings and additional recourses for ambulatory care personnel and patients. The American Recovery and Reinvestment Act (ARRA) of 2009 (Recovery Act) has led to increased efforts in HAI prevention. Approximately 50 million dollars were allocated to HAI prevention, 10 million of which was designated to increase regulatory oversight of ambulatory surgery centers (ASC) (Centers for Medicaid and Medicare Services [CMS], 2009). This has led to the development of HAI survey tools and training programs for ASC inspectors. ARRA funding also allowed the U.S. Department of Health and Human Services (HHS) to move beyond HAI prevention in hospitals and extend their focus to outpatient settings. The HHS published an amendment to their 2009 *National Action Plan to Prevent Health Care-Associated Infections: Road Map to Elimination* that outlines infection prevention strategies for ambulatory surgical centers and renal dialysis centers (HHS, 2013). The Action Plan details the challenges faced by ASCs and dialysis centers in preventing HAIs and highlights the need for the development and dissemination of evidence-based infection control strategies including tailored guidelines and training materials.

The federal initiatives referenced above are evidence that the HAI prevention pendulum is beginning to shift to outpatient settings; however, change takes time. In the meantime, it is important to seize opportunities whenever possible to contribute to this positive movement. The

project described in this proposal is an example of an evidence-based strategy developed and implemented by an advanced practice nurse to address a serious public health issue.

Purpose

The purpose of this project is to study the feasibility of an online infection control training module in educating temporary clinic volunteers about infection prevention and control strategies. This project will include the development, implementation and evaluation of an on-line training module tailored to address infection control risks and strategies in free, temporary clinics.

Rationale

The conceptual public health foundation of primary prevention, which encompasses interventions aimed at keeping illness or injuries from occurring, provides the rationale for this project (Ervin, 2002). Primary prevention is the cornerstone of public health practice and critical in preventing disease and promoting health. This project also incorporates the American Association of Colleges of Nursing's *Doctor of Nursing Practice Essentials* (McCaffrey, 2012), utilizing scientific-underpinnings of nursing practice, clinical scholarship, systems leadership, technology and inter-professional collaboration to create a clinical intervention that is designed to prevent infections and promote health for individual and populations. Finally, the three public health core functions of assessment, policy development, and assurance, provide a basis for this intervention (Stanhope and Lancaster, 2011). This project involves a thorough assessment of a problem, population, policies and practices and offers an intervention designed to assure the competency of workers caring for patients receiving community-oriented health services.

Research Question

The primary research question in this project is: What is the feasibility of an online training program as a means of educating temporary clinic volunteers about infection control?

The feasibility of the training module will be explored using the RE-AIM framework, a well-recognized and successful public health planning and evaluation model, see Figure 1 (RE-AIM.org, 2013; National Council on Aging, 2007; Glasgow, McKay, Piette, Reynolds, 2001). The RE-AIM framework utilizes five domains (reach, adoption, efficacy, implementation, and evaluation) to measure the impact of public health programs.

Section II: Review of Literature

An assessment of current practice guidelines and review of current educational literature was performed to answer the following questions: What infection control guidance exists for temporary clinics? Are online training programs effective in teaching infection control principles to healthcare workers?

Outpatient Infection Control Guidance Inventory

The shift in healthcare to the outbreak settings and the recent outbreak activity in these settings highlight the need to increase awareness of and compliance with recommended infection control strategies and practices. The next section of this paper describes an infection control inventory that was conducted to identify the types of infection control guidelines on the web for outpatient settings and identify gaps in infection control guidance in these settings.

Literature review methods. A search was conducted using PubMed, Google, and the CDC's website using the search terms: infection control, outpatient clinics, temporary clinics, and free clinics. No specific timeframe parameters were used to conduct the search. An initial search conducted on PubMed using the terms infection control and outpatient clinics, revealed 1100 articles. The articles pertained primarily to diseases detected and treated in outpatient settings, not infection control guidance for these settings. The search was refined to include the terms infection control guidance and outpatient clinics. One hundred articles were identified and approximately 25 of 100 documents addressed infection control guidelines in outpatient settings. The CDC's website was searched as CDC is a well-known and primary source for infection prevention and control guidance. Two-hundred and thirty-six documents were found that referenced infection control in outpatient settings; these included case studies, newsletters, notices, guidance documents and other publications. Approximately 60 documents provided

infection control recommendations for outpatient settings. Finally, a search was conducted using Google to identify other outpatient infection control guidance documents not identified previously, this search yielded seven additional documents that referenced infection control in outpatient or ambulatory care settings. Ninety-two documents were found using PubMed, the CDC's website and Google. These articles were compiled in a database and analyzed by category (ambulatory care, dialysis center, disaster shelter, dental setting, home health setting, homeless shelter, long-term care [LTC], prison, and temporary clinic) and audience (healthcare worker or healthcare facility and patient or general public). Thirty-seven guidance documents targeting LTC, home health and prison settings, the general public and other unrelated patient populations were eliminated due to the lack of relevance to this study. The remaining documents were further analyzed.

Findings of literature review. Fifty-five infection control guidance documents were found that addressed infection control guidelines written for healthcare providers in outpatient clinics. Infection control recommendations were reviewed and categorized by setting. Infection control guidance was identified for the following outpatient settings; Ambulatory care (n=11); Dental (n=6); Dialysis (n=9); Disaster (n=19); Homeless Shelters (n=10). The CDC published over half of the documents and the others were authored by other public health agencies and professional organizations. The CDC was referenced in most of the documents not published by the CDC.

The documents in this review varied greatly in scope of practice from a single recommendation to more comprehensive guidance. Most of the documents included common infection control strategies such as hand hygiene, standard precautions, and personal protective equipment; however, all of documents highlighted the importance of infection control training

and education for healthcare workers. The most comprehensive infection control document for outpatient settings identified was the CDC's *Guide to Infection Prevention for Outpatient Settings, Minimum Expectations for Safe Care* (CDC, 2011). This 17-page document contained an extensive list of evidence-based infection prevention and control strategies for ambulatory clinics, an infection control program checklist and links to an exhaustive repository of infection prevention resources and tools. Two other infection control checklists were found, one for mobile dental clinics and another for oncology clinics. No infection control guidance documents were found for temporary medical clinics.

Discussion of literature review findings. This review describes the body of infection control guidance currently available on the web for ambulatory clinics and identifies setting-specific gaps in guidance. It highlights the need for infection control guidelines for temporary clinics and the lack of accessibility of information to clinic programs planners and volunteers. Conducting medical care in temporary clinic settings is challenging due to the lack of organizational infrastructure, resources, and training opportunities for healthcare providers. Infection control guidance and training is needed to address the unique challenges of temporary clinics and to educate those who deliver care in these settings.

Review of Traditional and Online Teaching Literature

A fundamental component of any infection program is education and training. In fact, healthcare facilities are mandated by the Occupational Safety and Health Association (OSHA) to provide training to all employees who have the potential for occupational exposure to blood and body fluids (OSHA, 1991). Infection control training upon hire and annually has long been a condition of Joint Commission hospital accreditation (Joint Commission, 2011). In the past, hospitals met this requirement by providing face-to-face educational programs for their

employees. However, advances in technology offer alternative delivery methods that allow more flexibility for educators in presenting course content and increased accessibility to material by participants. Online programs are used with increasing frequency to deliver mandatory infection control training programs and meet annual competency requirements. However, the shift to on-line education has created on-going controversy among educators regarding the effectiveness of on-line education compared to face-to-face education. A second literature review was conducted to examine the efficacy of online and face-to-face training programs.

Literature review methods. A systematic review of the literature from January 2002-November 2012 was conducted to identify studies that compared online (distance) and face-to face (traditional) training methods. The search began in the CINAHL, Cochrane and ERIC databases using the terms "distance learning" and "traditional learning" and "nursing." The initial search revealed 626 articles; 591 from CINAHL, 25 articles from ERIC and 10 in Cochrane. Another search was conducted in CINAHL and PubMed using the terms "distance learning" and "infection control." In addition, ninety-two studies were identified; 42 in CINAHL and 50 from PubMed. Finally, a hand search identified two additional meta-analyses that were frequently referenced in related studies. A total of 720 studies were identified during the search as shown in Figure 2. Inclusion criteria for the studies selected included: (1) studies that compared distance learning to traditional learning and (2) studies including healthcare and non-healthcare related educational programs. Exclusion criteria included: (1) intervention studies with only one group and (2) studies without an English abstract. In an effort to evaluate the most current literature, individual studies were limited to those published between 2006 and 2012. Randomized clinical trial and quasi-experimental studies were included in this review and case studies, multiple case series and descriptive studies were excluded.

Findings of literature review. Eleven studies met the criteria for this study (see Table 1). Four meta-analyses were found that compared face-to face educational courses with online educational courses. In each of these reviews internet learning was found to be more effective than traditional classroom instruction. Shachar and Neumann (2010) reviewed 125 experimental and quasi-experimental studies published from1990 to 2009. The researchers compared learning outcomes of graduate, undergraduate and non-credit courses and found that students who took the online courses outperformed those who received face-to-face instruction. Similar results were published following a meta-analysis conducted by Cook, et al. (2008). This review examined 201 studies conducted from 1990 to 2007 involving students who were enrolled in healthcare programs or were practicing healthcare providers. While there was wide variability in course content, students who received online training performed better than those who received classroom training. A study by Bernard et al. (2004) supports these findings in an analysis of 232 studies that compared distance learning to traditional classroom courses. Achievement outcomes of Internet learners were greater than those who received classroom instruction. Finally, a study conducted by the U.S. Department of Education (2010) examined 46 studies that compared face-to-face instruction with on-line learning and blended instruction (a combination of face-to-face and online learning). Learning outcomes for online learners exceeded those who had face-to-face instruction. Students who received blended instruction also outperformed students who received face-to-face instruction. There were no significant differences in students' outcomes when online instruction was compared to blended instruction.

Several individual studies support the effectiveness of online education. In a randomized case-control study of forty-eight 3rd and 4th year medical, nursing, and physiology students, Phadtare, Bahmani, Shah, and Pietroban (2009), compared the classroom writing scores of

students who received on-line instruction with students who received classroom instruction. Students who received the intervention (online instruction) scored significantly better than the control group (classroom instruction) on three outcomes: text quality, satisfaction and communication. These results were supported in an experimental cohort study of physicians conducted by Fakih, Enayet, Miinick & Saravolatz (2006). Two groups of physicians-in- training were evaluated after receiving infection control training. One group took a web-based course and the other a lecture-based course. Post-course scores from the web-based students were significantly higher immediately following the course. Campbell, Gibson, Hall & Callery (2008) also found web-based instruction to be effective in teaching research methods to graduate students. In this study 117 graduate students were divided into a control and intervention group. The students that received online training scored higher than those who received face-to face instruction. However, the researchers stated that selection bias may have been a factor since students were allowed to self-select their group.

In addition to teaching methods there may be other variables that affect learning outcomes. A study conducted by Aggerwahl, et al. (2011), compared the learning outcomes of 58 medical professionals and researchers. The participants were placed in two groups; each group was exposed to online and onsite courses in biostatistics and research ethics. A pre-test, post-test and satisfaction survey was administered to each student. Both groups showed a significant increase in knowledge at the completion of both onsite and online courses. There was no difference in the online vs. onsite learning scores or students' satisfaction scores. The researcher concluded that both methods of instruction were effective in highly motivated students.

Another variable that may influence the effectiveness of online versus traditional classroom is subject matter. Reime, Harris, Aksnes, and Mikkelson (2008) conducted an

intervention study to examine the effectiveness of online versus classroom infection control training in 2nd year nursing students. In this study, 141 nursing students were divided into two groups, an intervention and a control group. The intervention group was given an online training module in infection control and the control group received classroom training in infection control. Multiple choice evaluations were used to measure the knowledge gained by students in both courses. The evaluations were divided into five subcategories: standard precautions, isolation, protocols and practices, epidemiology and preoperative preparation. Scores for both groups showed an improvement in knowledge in all categories. However, the students who received classroom training in epidemiology and preoperative preparation scored higher than students who received training online.

Bloomfield, Roberts and White (2008) also studied nursing students and the effects of a computer-based vs. classroom-led program designed to improve hand washing skills in a randomized control study. The researchers studied the hand washing skills of 231 students following the implementation of a computer- and classroom-based course. The students were randomly assigned to an intervention (online) group and control group (classroom). Both groups showed increased knowledge about hand washing after the courses; however, no significant differences were detected in the scores of the two groups. Similar results were found by Linn, Lee, Tinker and Chiu (2006) following a large multi-state study that compared the knowledge integration of sixth-to twelfth grade students who took a web-based science (3712 students) course to those who attended class lectures (4520 students). No significant differences in the overall group scores were detected; however, the web-based group scored slightly higher in some subcategories.

Discussion of literature review findings. This review was conducted to determine the effectiveness of online training programs in teaching infection control principles to healthcare workers. While few studies were found that compared infection control training in the classroom to online infection control training, the research conducted in this review clearly supports the effectiveness of online education in teaching new information.

The findings from all four of the meta-analyses showed distance learning (internet, on-line and web-based) to be more effective than traditional instruction (classroom, face-to-face). Six hundred and four comparison studies were represented in the findings and each study compared the outcomes of students receiving online education to those who received classroom instruction. While the authors noted wide variability in course topic and content, each concluded that on-line learning was an effective teaching delivery method.

Each of the individual studies in this review found online training to be as effective, or more effective than traditional classroom education. Studies analyzed in this review also support the use of online instruction in training students with and without medical training. Temporary clinic volunteers have varied backgrounds and not all of them have medical training. These findings support not only the effectiveness of online training but also the utility of use with different student populations.

Implications for practice of literature review. This review has several implications for public health nursing practice. Preventing healthcare-associated infections (HAIs) requires knowledge about infection control strategies that prevent the spread of infection. Training in infection prevention and control is commonplace in licensed and accredited hospitals and other healthcare facilities. These trainings are free of charge and often designed and conducted onsite by infection control subject matter experts. Temporary clinics are different ─ they not are not

licensed or accredited facilities. They are brief events organized and staffed by volunteers. These events are not conducive to onsite training and are not typically staffed by persons with expertise in infection control.

Based on the findings of this literature review, an online training program in infection prevention and control would provide temporary clinic volunteers an effective and accessible alternative to classroom education.

Section III: Study Methods

This intervention seeks to address a gap that exists in the accessibility of infection control training for temporary clinic volunteers. An online infection control training module will be developed, implemented and evaluated to determine the feasibility of such a program in educating clinic volunteers about infection prevention and control practices**.**

Purpose of Study

The purpose of this study is to examine the feasibility of an online training module in educating temporary clinic volunteers about infection control practices. The need for training clinic volunteers is evidenced by occurrences of disease transmission in outpatient settings and the lack of educational resources available for temporary clinics.

Definition of Terms

Healthcare-Associated Infections-Infections that result from healthcare delivery. Previously referred to as nosocomial or hospital acquired infections.

Infection Prevention and Control Strategies - Any measure designed to prevent or control the transmission of infection, e.g., handwashing, environmental cleaning, disinfection, use of personal protective equipment, hepatitis B vaccine, safe needle devices, isolation precautions.

Online training - An educational program delivered electronically. Other terms include web-based, internet or distance learning.

Re-AIM-an acronym that represents five dimensions of an intervention framework: Reach, Effectiveness, Adoption, Implementation and Maintenance.

Temporary Clinics - free-standing, non-permanent clinics staffed by volunteers that provide medical and dental services free of charge.

Volunteers - Medical and non-medical persons who provide services at temporary clinics who do not receive pay for services.

