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Barriers to the Use of Standard Precautions for Infection Control in Long Term Care Facilities:

An Integrative Literature Review.

Uyiosa Chu

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Chicago.

August 13th, 2018.
1. INTRODUCTION

1.1. Background and Significance

The exposure of a susceptible host to organisms such as bacteria, fungi, parasites and viruses result in infectious disease conditions. Infectious diseases are among the top 10 leading causes of death in the United States (CDC, 2017). According to the National Center for Health Statistics, the number of visits to physician’s offices for infectious diseases was 17.8 million in 2014 with 94,770 people dying from some forms of infectious diseases (CDC, 2017). Infection prevention and control are essential for creating a safe healthcare environment for patients, families, and staff because they reduce the likelihood of spreading diseases from one person to another (Potter, Perry, Stockert, and Hall, 2013).

Long term care facilities (LTCFs) serve as an indispensable bridge between acute hospitalization and a return to the normal daily routine for many patients. According to the Centers for Disease Control and Prevention (CDC), an average of 1,383,700 people are residing in LTCFs each day (Bowman and Forbes, 2015). LTCFs help with the recovery needs of individuals requiring physical and health support, as well as assistance with activities of daily living to promote independent functioning and prevent disability. For many elderly, long term care facilities are permanent residences. Aging is associated with a weakening of the body’s immune system, and this singular factor places older adults at risk for susceptibility to infectious diseases (