Research Design

The study described in this proposal is descriptive in nature. Qualitative and quantitative methods will be used to evaluate the feasibility of the training module in educating participants about infection control.

Intervention

Online training module. This study includes the development, implementation and evaluation of an online training module designed to educate temporary clinic volunteers about infection prevention and control strategies. This researcher will develop the training module based on current evidence-based infection prevention and control practice standards using Microsoft Office Power Point and audio software (see Appendix A). A-10 item multiple-choice post-test will be embedded at the end of the training module to assess students' comprehension and understanding of the course content (see Appendix B). A 12-item course evaluation will be linked to the training module and available at the end of the training session to evaluate participants' perceptions of the effectiveness of and satisfaction with the course (see Appendix C).

Training Finder Real-time Affiliate Integrated Network (TRAIN). The training module with voice tracks, post-test, and course evaluation will be published on Training Finder Real-time Affiliate Integrated Network (TRAIN). TRAIN is a web-based educational platform offered as a free service by the Public Health Foundation. TRAIN is available from the www.train.org site and participating TRAIN affiliate sites. Affiliate sites are managed by many state public health agencies, academic partners, and others. The TRAIN network is

interconnected so TRAIN users can access all courses offered on local, state, national and international TRAIN sites. TRAIN offers benefits to both learners and course providers. Learners can use the national database to search for onsite and distance learning courses, create personal training records, provide feedback on courses, sign-up for email notifications for new courses, print certificates of completion and earn CEUs. Course providers can publicize new courses to TRAIN users, manage rosters and registration, collect course feedback and post course material.

This course will be placed on TRAIN Virginia, a state affiliate site hosted by the Virginia Department of Health (VDH). Study participants will access the intervention (training module) from their personal computers using the TRAIN electronic platform. The online module will be field-tested prior to implementation by this researcher and the capstone chair. The instructional designer at VDH will complete any revisions to the training module prior to recruiting study participants.

Description of the Sample

Project participants. A convenience sample will be used to test this training module. Undergraduate nursing and other University of Virginia students enrolled in the spring semester course, NUIP 4003 Culture in Health, will be invited to participate in the program. These students have the opportunity to participate in temporary medical clinics in May, July and October each year. Study participants will be recruited in class by the researcher at the beginning of the spring semester. Approximately 42 participants will be recruited for this study. Inclusion criteria will include students enrolled in the nursing course, Culture in Health; English speaking students; and students who have computer access. Exclusion will include students not enrolled in the Culture and Health course, non-English speaking students and students without computer access.

Recruitment of the participants. Participants will be recruited in person during class for the study by this researcher. They will be told that the project is part of a doctoral Capstone project developed to determine the feasibility of using an online training module to educate temporary clinic volunteers. They will be informed that participation is voluntary and that their decision to participate will not influence their course grade. Students will be given a link to the TRAIN Virginia website and asked to register for an account (see Appendix D). Students will be asked to complete the course within two weeks of the day of recruitment.

Implementation of the training module. Implementation of the training module including participant registration and course completion will occur outside of class. Once the students have registered and receive confirmation from TRAIN, they will be eligible to complete the training module, "Infection Control Course for Temporary Clinic Volunteers". Participants will select the course from the course menu. They will be taken to the course details page (see Appendix E) that will include a description of the course, consent statement, information about the course instructor, and instructions for taking the course, post-test, and course evaluation. The training module, post-test and course evaluation will take approximately 30 minutes to complete.

The researcher will monitor participation in the intervention using the course roster available on the TRAIN website. An email will be sent to the students via the class site one week after recruitment to remind them of the study and how to access the training module.

Evaluation Measures

The intervention will be evaluated using a metric created from the five dimensions of the RE-AIM framework, which include: (1) Reach; (2) Efficacy; (3) Adoption; (4) Implementation;

and (5) Maintenance (Table 2). An evaluation metric using these five domains will be used to measure the feasibility of the online module in providing infection control training.

The primary data source will be the TRAIN website. Data available to the researcher will include the participant roster, participant demographics, post-test scores, and course evaluation responses. The participant roster will include a list of participants who registered on TRAIN and completed the training module. Demographic data will also be available on all registrants (see Appendix D); however, the only demographic data collected for this project will be gender, educational level, professional affiliation and organization.

Post-test data will consist of a single score that is automatically calculated by the software program. The course evaluation, which will be linked to the online training module, will include a 12– item questionnaire developed using a 4-point Likert Scale and open-ended questions to assess participants' perceptions about the course. Individual responses to each course evaluation item will be available for analysis.

The researcher's self-reported experience in implementing the online infection control training module, including the availability of resources, impediments to implementation and sustainability will be considered in the evaluation.

The training module, post-test and course evaluation instruments will be reviewed by two doctorally-prepared nurses and a master's prepared educational designer to ensure content validity. A subject matter expert in infection prevention will also review the post-test to validate content.

Data Analysis Plan

Descriptive statistics will be used to characterize the sample, post-test results, and program evaluation responses. Aggregate scores obtained from the post-tests will be used to

measure the infection control knowledge of the study participants following the completion of the course. The course evaluation responses will be analyzed to determine participants' perceptions about the course. These data will be compared to the outcome thresholds established in the RE-AIM evaluation rubric.

Protection of Human Rights

Every effort will be made to protect participants in the study. The study's purpose, methods, data, and anticipated outcomes will be disclosed to all potential study participants at the time of recruitment. Participants will be told that this is a voluntary study and that participation or lack of participation will not impact their course grade. A consent statement will be included on the course details page, which will be linked to the training module on the TRAIN website. Consent will be acknowledged through the completion of the training module. Since participation is voluntary, students who elect not to participate will not take the course or sign a declination form. This protocol will be submitted to University of Virginia's Institutional Review Board for Social and Behavioral Sciences (IRB-SBS) by this researcher using standardized forms provided by the IRB-SBS. All researchers will complete the human investigation research educational training requirement prior to the recruitment of participants.

Capstone Project Procedures

Prior to the implementation of this Capstone project, the study protocol will be submitted as described above to U.Va.'s Institutional Review Board for Social and Behavioral Sciences for review and approval (see section, Protection of Human Rights).

This project will occur in consecutive three stages including the: (1) completion, placement and field-testing of the online training module; (2) recruitment of participants and

implementation of the training program by participants; and (3) project evaluation. This project will occur during the spring 2014 academic semester (See Table 3).

Stage I. The contents of the training module, "Infection Control Course for Temporary Clinic Volunteers" including the post-test, course evaluation and course details page will be reviewed by the Capstone chair and VDH's instructional designer. A nurse certified in infection prevention will review the post-test. After the documents are finalized, that will be submitted online to VDH's instructional designer for publication and posting on the TRAIN Virginia website. Once the training module is available on TRAIN, the researcher and capstone chair will field-test the course to ensure functionality. The researcher and instructional designer will resolve any problems that are identified prior to recruiting the project participants.

Stage II. Participants will be recruited as described previously from a pool of nursing and other U.Va students. The researcher will recruit the students in person during a classroom session that will include a description of the study and a link to the training module. Students will be instructed for register for a TRAIN Virginia account and given a link to the website (see Appendix D). The researcher will monitor the TRAIN course for participation and send a follow-up email to student one week after the day of recruitment.

Stage III. After the completion of the two-week implementation period, data will be gathered from the TRAIN website that will include participants' demographic data (sex, educational level, professional affiliation and organization), post-test scores and course evaluation responses. As mentioned previously, the researcher's experience in implementing the online infection control training module, including the availability of resources, impediments to implementation and sustainability will be considered in the evaluation. The data will be analyzed by the researcher and the results will be evaluated using the evaluation metric designed for this

study. The data will be reviewed with the capstone committee chair prior to documenting the results.

Strengths of the Study Design

This study seeks to address an important gap in education that exists among volunteers who participate in temporary clinics. The outcomes of this study may provide insight about effective ways to train clinic volunteers about infection prevention and control and prevent the spread of infectious diseases in clinic settings.

The online method of delivery used in this training module is an effective educational platform for delivering information about infection prevention and control. The training module will be accessible to any participant who has a computer and internet access. Standardized educational software programs will used to create and publish this program. The use of a pre-existing web-based educational platform hosted and maintained by the Virginia Department of Health will enhance accessibility and feasibility. Persons who participate in the study can also participate in other training programs on the TRAIN website.

The course is economical and sustainable. This training module will be available as long as the TRAIN website exists. TRAIN is supported by the Public Health Foundation and is maintained by federal and state agencies. There is no charge for course developers to publish courses on TRAIN and there is no cost to course participants for this course. The course developer can edit the module at any time and easily upload revisions and updates.

Recordkeeping is simple for both the course provider and participants. The TRAIN program tracks course participation and both the researcher and individual participants will have a record of attendance that can be accessed at any time. Participants can also print a certificate of attendance for their records.

Participants recruited for this project represent a segment of the population that volunteer at temporary clinics. The participants in this study will include both medical and non-medical training participants. The post-test and course evaluation will provide insight as to the feasibility of the module in educating participants about infection prevention and control.

Weaknesses of the Study Design

Several limitations have been identified in this study design. First, the size of the sample may not be adequate to demonstrate the feasibility of the module in educating persons about infection prevention and control. The sample is also a convenience sample and it does not represent all temporary clinic volunteers.

The software program used to publish this training module will not accommodate both a pre-test and post-test; therefore, it is difficult to measure the effectiveness of the module in increasing participants' knowledge about infection control. The availability of only a single post-test score limits the ability of the researcher to identify strengths and weaknesses in content delivery and the data collection instrument.

This researcher extensively investigated the availability of other platforms for presenting and evaluating the training module. While other training software programs and platforms exist, this venue offered a readily accessible online platform for publishing course content, recordkeeping, collecting both demographic and evaluative data, is offered at no cost to the participants or researcher.

Products of Capstone

The products of this capstone project include: (1) an online training, module, "Infection Control Course for Temporary Clinic Volunteers"; (2) a post-test; (3) a course evaluation tool;

(4) a course details page; (5) a 2-page summary using the course evaluation metric; (6) and a manuscript submission to *Infection Control and Healthcare Epidemiology* (Appendix F).

Section IV: Results

The purpose of this project was to study feasibility of an online infection control training module in educating temporary clinic volunteers about infection prevention and control strategies. This project included the development, implementation and evaluation of an on-line training module tailored to address infection control risks and strategies in free, temporary clinics as described below.

Protection of Human Rights

This project was submitted per protocol to UVA's IRB SBS for review. Following review by the IRB, the researchers were notified that the project was exempt (Appendix G).

Development of the Training Module

The training module, "Infection Control for Temporary Clinic Volunteers," including the post-test, program evaluation, and course details page was completed and reviewed by two doctorally-prepared nurses and the VDH educational designer. A script was written for each slide and professionally narrated. The training module (including slides, voice tracks, post-test, course evaluation, and course details page) was submitted to the VDH instructional designer for publication and posted on the TRAINVA website. The training module was field-tested by the researchers and two other nurses to determine the functionality of the registration process and all components of the training program. Minor edits to the training module were submitted to and completed by the VDH instructional designer. The revised module was field-tested again and no additional revisions were made to the module.

In an effort to achieve optimal project outcomes, numerous meetings were held with the VDH educational designer prior to the development and implementation of this project. The functionality of the site was explored prior to implementation to ensure that TRAIN was a solid

platform for this project. This project director was familiar with TRAIN as a participant, but not as a course provider. Course provider policies were reviewed and a course provider application was submitted to the TRAIN Virginia administrator.

Implementation of Training Module

A total of forty-two students enrolled in University of Virginia's spring semester course, NUIP 4003 Culture in Health were recruited during a scheduled class meeting time. They were given an explanation of the project and instructions on how to access the course. They were informed that participation was voluntary and that their decision to participate would not affect their course grade. They were given a handout that included a link to the TRAIN Virginia website and instructions for registering for a TRAIN account (Appendix D). They were asked to complete the course within two weeks from the day of recruitment. Two emails were sent to the students via the course professor during the recruitment period to remind them about the training module.

At the end of the two-week implementation period, 11/42 (26%) students were registered TRAIN users and 9/42 (21%) had completed the training module and post-test. The sample was comprised of 10 females and one male. The group was ethnically diverse, with 55% (6/11) indicating they were white and 45% 9 (5/11) representing other ethnic backgrounds. All of the students indicated that English was their primary language. Program participants included students who were enrolled in both medical and non-medical undergraduate programs of study. Approximately 55% (6/11) were from the School of Nursing and the remaining 45% (5/11) were from the Schools of Arts and Sciences and Education.

RE-AIM Evaluation

Nine of the 11 registered students completed the training program and course post-test and eight students completed the course evaluation. The feasibility of the training module was evaluated in relation to the RE-AIM dimensions using data obtained from the TRAIN course roster and program evaluation responses. Students were asked to score 10 questions on the program evaluation using a 4 point Likert scale (strongly agree, agree, disagree and strongly disagree) and to comment on two open-ended questions (see Appendix C). The program evaluation questions were cross-walked to an evaluation metric that was created using the five dimensions of the RE-AIM model (Table 2). Each domain of the Re-AIM metric was addressed as described below.

Reach. The reach domain is measured by the success of the project in exposing or serving the intended audience. In this study, the desired outcome was to recruit students to complete the training module. Forty-two students were exposed to the course and 21% (9/42) completed the training module and post-test.

Effectiveness. The effectiveness of the project was measured by the impact the program had on the participants in gaining knowledge about infection control. The students' post-test scores were, 100% (4 students), 90% (3 students), one 80% (1 student) and 40% (1 student). Two other measures were examined including students' perceptions about their knowledge gained about infection control from the training and the effectiveness of the web-based format in promoting learning. Ninety-percent of the students agreed that their knowledge about infection control had increased because of the training and all of the students agreed that the web-based format was conducive to learning.

Adoption. The adoption dimension involves the uptake of information by the target population and the perceived value of the project to the participants. Temporary clinic volunteers have diverse backgrounds and experiences. While there was ethnic diversity among the participants, all of them were undergraduate students from the University of Virginia. The perceived value of the training program was scored by the participants in regard to relevance of the information to practice and the level of confidence in performing infection control strategies after taking the module. All of the students agreed that the information in the module was important to practice and they felt confident in performing the infection control strategies presented in the module.

Implementation. The implementation of this training module was evaluated by examining the timeliness of implementation, respondent's perceptions about the organization and length of the course, efficiency of TRAIN registration process, and ease of understanding of the course instructions and terminology. The training course was implemented according to the timeline established during the project planning phase. All the components of the program, including the training module, voice tracks, course description, post-test and course evaluation were online and field-tested prior to the recruitment of the participants. All of the students agreed that the course was well-organized, adequate in length, the instructions were easy to follow and the terminology was understandable. The students did not agree on the efficacy of the TRAIN registration process. Of the eight respondents that completed the course evaluation, six (75%) agreed that the registration process was efficient and two disagreed (25%).

Maintenance. The sustainability and long-term use of this training module were the basis for choosing the TRAIN platform. TRAIN is a growing public health information network that has been in existence since 2003. TRAIN Virginia, an affiliate of TRAIN, is supported by

federal and state funding and maintained by designated VDH training personnel. The perception of the course is important in marketing the training program to potential users. All of the project participants indicated they would recommend the training module to persons who plan to volunteer at temporary clinics.

Additional Feedback:

Participants were asked to provide additional comments and suggestions on the course evaluation. Several students indicated the course was helpful, effective, comprehensive, well-organized and contained important information to prevent the spread of disease in clinics. Suggestions for improvement included providing a transcript for hearing-impaired learners, making the course a continuous video that has the options to pause, rewind and play, and improving the TRAIN registration process to make it more user-friendly.

Discussion

The successful implementation and completion of this training module by project participants using a web-based training platform is evidence that an online program is a feasible means of educating temporary clinic volunteers about infection control. Results obtained from course evaluations support the effectiveness of the project in addressing the five RE-AIM evaluation domains: Reach, Effectiveness, Adoption, Implementation and Maintenance. The RE-AIM framework also provided important insights about the strengths and weaknesses of the program.

All aspects of the training module were implemented as scheduled. Numerous meetings were held with VDH personnel prior to implementation to learn about TRAIN and the course provider process. These meetings were instrumental in the development, implementation and evaluation of the final product.

The program was successful in reaching a group of potential temporary clinic volunteers and recruiting course participants. However, this group was not representative of all temporary clinic volunteers and further testing is needed to determine the extent to which the program can be accessed and completed by all temporary clinics volunteers. Persons without internet access or previous experience in taking online training courses may have difficulty accessing or completing the module. To accommodate temporary clinic volunteers who don't have computer access, clinic planners could provide a hard copy of the module to volunteers at the time of registration either by mail or on-site.

All of the participants agreed that the web-based format was conducive to learning. Most of the participants who completed the training module increased their knowledge about infection control and scored well on the post-test. Some of the students, particularly the nursing students, may have been exposed to the information prior to taking the module. Only aggregate test scores were available for the post-tests so it was difficult to determine trends in scoring patterns for specific questions. It's also possible that because the module was not a required learning activity, and there was no required score for participation in the remote clinics, some participants did not take the post-test seriously. Consideration should be given to the value of the post-test in future training modules. It is unlikely that temporary clinic planners or volunteer coordinators have the resources to monitor test results or would turn away volunteers based on their test scores. However, clinic planners should require volunteers to show documentation of infection control training prior to serving in clinics.

The training module was adopted by the course participants as evidenced by the high participant rankings in the area of perceived confidence in performing the infection control strategies. However, the sample was comprised of undergraduate university students, some with

formal nursing training. The overall effectiveness of the course in the general volunteer population must be further evaluated. It would also be worthwhile to observe how those who complete the module perform infection control procedures in temporary clinic settings once they have had a chance to implement them in the remote clinical settings.

Participants perceived the course to be well-organized, easy to follow, and easy to understand. One participant suggested adding a transcript to the module to accommodate volunteers that are hearing impaired. Another suggested offering the course in a format that could allow participants to pause, replay or stop it.

TRAIN was chosen as the online platform for this training module because it is sustainable, economical and accessible. TRAIN is a well-established and long-standing program that is publically funded and maintained. TRAIN courses are accessible to anyone who has a computer and internet access. TRAIN offers course providers easy access to course rosters and demographic information submitted by the registrants, and test scores. Course participants can access a permanent log of all of the TRAIN courses they have completed and print a certificate of completion. TRAIN also allows course providers to offer contact hour credit for approved courses.

While TRAIN has many attributes, the registration process is perceived by some to be difficult to navigate. Two students who registered for TRAIN did not complete the course. The reason for this is unknown, but it is possible the students had technical difficulties with the course or that the registration process was too cumbersome or time consuming. In addition, one student who field tested the course and two participants stated they had difficulty registering for TRAIN even with written instructions. These difficulties may deter potential learners from taking courses on TRAIN. This feedback will be provided to the VDH TRAIN administer in the

event the TRAIN site could be streamlined to improve usability. In addition to TRAIN, other on-line platforms should be explored for future training programs.

All of the project participants indicated they would recommend the training module to persons who plan to volunteer at temporary clinics and felt the information was important to providing safe care. The perceived value of the program by the participants in this project supports the potential advantages of an on-line training program in infection control to safe practice in temporary clinics.

Nursing Implications

This project has important implications for nursing practice. First, this study addresses an educational gap in infection control that exists for nursing and non-nursing outpatient clinic staff, specifically temporary clinic volunteers. Second, a web-based training program would increase the accessibility of infection control training for nurses and anyone who seeks training in infection control. The online training format is particularly beneficial for persons participating in temporary medical clinics and disaster shelters, where on-site training is often unavailable. Third, this program is built on evidenced-based practices that have been shown to prevent and minimize the transmission healthcare-associated infections. Fourth, this project considers the challenges faced by temporary clinic program planners in meeting the needs of the public and emphasizes the importance of promoting safe practice in all healthcare settings, including temporary clinics. Finally, this project highlights the need for further research in determining the utility of an online module in the general volunteer population and the impact of training on safe practice.

Section V: Manuscript

Manuscript Submission to: Infection Control and Hospital Epidemiology

An On-Line Infection Control Training Program

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Abstract

Objective: Temporary clinic settings pose unique challenges in infection prevention. This paper describes the feasibility of an online training module in educating temporary clinic volunteers about infection control.

Background: The recent increase in healthcare-associated infection (HAI) outbreaks in outpatient settings underscores the need for increased emphasis on infection prevention and control in these settings. Data from outbreak reports reveal a lack of staff knowledge about infection control recommendations and adherence to proven infection control standards. Temporary outpatient clinic settings often lack the infrastructure and resources to ensure compliance with current practice standards and the staff frequently includes volunteers that lack formal training in infection control. This gap provides the rationale for the educational intervention described in this paper.

Methods: An on-line infection control training module was developed and placed on the Training Finder Real-Time Affiliate Integrated Network (TRAIN), a web-based educational platform maintained by the Virginia Department of Health. The narrated module included a review of evidence-based infection control strategies, a post-test and course evaluation. The feasibility of the online training module was evaluated using the five domains of the RE-AIM model: Reach, Effectiveness, Adoption, Implementation and Maintenance.

Results: An online infection control training program tailored for temporary clinic volunteers was successfully completed by student participants. Evaluation data obtained from participants indicated the program was successful in addressing the five dimensions of the RE-AIM framework.

Conclusions: An online training module is a feasible means of educating temporary clinic volunteers about infection control. There is a need for further research to determine the utility of an online training module in promoting safe infection control practices.

The shift in healthcare delivery from inpatient hospital settings to outpatient (or ambulatory) clinics has resulted in the creation of thousands of non-hospital settings nationwide, including ambulatory surgical centers, dialysis centers, long-term care facilities and permanent and temporary medical clinics. [1,2]As a result, healthcare-associated infection (HAI) outbreaks are increasingly frequent in these settings. Data obtained from outbreak investigations reveal a lack of knowledge about and adherence to infection control practices. This paper describes an educational intervention developed to train temporary clinic volunteers about infection control.

Temporary Clinics

Further complicating the healthcare landscape is the utilization of free, temporary ambulatory clinics that provide medical and dental services to individuals with limited access to care. Free clinics serve approximately 38% of the population, and demand for them has increased steadily since the recession.[3] Temporary clinics generally serve large numbers of patients in an expedited manner. They are often in public community settings such as school gymnasiums, auditoriums, fairgrounds, parks and coliseums. They are generally unregulated and rely heavily on donated resources including space, equipment, supplies and healthcare services.[4] Healthcare services are typically provided by volunteers with diverse backgrounds who travel long distances to attend the clinics. Finally, due to the episodic nature of these clinics, they do not have established policies and procedures, or the infrastructure to develop and implement quality improvement programs or provide training to clinic volunteers.

Infection Risks in Temporary Clinics

The risk of HAIs in these clinics is similar to risks in other healthcare settings, as many perform the same procedures conducted in hospitals, permanent outpatient clinics and surgical centers. Medical services offered in temporary clinics vary from simple health screenings (e.g., blood pressure, blood glucose screenings) to invasive surgical procedures (e.g., biopsies, tooth extractions, root canals). Temporary clinics are not regulated by state health departments and operate outside of the safety net system.[5]

Healthcare-Associated Prevention Initiatives

While the magnitude of the HAI burden is unknown, there is little disagreement that HAIs are a public health problem worthy of prevention. The majority of HAIs result from breaches in proven infection prevention strategies[1]. In a landmark study conducted by Centers for Disease Control and Prevention (CDC) in the 1970s, known as the SENIC Study, researchers found that at least 30% of HAIs in hospitals are preventable when proven infection control strategies are followed. [6] However, current researchers have shown an even larger margin of error and estimate that at least 50% of HAIs are preventable when evidence-based infection control standards are consistently implemented. [7]

The shift in healthcare delivery to outpatient settings and the recent increase in HAI outbreaks reported to the CDC highlight the need for greater focused infection prevention efforts in these settings. [2] Data from outbreak reports reveal insufficient knowledge about infection control recommendations and adherence to basic practice standards for infection control. HAI outbreaks have occurred in all ambulatory settings including dialysis centers, surgery centers, temporary clinics, health fairs, dermatology, pediatric, primary care, pain and oncology clinics;

and most involved common medical procedures such as medication preparation and administration, and blood glucose monitoring. A recent report published by the CDC documented 35 outbreaks of viral hepatitis in outpatient settings from 2008 to 2012.[8] Almost half (17 out of 35) of the infections occurred in outpatient medical clinics, including one in a temporary dental clinic held in a school gymnasium. This outbreak involved the transmission of hepatitis B to both clinic volunteers and patients. The exact source of transmission is unknown; however, breaches in infection control are likely the cause.

In an effort to address infection prevention and control in outpatient settings, the CDC has launched a HAI website dedicated to preventing infections in ambulatory care settings.[9] The website provides resources for outpatient facilities, including a list of outbreaks and notification events, infection prevention guidelines and checklist, a model infection control plan for oncology settings, and additional recourses for ambulatory care personnel and patients. The American Recovery and Reinvestment Act (ARRA) of 2009 (Recovery Act) has led to increased efforts in HAI prevention.[10] Approximately $50 million were allocated to HAI prevention which allowed the U.S. Department of Health and Human Services (DHHS) to move beyond HAI prevention in hospitals and extend their focus to outpatient settings.

Evidence of Need

The federal initiatives referenced above are evidence that the HAI prevention pendulum is beginning to shift to outpatient settings. However, the availability of infection control guidance for outpatient settings varies greatly by setting. A review of web-based outpatient infection prevention and control guidance documents conducted by the author in 2013 found 55 documents that addressed infection control strategies in the following outpatient settings:

Ambulatory care (n=11); Dental (n=6); Dialysis (n=9); Disaster (n=19); Homeless Shelters (n=10). No guidance documents or educational materials were found for temporary medical clinics.

Procedures and practices also vary in temporary clinic settings. An onsite infection control assessment of a large Remote Area Medical (RAM) clinic in Virginia was conducted in 2012 by the author. Medical and dental services were provided to 5,046 patients by 1,379 volunteers during the three day expedition. The assessment was conducted using CDC's Infection Prevention Checklist for Outpatient Settings [9] and included clinical observations, protocol reviews, and in-person interviews. The findings revealed that infection control training is a volunteer requirement, but is not provided by RAM or validated. Clinic protocols developed by the Wise RAM Advisory Committee were obtained and included references to the Occupational Safety and Health Administration's Bloodborne Pathogen Standard and a procedure for managing occupational exposures. However, these documents were not readily available to volunteers. Volunteers were observed using infection control strategies while caring for patients; however, inconsistencies were noted in the areas of hand hygiene, personal hygiene, personal protective equipment, and cleaning and disinfection.[9] Interviews with volunteers revealed varying backgrounds, education and clinical skills. None of the volunteers interviewed stated they had infection control training in preparation for the RAM clinic.

Purpose of Study

The purpose of this study was to examine the feasibility of an online training module in educating temporary clinic volunteers about infection control practices. Occurrences of disease

transmission in outpatient settings and the lack of educational resources available for temporary clinics provided evidence of the need for training clinic volunteers.

METHODS

Intervention

Online training module. This project included the development, implementation and evaluation of an online training module designed to educate temporary clinic volunteers about infection prevention and control strategies. This researcher developed the training module based on current evidence-based infection prevention and control practice standards using Microsoft Office Power Point and audio software. A10-item multiple choice post-test was embedded at the end of the training module to assess students' comprehension and understanding of the course content. A 12-item course evaluation was linked to the training module and available at the end of the training session to evaluate participants' perceptions of course effectiveness and satisfaction. The evaluation included both ranked and open-ended questions (Table 1).

Two doctoral nurses and the instructional designer at the Virginia Department of Health reviewed the training module, post-test, and course evaluation prior to publication. The training module with audio tracks and a post-test were published in the software program, Articulate, and then placed on the Training Finder Real-time Affiliate Integrated Network (TRAIN), a web-based educational platform hosted and maintained by the Virginia Department of Health (VDH). The course evaluation was linked to the training module in a Google document. The online module was field-tested prior to implementation by this researcher and the capstone chair. The instructional designer at VDH completed revisions to the training module prior to recruiting study participants.

Participants

A convenience sample was used to test this training module. A total of 42 undergraduate students enrolled in the nursing course, NUIP 4003 Culture in Health, were invited to participate. These students have the opportunity to participate in temporary medical clinics in May, July and October each year. Student participants were recruited in class by this researcher and given an explanation of the project, including a handout with a link to the training module. They were told that participation was voluntary. Inclusion criteria included students enrolled in the course, Culture in Health; English speaking students; and students who had computer access. Exclusion criteria included students not enrolled in the Culture and Health course, non-English speaking students and students without computer access. Students were given two weeks to complete the course.

Evaluation of Feasibility

The intervention was evaluated using a metric created from the five dimensions of the RE-AIM framework, which include: (1) Reach; (2) Efficacy; (3) Adoption; (4) Implementation; and (5) Maintenance (Table 2). [11] The course evaluation questions were cross-walked to the evaluation metric, which was the primary tool, used to assess feasibility (Table 2). The main data source was the TRAIN website. Data available included the participant roster, participant demographics, post-test scores and course evaluation responses. Demographic data was available on all registrants; however, the only demographic data collected for this project included gender, educational level, professional affiliation and organization. Post-test scores and participants' responses on the course evaluation were used to complete the evaluation metric. The researcher's experience in implementing the online infection control training module, including the

availability of resources, impediments to implementation and sustainability, were considered in the evaluation.

The training module, post-test and course evaluation instruments were reviewed by two doctorally-prepared nurses and a master's prepared educational designer and infection preventionist to ensure content validity. The University of Virginia's Institutional Review Board for the Social and Behavioral Sciences approved the project protocol.

RESULTS

On-Line Training Module

The narrated training module, "Infection Control for Temporary Clinic Volunteers," was completed, validated and posted on the TRAIN Virginia website. All of the components of the training module were field-tested by the author and two other nurses to verify the functionality of the registration process and module components.

Implementation of Training Module

Students were recruited during class by the researcher. They were given a handout that included a link to the TRAIN Virginia website and instructions for registering for a TRAIN account. They were asked to complete the course within two weeks from the day of recruitment. Two reminders about the training module were emailed to students via the course professor during the recruitment period.

At the end of the two-week implementation period, 11 students were registered TRAIN users and nine had completed the training module and post-test. The sample was comprised of 10 females and one male. The group was ethnically diverse, with 55% (6/11) indicating they were white and 45% (5/11) representing other ethnic backgrounds. All students indicated English was their primary language. Program participants included students who were enrolled in both

medical and non-medical undergraduate programs of study. Approximately 55% (6/11) were from the School of Nursing and the remaining 45% (5/11) were from the Schools of Arts and Sciences and Education.

RE-AIM Evaluation

Nine of the 11 registered students completed the training program and course post-test and eight students completed the course evaluation. The feasibility of the training module was evaluated in relation to the RE-AIM dimensions using data obtained from the TRAIN course roster, post-test scores and program evaluation responses.

Reach. The reach domain is measured by the success of the project in exposing or serving the intended audience. In this study, the desired outcome was to successfully recruit students to complete the training module. Forty-two students were exposed to the course and 21% (8/42) completed the training module and post-test.

Effectiveness. The project's effectiveness was measured by the program's impact on participants in gaining knowledge about infection control. Post-test scores obtained by students were: 100% (4 students), 90% (3 students), one 80% (1 student) and 40% (1 student). Students' perceptions about knowledge gained about infection control and the effectiveness of the web-based format in promoting learning were also measured. Ninety-percent agreed that their infection control knowledge had increased as a result of the training and all students agreed that the web-based format was conducive to learning.

Adoption. The adoption dimension involves the uptake of information by the target population and the perceived value of the project to the participants. Temporary clinic volunteers have diverse backgrounds and experiences. While there was ethnic diversity among participants, all were undergraduate students from the University of Virginia. The perceived value of the

training program was scored by participants in regard to relevance of the information to practice and the level of confidence in performing infection control strategies after taking the module. All students agreed that the information in the module was important to safe practice and felt confident in performing the strategies presented in the module.

Implementation. The implementation of this training module was evaluated by examining the timeliness of implementation, respondent's perceptions about the organization and length of the course, efficiency of the TRAIN registration process, and ease of understanding of the course instructions and terminology. All components of the program were field-tested and online prior to recruiting participants. All participants agreed that the course was well-organized, adequate in length, instructions were easy to follow, and terminology was understandable. The students did not agree on the efficacy of the TRAIN registration process. Of the eight respondents that completed the course evaluation, six (75%) agreed that the registration process was efficient and two disagreed (25%).

Maintenance. The sustainability and long-term use of this training module were factors considered in selecting the TRAIN platform. TRAIN Virginia, an affiliate of TRAIN, is supported by federal and state funding and maintained by designated VDH personnel. All project participants indicated they would recommend the training module to persons who plan to volunteer at temporary clinics.

Additional comments written by the students included, "the course was helpful, effective, comprehensive, well-organized and contained important information to prevent the spread of disease." Suggestions for improvement included, "provide a transcript of content for hearing impaired, make the course a continuous video so people can pause, replay or stop it, and make the TRAIN registration process more user-friendly."

DISCUSSION

The successful implementation and completion of this training module by project participants using a web-based training platform is evidence that an online program is a feasible means of educating temporary clinic volunteers about infection control. Results obtained from course evaluations support the effectiveness of the project in addressing the five RE-AIM evaluation domains: Reach, Effectiveness, Adoption, Implementation and Maintenance. The RE-AIM framework also provided important insights about program strengths and weaknesses.

All aspects of the training module were implemented as scheduled. Numerous meetings were held with VDH personnel prior to implementation to learn about TRAIN and the course provider process. These meetings were instrumental in the project's successful implementation.

The program was successful in reaching a group of potential temporary clinic volunteers and recruiting course participants. However, this group was not representative of all temporary clinic volunteers and further testing is needed to determine the extent to which the program can be accessed and completed by all temporary clinic volunteers. Persons without internet access or previous experience taking online training courses may have difficulty accessing or completing the module.

All participants agreed the web-based format was conducive to learning, important to safe practice, and increased their confidence in performing infection control strategies. Since the sample was comprised of undergraduate university students, some with formal nursing training, there is a need to further evaluate the course's overall effectiveness in the general volunteer population. It also would be worthwhile to assess how those who complete the module perceive their adoption of the infection control procedures once they have had an opportunity to implement them in temporary clinical settings.

Most of the participants who completed the training module increased their knowledge about infection control and scored well on the post-test. Some students, particularly nursing students, may have been exposed to the information prior to taking the module. Since only aggregate test scores were available, a test item analysis could not be performed to identify scoring patterns. It's also possible that because the module was not a required learning activity, and there was no required score for participation, participants did not take the post-test seriously. Consideration should be given to the value of including a post-test in the future since test scores are unlikely to impact clinic participation.

TRAIN was chosen as the online platform for this training module because it is sustainable, economical and accessible, allows course providers easy access to course rosters and test-scores, and offers a permanent attendance log and certificate of completion for participants. The TRAIN registration process was perceived by some participants as difficult to navigate. Some students stated they had difficulty registering for TRAIN even with written instructions and two students that completed registration did not complete the course. These difficulties may deter potential learners from taking courses on TRAIN. This feedback was provided to the VDH TRAIN administrator. In addition to TRAIN, other on-line platforms should be explored for future training programs.

Participants perceived the course to be well-organized, easy to follow, and easy to understand. Suggestions for improvement included adding a transcript to the module to accommodate hearing impaired learners and offering the course in a format that allows participants to pause and rewind the module.

All participants indicated they would recommend the training module to persons who plan to volunteer at temporary clinics and felt the information was important to providing safe

care. The perceived value of the program by participants in this project supports the potential advantages of an online training program in infection control to safe practice in temporary clinics.

Practice Implications

This project has important implications for clinical practice. An educational gap in infection prevention and control is addressed for temporary clinic volunteers. The web-based training module increases the accessibility of evidence-based infection control practice strategies to prevent the transmission of healthcare-associated infections in temporary clinic settings. Finally, this project considers the challenges faced by temporary clinic program planners in meeting the needs of the public and emphasizes the importance of promoting safe practice in these settings. Further research is needed to determine the utility of the training module in educating all temporary clinic volunteers and in changing practice behaviors.

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Potential conflicts of interest. All authors report no conflicts of interest relevant to this article.

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Table 1

Infection Control Training for Temporary Clinic Volunteers Course Evaluation

Topic	Strongly Agree	Agree	Disagree	Strongly Disagree
The course was well organized.	n=6	n=2		
The time devoted to the topic was adequate.	n=4	n=4		
The TRAIN registration process was efficient.	n=5	n=1	n=2	
The instructions for completing the training module were easy to follow.	n=6	n=2		
The information presented in the module is important to providing safe care.	n=7	n=1		
My knowledge about infection prevention and control increased as a result of the training.	n=2	n=5	n=1	
The web-based format is conducive to learning.	n=5	n=3		
The terminology used in the training module was at a level I could understand.	n=6	n=2		
Would you recommend this online training program to persons who volunteer at temporary clinics?	n=6	n=2		
I feel confident performing the infection control strategies presented in the module.	n=5	n=3		
Additional Thoughts: 1. What suggestions would you have to improve the training module? 2. Please provide any additional comments you have about the course?				

Table 2

RE-AIM Infection Control Evaluation Metric

RE-AIM Dimension	**Definition**	**Application to Study**	**Outcome Measure**	**Project Outcomes**
Reach	How many people are exposed or served?	How many people were exposed to the online training module and how many completed module?	Students recruited for the project will complete the training module. # completed module # exposed to module	Achieved. Nine students completed the training module representing 21% (9/42) of the students recruited.
Effectiveness	What is the impact of initiative on intended outcomes?	Did the participants who completed the online module gain knowledge about infection prevention and control practices?	The average score of students completing the post-test will be 80% or better.	Achieved. The average score of the students completing the training module was 87.5%. Post-test scores: 100% (n=4) 90% (n=3) 80% (n=1) 40% (n=1)
			80% of the course evaluations will reflect agreement with the following items:	Achieved.

			1. My knowledge about infection control increased as a result of the training.	Eighty-eight percent (7/8) of the students agreed that their knowledge about infection control increased as a result of taking the course.
			2. The web-based format is conducive to learning.	100% of the students agreed that the web-based format was conducive to learning.
Adoption	How many settings/sectors are involved and are they representative? Values and capacity of the setting/sectors are similar. Evidence of effectiveness.	Did study participants represent different agencies and professional roles? Did study participants perceive the online training module to be of value? Did the study	Project participants represented RAM population.	Partially achieved. Convenience sample of UVa students.
			80% of the course evaluations will reflect agreement with the following items:	Achieved.

		participants adopt the training concepts?	1. The information presented in the module is important to providing safe care.	100% of the participants agreed that the information is important to providing safe care.
			2. I feel confident in performing the infection control strategies presented in this module.	100% of the participants agreed that they felt confident in performing the infection control strategies presented.
Implementation	Were the required activities of your initiative successfully implemented?	Were all components of the training program published online and accessible to the study participants? Did the implementation of the intervention occur on schedule? Was the module organized?	All components of the training module are available in TRAIN Virginia and were available the same day students were recruited.	Achieved. All of the components of the training module were placed on TRAIN Virginia and field tested prior to recruiting participants.
			80% of the course evaluations will reflect agreement with the following items:	Partially Achieved.

		Was the length of the course adequate? Was the TRAIN registration process efficient? Were the instructions for completing the module easy to follow? Was the terminology used in the module understandable?	1. The course was well-organized.	100% of the participants agreed the course was well-organized.
			2. The length of the training module was adequate.	100% of the participants agreed the length of the course was adequate.
			3. The TRAIN registration process was efficient.	75% (6/8) of the percent of the participants agreed the TRAIN registration process was efficient.
			4. The instructions for completing the module were easy to follow.	100% of the participants agreed that the module instructions were easy to follow.
			5. The terminology used in the training module was understandable.	100% of the participants agreed the terminology was understandable.

Maintenance	What are the long-term effects of the initiative, and is it sustainable?	Would you recommend this online training program to persons who volunteer at temporary clinics? Is the online training program sustainable?	Evidence exists to show that the program is sustainable.	Achieved. TRAIN Virginia has been in existence since 2003 and is well-supported by federal and state resources.
			80% of the course participants will indicate they would recommend this online training program to persons who volunteer at temporary clinics.	Achieved. 100% of the course participants indicated they would recommend the course.

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Table 1.

Literature Review Summary for Comparative Teaching Studies

Author/Date	Participants	Study Design	Intervention	Outcomes	Study Limitations
Bernard et al (2004)	232 studies published from 1985 - 2002	Meta-analysis	Analysis of comparative studies that compared distance learning and traditional classroom courses.	Distance learning had a slightly larger overall effect size (g=0.0128) when compared to classroom course achievement outcomes (k=318). Wide range of effect sizes in studies (+1.41 to -1.31) Inter-rater reliability 89%	Sample size among studies was highly variable and heterogeneous Missing variables (classroom conditions) in 60% of studies
Cook, et al (2008)	201 studies published from 1990-2007 Study participants were all students enrolled in a healthcare programs or practicing healthcare providers	Meta-analysis	Studies reviewed included those that compared the use of internet-based educational program to a traditional classroom program and with no program.	Internet-based programs designed for health professional were found to be slightly more effective than non-internet courses. Pooled effects 0.10 (95%CI, -0.12 to 0.32; p =.37) Skill scores were better after internet training. When compared to no training 0.85 overall effect (95% CI, 0.49-1.20; p<.001) and when compared to non-internet training 0.90 overall effect	Lack of instructional details in studies Wide variability of instruction designs and topics Control groups varied in study design from no intervention to non-internet interventions.

				(95% CI, -0.26 to 0.44, p=.61; n=12). Inter-rater reliability 71% Heterogeneity was large (1z ≥79%).	
Shachar and Neumann (2010)	125 studies (20,800 students; traditional 11,500 and distance 9,300) Published 1990-2009 University graduate and undergraduate and non-credit courses	Meta-analysis Experimental and quasi-experimental studies Compared student outcomes in face to face and online courses	Independent variable: Method of delivery Dependent variable: Outcome, class performance	Studies comparing outcomes of online courses and face-to-face courses showed that students taking on-line courses outperformed students who received face-to-face instruction. The overall effect size was 0.257 (0.17, 95%CI<0.35) p<.01 High variability score-did not disclose a specific score.	Did not list individual studies No mention of inter-rater reliability Did not describe limitations
U.S. Department of Education (2010)	51 effect; 46 studies Published 1996-2006	Meta-analysis Experimental and quasi-experimental studies Included comparison of face-to-face instruction with online Included comparison of a smaller subset of	Independent variable: delivery method Dependent variable: outcome, class performance	Learning outcomes for online learners exceeded those of students receiving face to face instruction. Online or blended courses outperformed face to face instruction Average effect score +0.24, p,.01 Blended and online compared to face to face +0.35, p<.001	Small study in some studies Not specific to adult learners

		blended instruction courses (face to face plus online) with face to face instruction and online		Purely online and face to face +0.14, p<.05 No significant differences detected in blended vs. online courses Inter-rater reliability 86% Homogeniety- Q 5.4 p<.05	
Aggarwahl et al. (2011)	Medical professionals researchers	Randomized experimental cross-over study	Subjects were divided into two groups (arms). Each group was exposed to an online and onsite biostatistics course and an online and onsite research ethics course. Each student was given a pre-test, immediate post course knowledge and satisfaction test.	Students had a significant increase in knowledge at the completion of both the online and onsite biostatistics and research ethics courses. Biostatistics knowledge scores for both the online and onsite scores showed a significant increase online (48%-58%, p=0.009) and on-site (49%-74%, p<0.001). Research ethics knowledge scores increased from baseline to course completion for both the online (62% to 77%, p=0.005) and on-site (69% to 82% p<0.001) course.	Participants were highly educated, motivated and volunteered for the study which is not representative of all students.

Bloomfield, Roberts & White (2010)	231 first year nursing students enrolled at a single university 2 groups: Control-face-to-face group (n=113) Intervention-computer-assisted learning module (CAL) (n=118) Randomized by computer number generator	Randomized control trial	Control group: Received standardized classroom lecture and in-person hand-washing demon-stration Intervention group: Received instruction on-campus via a computer. A hand-washing demon-stration video was included. Knowledge gained was measured and hand-washing skills were evaluated.	Computer-based and classroom instruction were both effective in increasing knowledge and improving handwashing skills. No significant differences were detected in outcomes between the two groups.	No calculation for sample size Subjects were from one nursing school. Attrition over course of study decreased the sample size of follow-up test scores.
Campell, Gibson, Hall, Richards & Callery (2008)	117 post-graduate nursing students taking a research course at a single university	Non-randomized quasi-experimental study	Control group: Received face-to-face instruction Intervention group: Received course content via internet	Students who took an online research methods course had higher markers than students who received face to face instruction. Overall the mean score was significantly higher among online	Students self-selected group Sample included only post-graduate nursing students from one university No calculation for sample

				learners when compared to face to face instruction (mean benchmark 60.8 compared to those receiving face to face instruction 54.4 (*t*=3.13, df=102, p=0.002).	size
Fakih, Enayet, Minnick, & Saravolatz (2006)	104 physicians in training	Cohort experimental design.	2 Groups Intervention: Mandatory web-based infection control course taken by in-coming students Control: Lecture-based course in infection control taken previously by medical students at start of residency program	Physicians taking a web-based course infection control performed better than the physicians who previously took a lecture-based course. Scores immediately following the web-based course (SD 10.6 ± 2.2) were significantly higher (p.001) than those of the lecture course (SD 8.0 ±2.5).	Not randomized Evaluation did not measure skill on any level. No study limitations described
Linn, Lee, Tinker and Chiu (2006)	26 teachers, 4325 students 16 schools, 5 states, 6-12 graders 2 Groups: Control: 3712	Cohort time-delayed comparison study	Intervention Group: Students received technology-based science curriculum	Students who received the web-based science course scored as well as students who attended class lectures. The overall	Not randomized Demographics excluded. No baseline test for comparison.

	students Intervention: 4328 students		Control: Students received typical non-technology based lecture	invention and control group scores were not significantly different (typical mean 55% correct; TELS mean 54.9% correct; effect size 0.007)	The lecture course was not described in detail.
Phadtare, Bahmani, Shah, and Pietrobon (2009)	48 3rd and 4th year medical, nursing physiotherapy students in U.S. and Brazil. Conducted 2005-2006	Randomized controlled trial study	Intervention Received online program Control Students received traditional classroom lecture	Students who took the scientific writing class on-line scored higher than students who received instruction in the classroom. On all three outcomes, text quality, satisfaction and communication events, the intervention group scored significantly better than the control group.	Inclusion and exclusion criteria minimal, no consideration given to confounders, e.g., IT skills, educational level
Reime, Harris, Aksnes, and Mikkelsen (2008)	141 2nd year nursing students; 119 women, 22 men Alphabeticall y divided into 2 groups 68 Intervention and 73 in control group	Intervention study	Intervention Online course in infection control Control-3 one hour lectures on infection control	Students who received traditional classroom instruction in infection control scored higher multiple choice tests than those receiving online training. On the multiple choice test used to evaluate knowledge, the lecture group scored better than online group (F= (1,138)3.9, p=01);	

				When analyzed by five subgroups, on-line participants scored as well as lecture students on 3/5 subgroups: • Protocols and policies (F=(1,138). 32 p=53 • Standard precautions (F=(1,138). 00 p=91), and • Isolation (F=(1,135) 3.5, p=35. Lecture students scored higher in 2/5 subtests • Epidemio-logy (F=(1,138). 52 p=.00), and • Preoper-ative preparation (F=(1,130)1 1.9, p=.00). No significant differences between the students' satisfaction or time spent in course were detected.	

Table 2

RE-AIM Infection Control Evaluation Metric

RE-AIM Dimension	**Definition**	**Application to Study**	**Outcome Measure**	**Project Outcomes**
Reach	How many people are exposed?	How many people were exposed to the online training module and how many completed module?	Students recruited for the project will complete the training module. # completed module____ # exposed to module	Achieved. Nine students completed the training module representing 21% (9/42) of the students recruited.
Effectiveness	What is the impact of initiative on intended outcomes?	Did the participants who completed the online module gain knowledge about infection prevention and control practices?	The average score of students completing the post-test will be 80% or better.	Achieved. The average score of the students completing the training module was 87.5%. Post-test scores: 100% (n=4) 90% (n=3) 80% (n=1) 40% (n=1)
			80% of the course evaluations will reflect agreement with the following items:	Achieved.

			1. My knowledge about infection control increased as a result of the training.	Eighty-eight percent (7/8) of the students agreed that their knowledge about infection control increased as a result of taking the course.
			2. The web-based format is conducive to learning.	100% of the students agreed that the web-based format was conducive to learning.
Adoption	How many settings/sectors are involved and are they representative? Values and capacity of the setting/sectors are similar. Evidence of effectiveness.	Did study participants represent different agencies and professional roles? Did study participants perceive the online training module to be of value? Did the study	Project participants represented RAM population.	Partially achieved. Convenience sample of UVa students.
			80% of the course evaluations will reflect agreement with the following items:	Achieved.

		participants adopt the training concepts?	1. The information presented in the module is important to providing safe care.	100% of the participants agreed that the information is important to providing safe care.
			2. I feel confident in performing the infection control strategies presented in this module.	100% of the participants agreed that they felt confident in performing the infection control strategies presented.
Implementation	Were the required activities of your initiative successfully implemented?	Were all components of the training program published online and accessible to the study participants? Did the implementation of the intervention occur on schedule? Was the module organized?	All components of the training module are available in TRAIN Virginia and were available the same day students were recruited.	Achieved. All of the components of the training module were placed on TRAIN Virginia and field tested prior to recruiting participants.
			80% of the course evaluations will reflect agreement with the following items:	Partially Achieved.

		Was the length of the course adequate? Was the TRAIN registration process efficient? Were the instructions for completing the module easy to follow? Was the terminology used in the module understandable?	1. The course was well-organized.	100% of the participants agreed the course was well-organized.
			2. The length of the training module was adequate.	100% of the participants agreed the length of the course was adequate.
			3. The TRAIN registration process was efficient.	75% (6/8) of the percent of the participants agreed the TRAIN registration process was efficient.
			4. The instructions for completing the module were easy to follow.	100% of the participants agreed that the module instructions were easy to follow.
			5. The terminology used in the training module was understandable.	100% of the participants agreed the terminology was understandable.

Maintenance	What are the long-term effects of the initiative, and is it sustainable?	Would you recommend this online training program to persons who volunteer at temporary clinics?	Evidence exists to show that the program is sustainable.	Achieved. TRAIN Virginia has been in existence since 2003 and is well-supported by federal and state resources.
		Is the online training program sustainable?	80% of the course participants will indicate they would recommend this online training program to persons who volunteer at temporary clinics.	Achieved. 100% of the course participants indicated they would recommend the course.

Center for Training and Research Translation (2012). Web-based trainings. Retrieved from http://centertrt.org/

Table 3

Capstone Proposal Timeline Grid

Activity	Date Completed
Establish Capstone Committee	August 2013
File Capstone Committee Form with Registrar	September 2013
Contact IRB offices to discuss the criteria for submission to both offices. Identify documents required for submission IRB proposal.	October 2013
Complete CITI training for Institutional Review Board	January 2014
Meet and review Capstone progress with chair	August 21, 2013 October 9, 2013 November 18, 2013
Complete draft proposal of Capstone and submit to Capstone Chair, edit and send to course professor for review and comment.	October 17, 2013 (Chair) October 21, 2013 November 15, 2013
Compete final draft of Capstone proposal and submit to course professor and chair.	November 22, 2013
Schedule date, time and Room for Proposal Defense	October 22, 2013
Send Capstone Proposal to Committee – no later than 2 weeks before proposal defense date	November 29, 2013
Defend Capstone Proposal	December 12, 2013
Prepare IRB application and review with Capstone chair.	December 8, 2013
Revise and review IRB application with Capstone Chair	December 12, 2013
Submit IRB application	January 14, 2014
Apply to TRAINVirginia to be a course provider	March 8, 2014
Submit title page of Capstone to SON registrar	December 2013
Complete “Infection Control Training Module for Temporary Clinic	January 2014

Volunteers”	
Send draft of completed training module to chair for review	January 30, 2014
Submit training module, post – test, evaluation tool and course instructions to VDH for publication on TRAIN Virginia website	February 21, 2014
Test Training Module on TRAIN Virginia website	March 5-19, 2014
Recruit participants in-person during a NUIP 4003 Culture in Health course. Discuss feasibility study, and consent process. Give students the link to TRAIN and ask for them to register for account and consider taking training module. Issue two week timeframe.	March 19, 2014
Capstone test period Monitor TRAIN website for participation	March 19-April 1, 2014
Schedule Capstone Proposal Defense	February 2014
Collect and analyze data from pilot study	April 1, 2014
Review data with chair	April 2, 2014
Finalize Capstone and distribute copies to committee members	April 2, 2014
Defend Capstone	April 15, 2014
Submit final Capstone to chair for review	April 22, 2014
File final copy of Capstone with SON Director of DNP Program. Submit degree application according to policy	May 1, 2014
Submit Final Capstone online	May 1, 2014

Figure 1. RE-AIM Framework

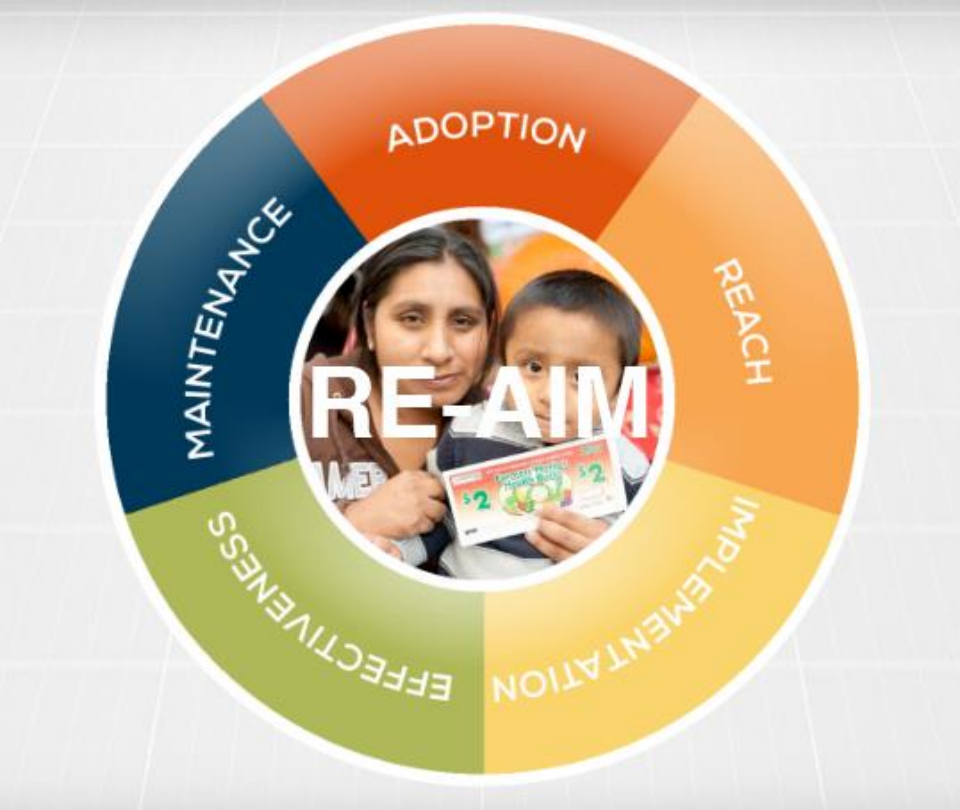


Figure 1. Five Elements of RE-AIM program planning and evaluation framework. Adapted fromRE-AIM.org, http://re-aim.org/

Figure 2. Flow Chart for Literature Review Summary for Comparative Teaching Studies

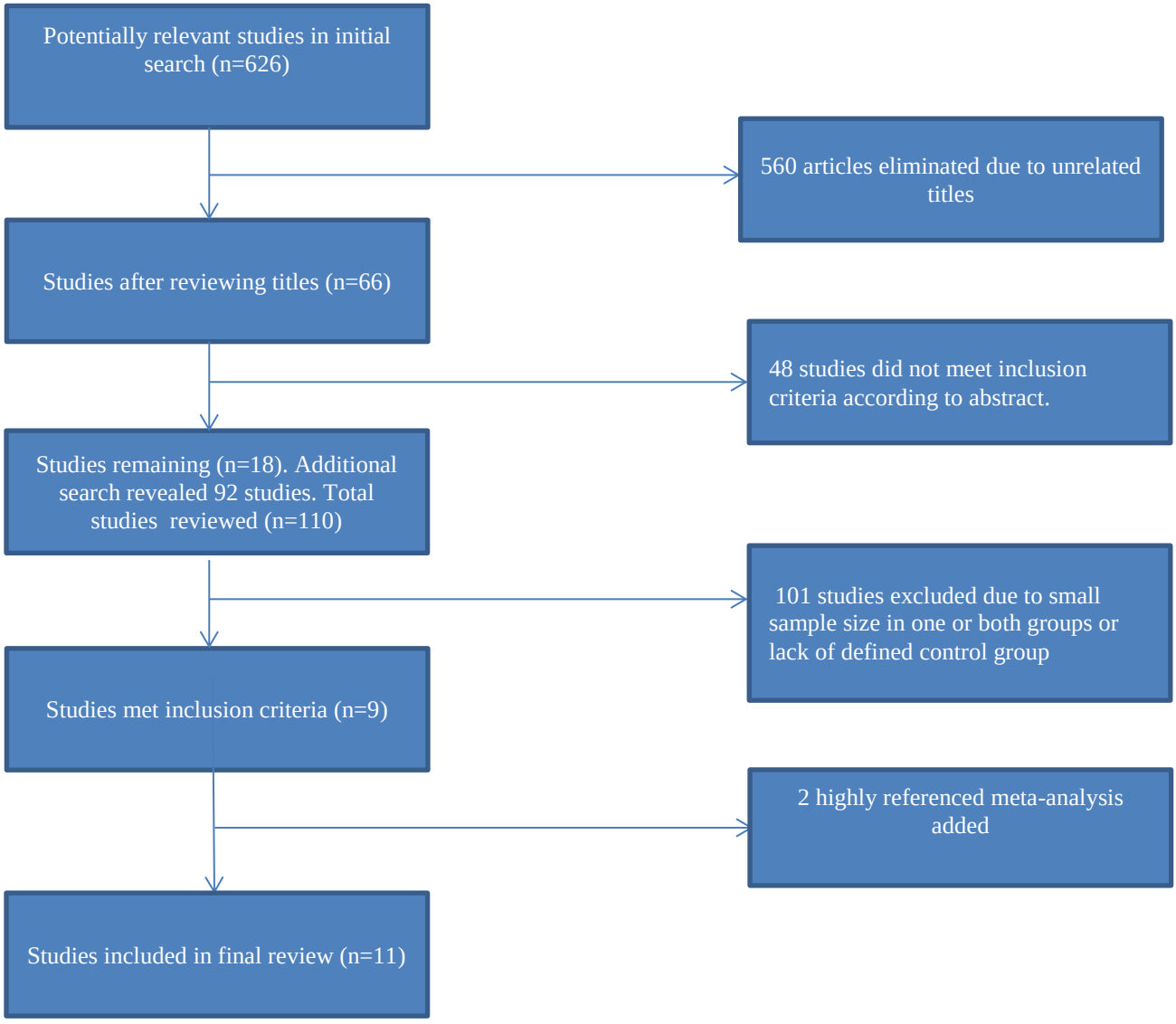
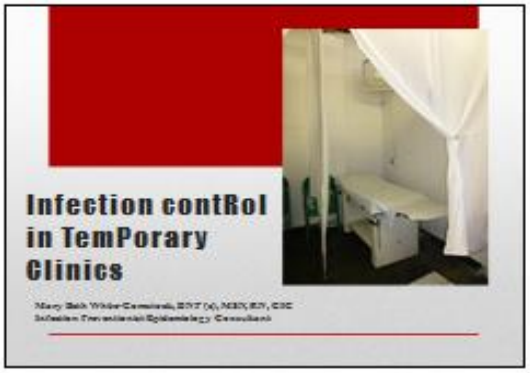


Figure 2. Flow Chart illustrating the literature search process and results.

Appendix A

Infection Control Course for Temporary Clinic Volunteers



Objectives

- Identify the risks of disease transmission in temporary clinics
- List infection control challenges in the temporary clinic setting
- Identify infection control strategies that minimize the risk of disease transmission in temporary clinic settings

Temporary Clinics

http://www.youtube.com/watch?v=TYkfEvGbrKo

Summary

- Temporary medical and dental clinics pose safety challenges to volenteers and their patients
- The transmission of disease in theses settings is preventable
- The Bloodborne Pathogens Standard has proved to be an effective tool in preventing the spread of bloodborne diseases
- Safe healthcare delivery is everyone's responsibility regardless of the setting

Resources

- Centers for Disease Control and Prevention
  - http://www.cdc.gov
- Occupational Safety and Health Administration
  - https://www.osha.gov/
- Virginia Department of Environmental Quality
  - http://www.deq.virginia.gov/Programs/LandProtectionRevitalization/SolidHazardousWasteRegulatoryPrograms/MedicalWaste.aspx
- Virginia Department of Health
  - http://www.vdh.state.va.us/

Post-Test

Appendix B
Infection Control Training Module for Temporary Clinic Volunteers
Post-Test

1. Infectious diseases can be transmitted in any healthcare setting.
    a. True
    b. False
2. Risk factors for disease transmission in temporary clinic settings include all but:
    a. Lack of running water and electricity
    b. Lack of infection control training
    c. Lack of written protocols and procedures
    d. Unlimited medical supplies
3. People infected with bloodborne diseases always have symptoms.
    a. True
    b. False
4. The hepatitis B virus can live approximately ____on environmental surfaces.
    a. 5-10 minutes
    b. 48 hours
    c. 1 week
    d. 1 month
5. Bloodborne diseases are transmitted by:
    a. Contact with needles contaminated with the virus
    b. Indirect contact by touching contaminated environmental surfaces
    c. Mucous membrane exposure to infectious materials
    d. All the above
6. Hand hygiene should always be performed after glove removal.
    a. True
    b. False
7. Standard Precautions refers to a set of precautions (e.g., personal protective equipment, hand hygiene) that apply only to patients with bloodborne diseases.
    a. True
    b. False
8. Gloves, gowns and face shields, should be worn when cleaning surgical instruments.
    a. True
    b. False
9. The hepatitis B vaccine is highly effective in preventing hepatitis B infection.
    a. True
    b. False

10. If an accidental exposure occurs, such a needlestick or body fluid splash to your mucous membranes, you should first schedule an appointment with your private health care provider.
    a. True
    b. False

Appendix C
Infection Control Training for Temporary Clinic Volunteers
Course Evaluation

Please select the answer that best reflects your opinion.

Topic	Strongly Agree	Agree	Disagree	Strongly Disagree
The course was well organized.	n=6	n=2		
The time devoted to the topic was adequate.	n=4	n=4		
The TRAIN registration process was efficient.	n=5	n=1	n=2	
The instructions for completing the training module were easy to follow.	n=6	n=2		
The information presented in the module is important to providing safe care.	n=7	n=1		
My knowledge about infection prevention and control increased as a result of the training.	n=2	n=5	n=1	
The web-based format is conducive to learning.	n=5	n=3		
The terminology used in the training module was at a level I could understand.	n=6	n=2		
Would you recommend this online training program to persons who volunteer at temporary clinics?	n=6	n=2		
I feel confident performing the infection control strategies presented in the module.	n=5	n=3		

Additional Thoughts:

1. What suggestions would you have to improve the training module?
2. Please provide any additional comments you have about the course?

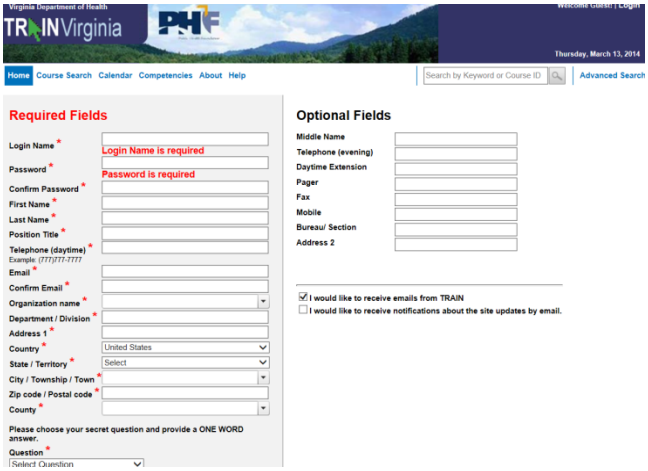
Appendix D
Infection Control Training for Temporary Clinics
Participant Instructions

1. Get Snacks

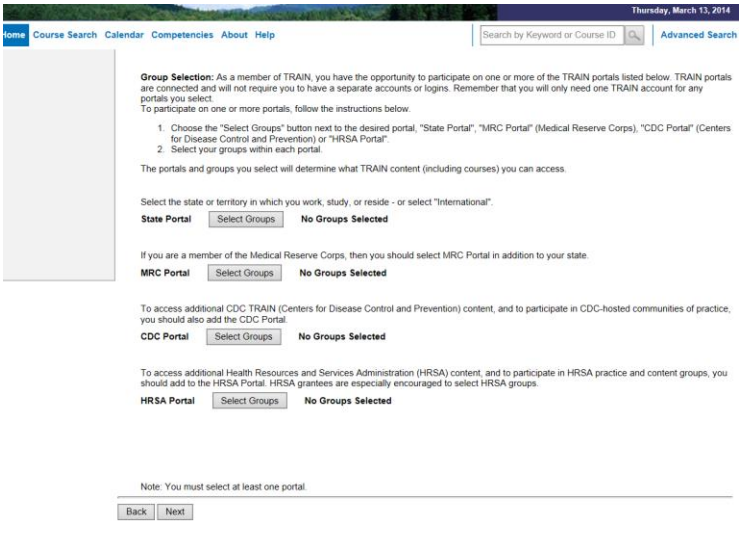
2. Ensure you have a good internet connection via laptop

3. Go to the website: https://va.train.org/DesktopShell.aspx

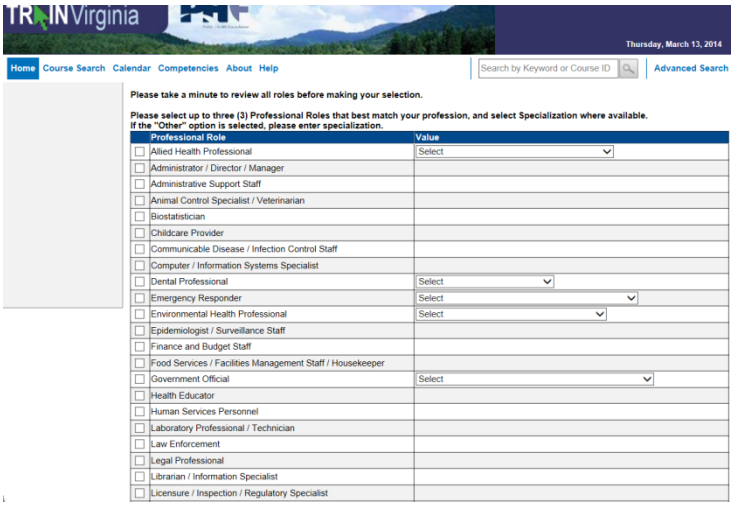
4. **Required and Optional Fields.** Complete all of the fields and select **NEXT.**



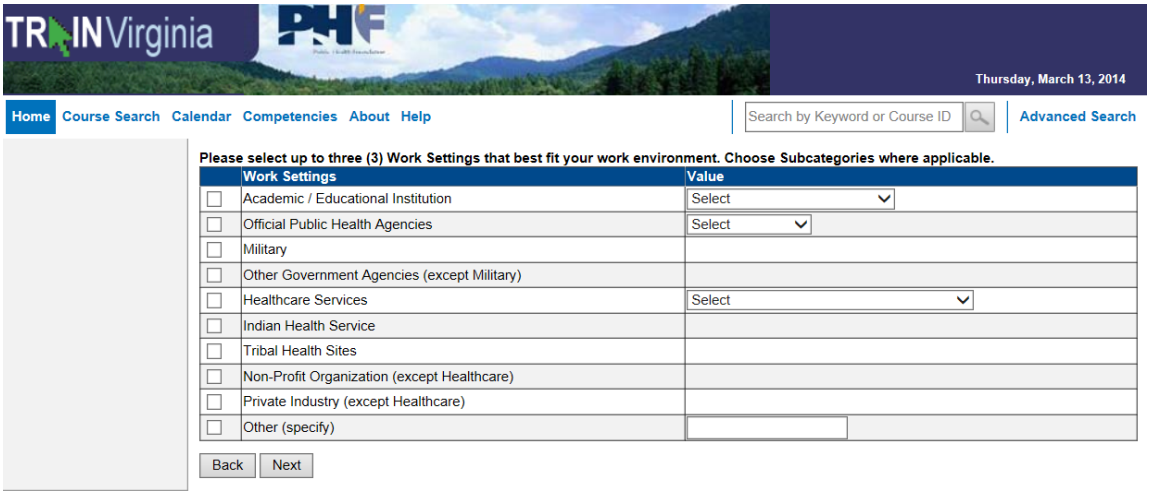
5. **Group Selection.** Choose at least one portal and then select a group(s) from the drop down menu in the Portal. Hit **NEXT.**



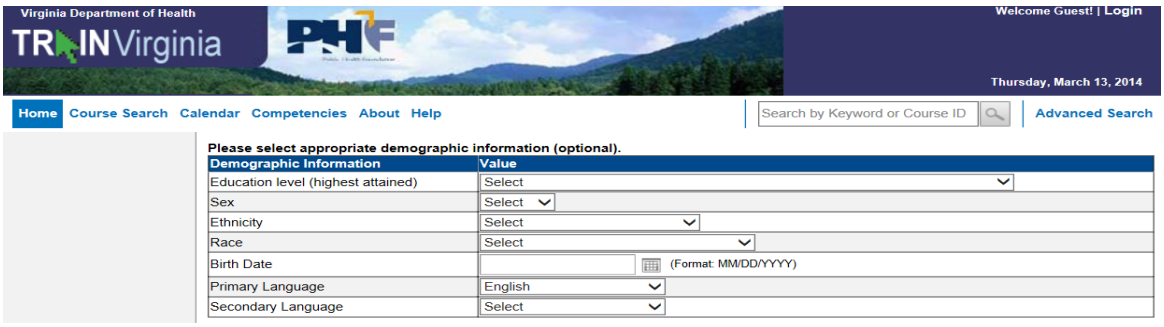
6. **Professional roles.** Please review the list of selections and choose up to three roles. Hit **NEXT** when you are done.



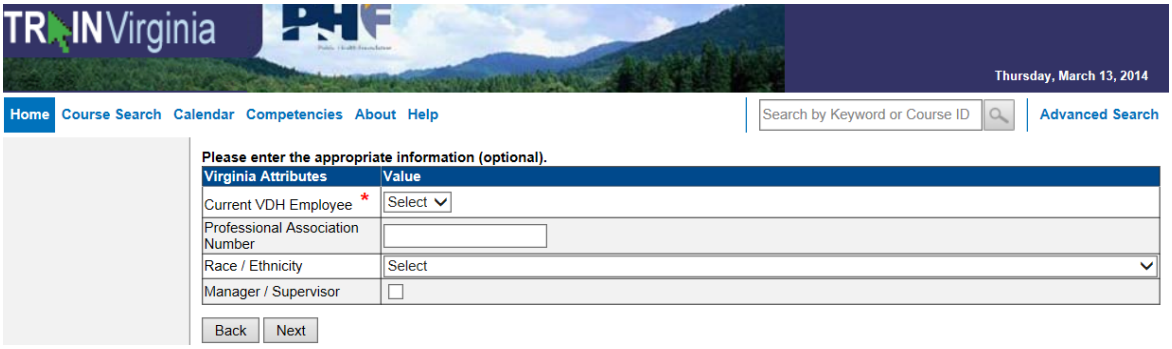
7. **Work Settings.** Review the list of work setting selections and choose up to three. Hit **NEXT** when you are done.



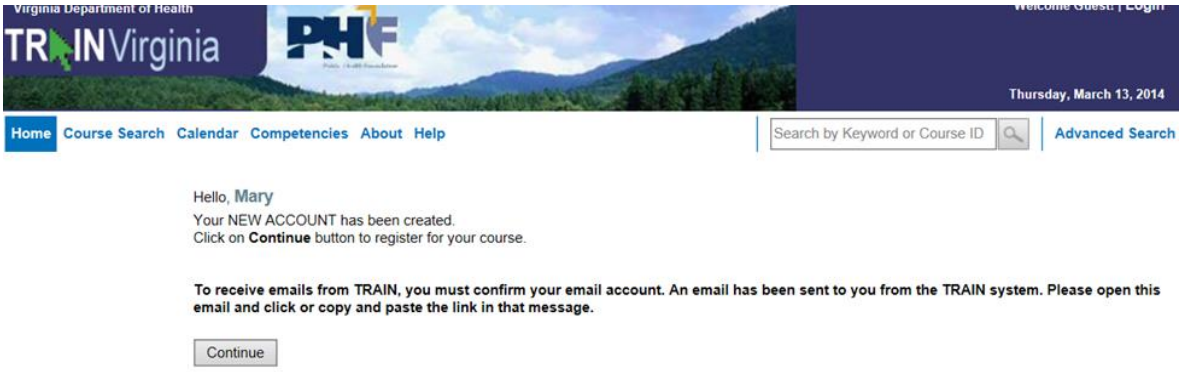
8. **Demographic information.** This is optional but for this project please select all but birthday. Hit **NEXT** when you are done.



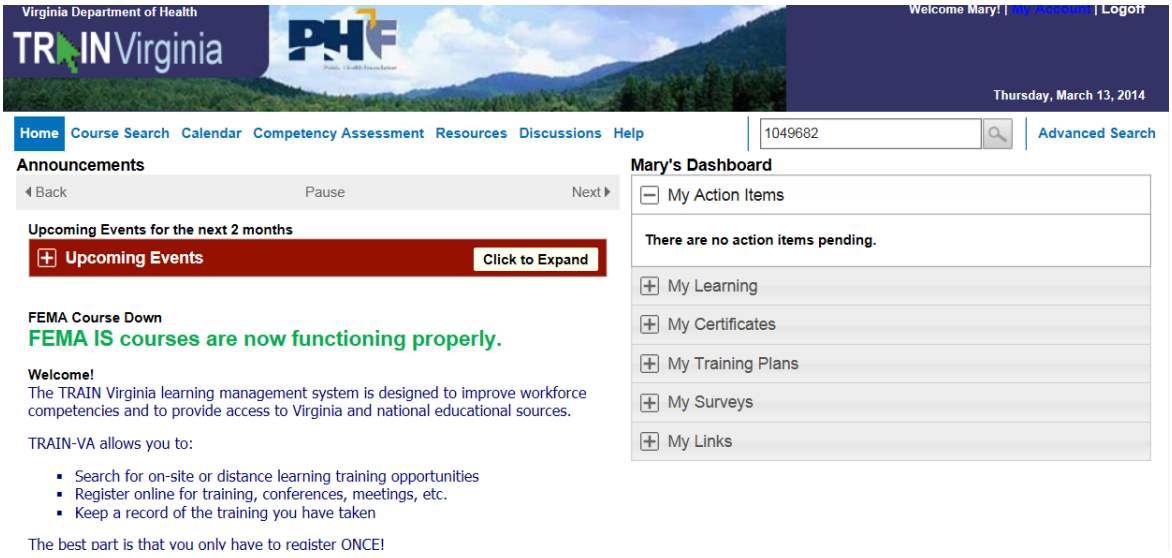
11. **Virginia Attributes.** Select whether or not you are a VDH employee. Hit **NEXT** when you are done.



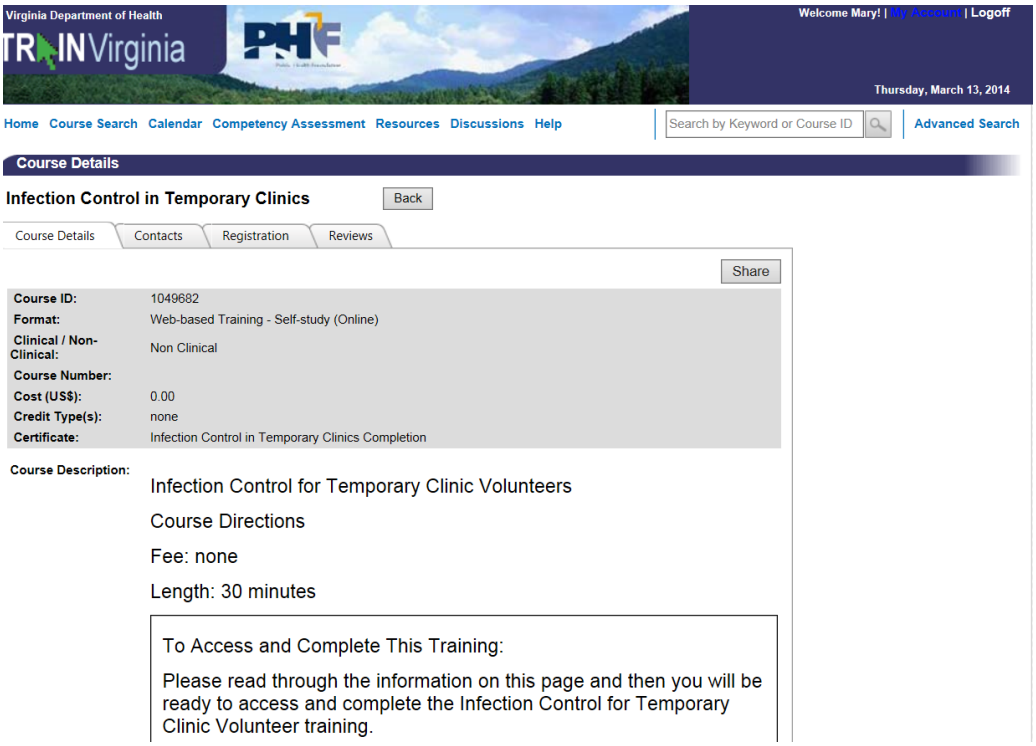
10. **Account confirmation.** Click **Continue** to register for courses.



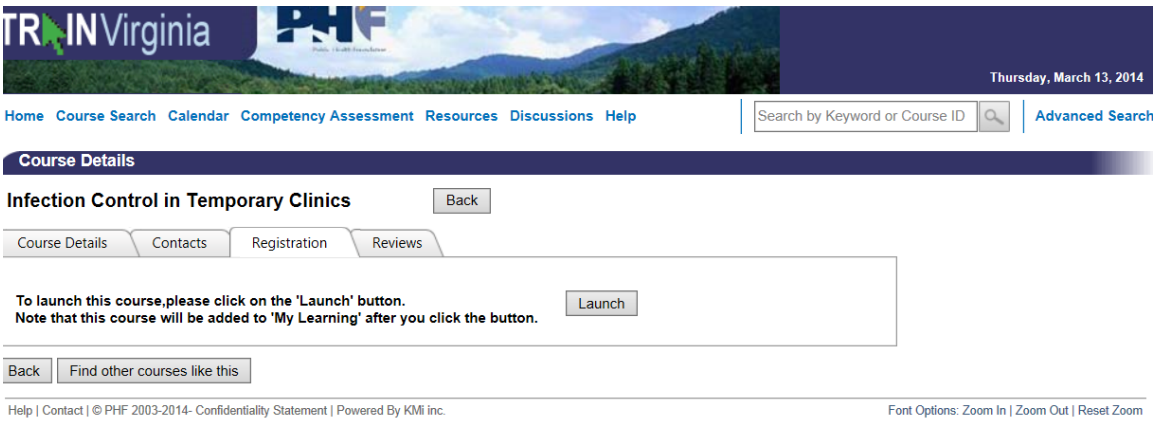
11. **Home Page and Dashboard.** You can begin searching for courses here. To take the *Infection Control for Temporary Clinics* course, type the course number 1049682 in the search box.



12. **Course Details.** Please read the entire description of the course before proceeding with the module. My contact information is included in the contacts tab. Please contact me with any questions. Stay on this page to **register** for the course.

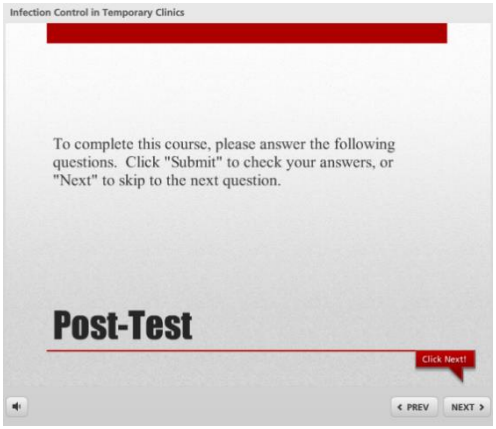


13. If you would like to take the course after reading the course description, click the **Registration** tab on the **Course Details** and then the **Launch** button.

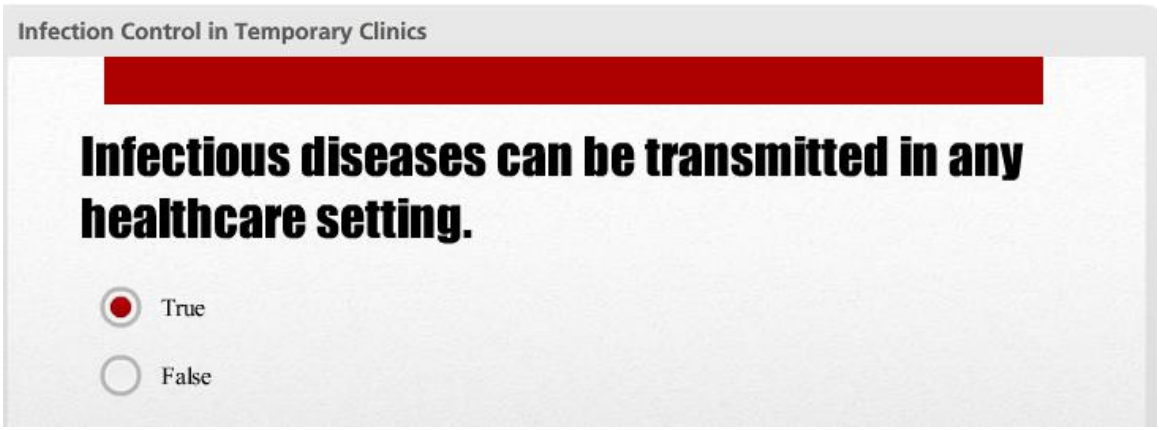


14. You will be taken directly to the training module. To advance the slides, click **NEXT**.

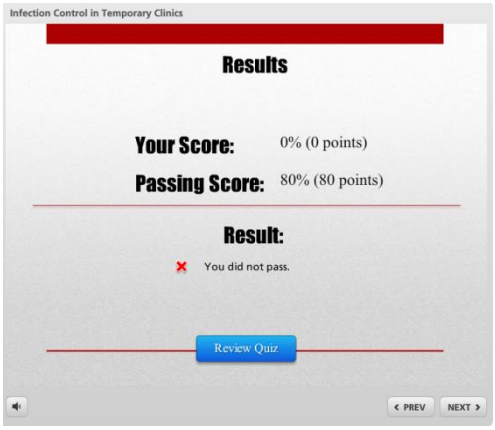
15. At the completion of the module you will be taken directly to the post-test. Please answer each question. Click **NEXT**.



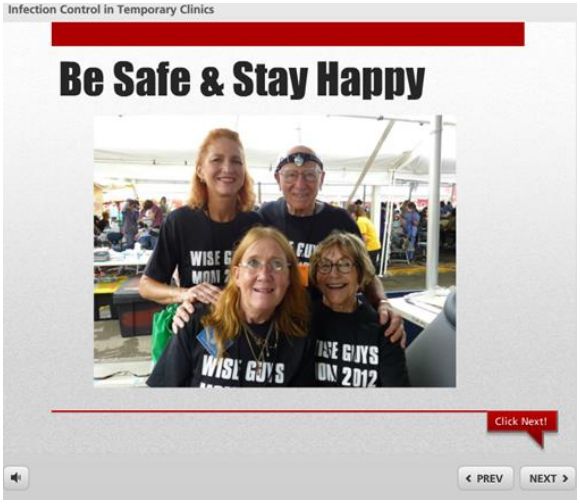
16. After answering each question click **NEXT**. There may be a short delay between slides.



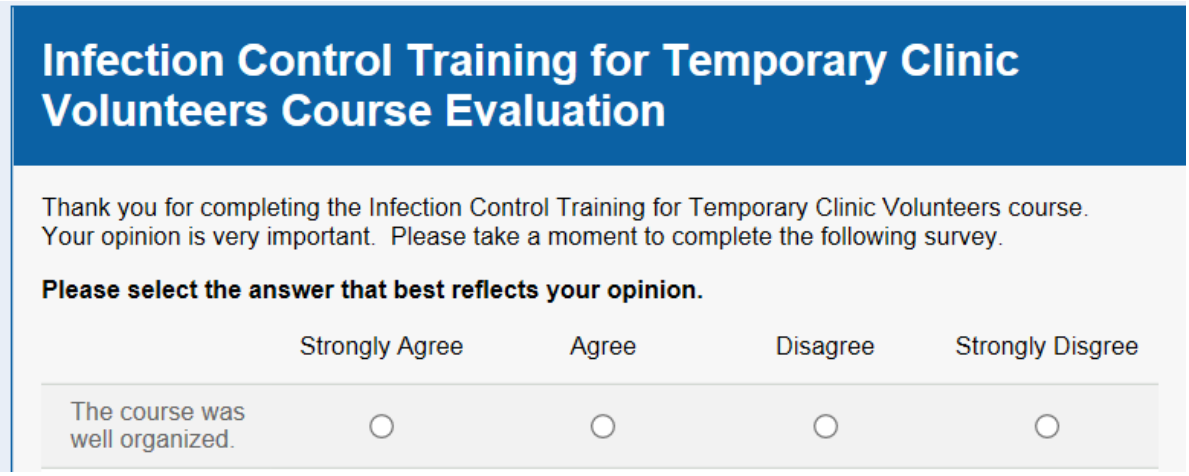
17. After the final question you will receive your test score! Click **NEXT**.



18. This is the final slide. When you hit NEXT you will be prompted to accept a pop-up, ***.agencies.virgina.gov.** *Please* allow the pop-up because this is needed to complete the Course Evaluation.



19. Please, please take a few minutes to complete the program evaluation. This is a **very important** part of this project. After answering all the questions please click **SUBMIT**. You are DONE! DONE! DONE!



Infection Control Training for Temporary Clinic Volunteers Course Evaluation

Thank you for completing the Infection Control Training for Temporary Clinic Volunteers course. Your opinion is very important. Please take a moment to complete the following survey.

Please select the answer that best reflects your opinion.

	Strongly Agree	Agree	Disagree	Strongly Disgree
The course was well organized.	○	○	○	○

20. If you wish to print a Certificate of Completion, you can go to your Dashboard on the Home page and select **Certificates**.

Many, Many Thanks for taking the time to participate in my project!!

Appendix E
Infection Control for Temporary Clinic Volunteers
TRAIN Course Details

Fee: none

Length: 30 minutes

To Access and Complete This Training:
Please read through the information on this page and then you will be ready to access and complete the Infection Control for Temporary Clinic Volunteer training.

Target Audience

This learning module is applicable to anyone who volunteers in a temporary clinic setting and has the potential for exposure to blood and body fluids.

Facilitator

This training module is presented by Mary Beth White-Comstock, MSN, RN, CIC, who is a nurse epidemiologist and health educator with extensive experience in infection prevention and epidemiology. The module provides an overview of the risks associated with disease transmission in temporary clinic settings and recommended prevention and control strategies.

Consent to Participate

Participation in the program is voluntary. This course is part of a study that is being conducted to identify the utility of an on-line training in educating temporary clinic volunteers about infection prevention and control practices.

Participants in the study will be asked to complete of the on-line training module and post – test. Registration for the module will serve as the participant's consent to participate.

Only aggregate data obtained from the TRAIN website will be used to characterize the study population and evaluate the significance and user satisfaction of the training module in educating participants about infection control.

Educational Objectives

- Identify the risks of disease transmission in temporary clinics
- List infection control challenges in the temporary clinic setting
- Identify infection control strategies that minimize the risk of disease transmission in temporary clinic setting

At the completion of the training program, please complete the post-test and course evaluation and print a certificate of completion for your records.

Appendix F
Infection Control and Hospital Epidemiology Manuscript Submission Guidelines

Infection Control and Hospital Epidemiology

Instructions for Authors

GENERAL INFORMATION

Manuscripts submitted to *Infection Control and Hospital Epidemiology (ICHE)* should consist of new material that focuses on healthcare epidemiology or infection control activities. *ICHE* welcomes submissions that address the transmission of pathogens or that involve the use of epidemiological principles and methods to evaluate or improve the delivery of care within healthcare institutions. Examples of appropriate material include studies of infection rates, distributions, or preventive measures; cost-benefit analyses related to infections or other adverse events in patients; surveillance; occupational health issues; pertinent regulatory issues; or analyses of resource use.

Manuscripts should be submitted electronically at the journal's submission website, at http://iche.edmgr.com.

AUTHORSHIP AND DISCLOSURES

At the time a manuscript is submitted, all authors are required to disclose all relevant financial support and conflicts of interest in the Acknowledgments section of their manuscript (see the section Manuscript Preparation, below). The Acknowledgments section should be consistent with disclosures that would be stated in the ICMJE Form for Disclosure of Potential Conflicts of Interest.

In addition to stating disclosures in the Acknowledgment section of the manuscript file, all authors of Original Articles, Concise Communications, and Research Briefs are required to complete and upload the ICMJE Disclosure Form when and if they are asked to submit a revision of their manuscript. All authors of Letters and invited manuscripts (Letters in Reply, Commentaries, Reviews, and Guidelines) are required to complete and upload the ICMJE Disclosure Form when they initially submit their manuscript.

If your manuscript is the report of a randomized clinical trial that has been registered in a public trials registry, please provide the trial registry name, the registration identification number, and the URL for the registry at the end of the abstract. This information will be published in the journal if the manuscript is accepted.

ARTICLE TYPES

Original Articles should include a title page, a structured abstract of no more than 250 words (see below), a text of no more than 3,000 words, no more than 7 tables and figures, and no more than 40 references.

Concise Communications should include a title page, a narrative abstract of no more than 50 words, a text of no more than 1,200 words, no more than 2 tables or figures, and no more than 10 references.

Research Briefs should include a title page, a text of no more than 900 words, no more than 1 table or figure, and no more than 10 references. This category of article is intended for the presentation of short, focused, and evidence-based experimental observations: substantial preliminary and novel results of importance to the journal readership but not substantial enough in content to warrant a longer presentation. Research Briefs undergo the same peer review as longer article types.

Letters to the Editor should not exceed 900 words and should include no more than 1 table or figure and no more than 10 references.

Invited Reviews, including guidelines and position papers: committees, task forces, and authors under the auspices of the Society for Healthcare Epidemiology of America, and all others considering the preparation of a review, should contact the editorial office during the very earliest phases of development. The editorial office will verify that there are no similar or overlapping documents under development. Anticipated length, format, number of citations, and mechanisms for peer review and publication by *ICHE* and the involvement of any other organizations will be negotiated with the journal and publisher well in advance of submission.

Commentaries are by invitation only. Please contact the journal office if you are interested in writing a Commentary.

MANUSCRIPT PREPARATION

Authors are encouraged to follow the Uniform Requirements for Manuscripts Submitted to Biomedical Journals; this is the format used in PubMed/MEDLINE. They should strive for a concise article that is unencumbered by excessive detail. Authors who are not fluent in English should have their manuscript checked by a native speaker of English and/or an editing service that provides such assistance. Manuscripts that do not follow the required format or are poorly prepared may be rejected for that reason.

Double space the entire manuscript, including title page, abstract, body, references, tables, and figure legends. Use left justification only, so that the right margin is ragged. Number pages consecutively, beginning with the title page. Use a standard font (such as Times New Roman or Helvetica) and set the font size to 12 points (for tables as well as text). Each component of the article should begin on a separate page, as follows: title page, abstract, body text, acknowledgments, references, appendices, figure legends, and tables. All these components must be in a single file, except any figures, each of which should be a separate file (see Figures and Figure Legends, below).

Title Page

The title page should include the following information: (1) the title of the manuscript; (2) the names of the author(s), including each author's highest academic degree or professional certification; (3) the departmental and institutional affiliation of each author, including city, state, and country; (4) the name, address, telephone number, fax number, and e-mail address of the author responsible for correspondence, and (if different) the name and address to be used for reprint requests; (5) if relevant, a statement about any previous presentation of the data or findings in a preliminary report or abstract; (6) an abbreviated title of not more than 45 characters (including spaces), to be used as a running head in print and for search results online; and (7) a word count for the body of the text (ie, excluding the abstract and the references). Acknowledgment of financial support and potential conflicts of interest must be included and should be placed in the Acknowledgments section (see below).

Abstract

Original Articles should include a structured abstract of no more than 250 words. The following headings are suggested: Objective, Design, Setting, Patients (or Participants), Methods (or Interventions), Results, and Conclusions. If this list of headings is inappropriate, variations are permitted: for example, a study that involved no intervention would use the heading "Methods" rather than "Intervention"; or an analysis of an existing data set might use the heading "Methods" in place of both "Intervention" and "Setting." For brevity, parts of the abstract can be written in phrases rather than complete sentences (eg, "Design: Retrospective cohort study" or "Design: Before-after trial"). The contents of each section should conform to the guidelines below.

Objective. Begin with a clear statement of the precise objective or question addressed in the report. If more than one objective is addressed, indicate the main objective and state only key secondary objectives. If an a priori hypothesis was tested, it should be stated.

Design. Describe the basic design of the study. Include the duration of follow-up, if any. Use as many of the following terms as apply.
• For intervention studies: randomized controlled trial; nonrandomized controlled trial; double-blind; placebo controlled; crossover trial; before-after trial.
• For studies of screening and diagnostic tests: criterion standard (ie, a widely accepted standard with which a new or alternative test is being compared; this term is preferred to "gold standard"); blinded or masked comparison.
• For studies of prognosis: inception cohort (subjects assembled at a similar and early time in the course of the disorder and followed thereafter); cohort (subjects followed forward in time, but not necessarily from a common starting point); validation cohort or validation sample, if the study involves the modeling of clinical predictions.
• For studies of causation: randomized controlled trial; cohort; case-control; survey (preferred to "cross-sectional study").
• For descriptions of the clinical features of medical disorders: survey; case series.
• For studies that include a formal economic evaluation: cost-effectiveness analysis; cost-utility analysis; cost-benefit analysis. For new analyses of existing data sets, the data set should be named and the basic study design disclosed.

Setting. To assist readers in determining the applicability of the report to their own clinical circumstances, include a brief description of the study setting(s). Of particular importance is whether the setting is the general community, a primary care or referral center, a private or institutional practice, or an ambulatory or hospital care setting.

Patients or participants. Provide information on the clinical disorders, important eligibility criteria, and key sociodemographic features of patients and how they were selected, including the number of otherwise eligible subjects who were approached but refused to participate. If matching was used for comparison groups, specify the characteristics that were matched. In follow-up studies, the proportion of participants who completed the study must be indicated. In intervention studies, the number of patients withdrawn because of adverse effects should be given.

For selection procedures, these terms should be used, if appropriate: random sample ("random" refers to a formal, randomized selection in which all eligible subjects have a fixed and usually equal chance of selection); population-based sample; referred sample; consecutive sample; volunteer sample; convenience sample. These terms assist the reader in assessing the generalizability of the study.

Intervention(s). Describe the essential features of any interventions, including the method and duration of administration. The intervention should be named by its most common clinical name (eg, the generic term "oseltamivir"). Common synonyms should be given as well, to facilitate

searches online. This includes the brand name of a drug, if a specific product was studied. Also include the name of the manufacturer or supplier for any product(s) mentioned in the manuscript, including software.

Results. Give the main results of the study in narrative form. Define measurements that require explanation for the expected audience of the manuscript. Important measurements not included in the presentation of results should be declared; however, no data should be reported in the abstract that do not appear in the rest of the manuscript. As relevant, indicate whether observers were blinded to patient grouping, particularly for subjective measurements. If possible, the results should be accompanied by confidence intervals (eg, 95%) and the exact level of statistical significance. For comparative studies, confidence intervals should relate to the differences between groups. For nonsignificant differences for the major study outcome measure(s), state the clinically important difference sought, and give the confidence interval for the difference between the groups. When risk changes or effect sizes are given, indicate absolute values, so that the reader can determine the absolute, as well as relative, impact of the finding. Approaches such as "number needed to treat" to achieve a unit of benefit are encouraged when appropriate; reporting of relative differences alone is usually inappropriate. If appropriate, studies of screening and diagnostic tests should use the terms sensitivity, specificity, and likelihood ratio. If predictive values or accuracy are given, prevalence or pretest likelihood should be given as well.

Conclusions. Only those conclusions of the study that are directly supported by the evidence reported should be given, along with the clinical application (avoiding speculation and over-generalization); indicate whether additional study is required before the information should be used in normal clinical settings. Equal emphasis must be given to positive and negative findings of equal scientific merit.

Clinical trials identifier. If your manuscript is the report of a randomized clinical trial that has been registered in a public trials registry, please provide the trial registry name, the registration identification number, and the URL for the registry at the end of the abstract.

Body Text

The main sections and subdivisions of the body text should be indicated by side heads flush with the left margin and two lines above the text. Keep Methods, Results, and Discussion distinct and separate. The Methods section should provide detail sufficient to allow others to re-create your experiment. Methods may not be described or restated in figure legends or table notes, but must be all together in the Methods section. The Results section contains the previously unpublished data derived by this application of your methods, without commentary (beyond the minimum that might be necessary to ensure intelligibility to the reader). The Discussion section contains your interpretation of the reported data and comments on its meaning. There should be no separate section labeled "Conclusion." Avoid duplicating in the text data that have been provided in tables or figures (minimal duplication, for emphasis or clarity, is acceptable). Also avoid duplication within the text; for example, the Discussion section should not restate all the findings that have been presented in Results and/or in tables and figures.

The Editor requests that authors reporting the results of clinical trials describe clearly the following: (1) eligibility criteria; (2) whether subjects were admitted before allocation to one of the study groups; (3) the method of randomization; (4) whether the study was "masked," what specific information was masked, and whether subjects, clinicians, and evaluators were masked; (5) the method used to identify treatment complications; (6) an explanation and analysis of subjects lost to follow-up; (7) statistical methods used; and (8) information that led to the determination of the size of the study groups and the expected differences between groups. For all studies involving human

subjects, the Methods section should include a statement that the study was reviewed and approved by the authors' institutional review board.

Abbreviations should conform to those given in the *AMA Manual of Style*. Symbols for units of measurement (mm, mL) should not be followed by periods. Chemical or generic names of drugs, materials, and equipment are strongly preferred; a proprietary name may be given only after it is preceded by the generic or chemical name the first time it appears and must be followed by the name of the manufacturer or supplier. Terms and abbreviations must be defined at first use, separately for the abstract, the body, and each table and figure. Use only common abbreviations and use as few as possible; and do not abbreviate terms used fewer than 5 times. Abbreviate genus names after first mention.

Footnotes are acceptable in tables but cannot be used in the body of the manuscript; any footnotes in your manuscript will be integrated into the text, perhaps in parentheses.

Acknowledgments

Financial support. The Acknowledgments section should list all sources of financial support for the work, including any financial arrangement with a company whose product is related to the study. If there was no financial support, that too should be stated. The statement should be consistent with disclosures that would be stated in the ICMJE Form for Disclosure of Potential Conflicts of Interest.

Examples:

• *Financial support*. The GERES Project is supported by the French Ministry of Health. Additional support for this study was provided by Becton-Dickinson and SIMS France.

• *Financial support*. H.S.C. received grant support from the Department of Veterans Affairs Rehabilitation Research and Development Service Merit Review (C2234-MD and C3-2442MD), D.B.L. received support from the US Public Health Service (grant HC41024), and A.E.T. received salary support from an Emerging Infectious Diseases Cooperative Agreement. C.U. receives 2% salary support from Aventis Pasteur for work on another study.

• *Financial support*. None reported.

Conflict of interest. The Acknowledgments section must contain a statement of potential conflicts of interest. If the manuscript is accepted for publication, the disclosures will be published. The Acknowledgments section of the manuscript must list the name of each contributing author and any potential conflicts of interest for each author for the previous three years; if no potential conflict exists, that too should be stated. The statement should be consistent with disclosures that would be stated in the ICMJE Disclosure Form. There is a potential conflict of interest when anyone involved in the publication process has a financial or other beneficial interest in the products or concepts mentioned in a submitted manuscript, or in competing products, that might bias his or her judgment. Examples of potential conflicts of interest with respect to a company whose product is mentioned in the manuscript include owning stock (except as part of a diversified portfolio), receiving grants, serving as a consultant, or being on the speakers' bureau. (This information is exclusive of the financial support discussed above.)

Examples:

• *Potential conflicts of interest*. S.A. and K.H. report that they are shareholders in Loke Diagnostics (Aarhus, Denmark).

• *Potential conflicts of interest*. K.L.H. reports having consulted for and having received grant support from Astellas and reports having received an honorarium from Cubist before starting employment with the New York Department of Public Health in 2009.

• *Potential conflicts of interest*. E.F.M. reports that she has been a consultant to Merck, Novartis, and GlaxoSmithKline and is member of the speakers' bureaus for Ortho McNeil and Novartis. J.A.S. reports that he received research funding from Bayer and Ortho McNeil and that he has been a consultant for Bayer and Pfizer. J.D.C. reports that he is an employee of AB Biodisk.

• *Potential conflicts of interest*. All authors report no conflicts of interest relevant to this article.

Authorship and manuscript preparation. If the manufacturer of a product discussed in a submitted manuscript had a role, either directly or through a third party, in the gathering or preparation of data or in the writing of the manuscript, that information must be disclosed in the Acknowledgments section. If anyone other than the named authors had a role in the gathering or preparation of data or in the writing of the manuscript, that too should be disclosed.

Examples:

• *Manuscript preparation*. Steris Corporation provided assistance with study design and data acquisition.

• *Manuscript preparation*. Statistical and other analyses were done by 3M Medical Division.

• *Manuscript preparation*. MedCommunications (Philadelphia) provided assistance in preparing and editing the manuscript.

Disclosure documentation. All authors of Original Articles, Concise Communications, and Research Briefs are required to complete and upload the ICMJE Form for Disclosure of Potential Conflicts of Interest when and if they are asked to submit a revision of their manuscript. All authors of Letters and invited manuscripts (Letters in Reply, Commentaries, Reviews, and Guidelines) are required to complete and upload the ICMJE Disclosure Form when they initially submit their manuscript. (See the section Authorship and Disclosures, above.) Note that this documentation is in addition to the disclosure statements in the Acknowledgments section of the manuscript file.

Thank yous. Persons should not be thanked in the Acknowledgments section without their knowledge and consent. Authors will be asked during the submission process to confirm they obtained permission from all persons thanked by name in the Acknowledgments section.

REFERENCES

References should be cited consecutively in the text, with superscript numbers placed outside periods and commas and inside colons and semicolons. References cited only in tables or figure legends should be numbered as though all were cited at the point at which the table or figure was first mentioned.

A paper that is "in press" may be included in the reference list if it has been accepted for publication. Citations such as "in preparation," "submitted for publication," "unpublished data," and "personal communication" should be given in parentheses in the text only, including the names of all individuals to whom the information should be attributed, as well as each person's highest academic degree and the month and year of the information's origin. For personal communications, specify whether the communication was written or oral.

At the end of each manuscript, list the references in numerical order, double spaced, according to the order they are cited in the text. If there are 7 or more authors, list the first 3 authors' names, followed by "et al"; otherwise, list all authors. Abbreviations of journal names should conform to *Index Medicus* or MEDLINE. Unlisted journals should not be abbreviated. Authors are responsible for bibliographic accuracy. Journal titles should be cited as they existed at the time of publication. Format references according to the style given in the AMA Manual of Style, 10th Edition.

Journal article *(examples)*
1. Pittet D, Simon A, Hugonnet S, Pessoa-Silva CL, Sauvan V, Perneger TV. Hand hygiene among physicians: performance, beliefs, and perceptions. *Ann Intern Med* 2004;141:1-8.

2. Camins BC, Richmond AM, Dyer KL, et al. A crossover intervention trial evaluating the efficacy of a chlorhexidine-impregnated sponge in reducing catheter-related bloodstream infections among patients undergoing hemodialysis. *Infect Control Hosp Epidemiol* 2010;31:1118-1123.

Journal article in press *(example)*
3. Figueroa P, Johanssen KL, Price FG, et al. Outbreak of *Acinetobacter* infection in a neonatal intensive care unit. *Pediatr Infect Dis J* (in press).

Paper presented at a professional meeting *(example)*
4. Chen LF, Freeman JT, Sexton DJ, Choi YI, Anderson DJ. NHSN definition of laboratory-detected BSI is overly sensitive for *Enterococcus*. In: Program and abstracts of the 19th Annual Scientific Meeting of the Society for Healthcare Epidemiology of America (SHEA); March 18–22, 2009; San Diego, CA. Abstract 359.

Book *(example)*
5. Heoprich PD. *Infectious Diseases*. 2nd ed. New York, NY: Harper & Row; 1977.

Chapter in a book *(example)*
6. Schaffner W. Psittacosis: ornithosis, parrot fever. In: Beeson PB, McDermott W, Wyngaarden JB, eds. *Cecil Textbook of Medicine*. 15th ed. Philadelphia, PA: W. B. Saunders; 1979:336-338.

Web page *(example)*
7. Clinical laboratory fee schedule. Centers for Medicare and Medicaid Services website. http://www.cms.gov/ClinicalLabFeeSched/02_clinlab.asp#TopOfPage. Published 2010. Accessed April 2, 2010.

TABLES

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(Updated December 5, 2012)

Appendix G
Institutional Review Board
Decision Notification

February 18, 2014

Mary Beth White-Comstock and Audrey Snyder
Academic Divisions
515 Fords Rd.
Manakin Sabot, VA 23103

Dear Mary Beth White-Comstock and Audrey Snyder:

Thank you for submitting your project entitled: "Infection Control Course for Temporary Clinic Volunteers" for review by the Institutional Review Board for the Social & Behavioral Sciences. The Board reviewed your Protocol on February 18, 2014.

The first action that the Board takes with a new project is to decide whether the project is exempt from a more detailed review by the Board because the project may fall into one of the categories of research described as "exempt" in the Code of Federal Regulations. Since the Board, and not individual researchers, is authorized to classify a project as exempt, we requested that you submit the materials describing your project so that we could make this initial decision.

As a result of this request, we have reviewed your project and classified it as exempt from further review by the Board for a period of four years. This means that you may conduct the study as planned and you are not required to submit requests for continuation until the end of the fourth year.

This project # 2014-0041-00 has been exempted for the period February 18, 2014 to February 17, 2018. If the study continues beyond the approval period, you will need to submit a continuation request to the Board. If you make changes in the study, you will need to notify the Board of the changes.

Sincerely,

Tonya R. Moon, Ph.D.
Chair, Institutional Review Board for the Social and Behavioral Sciences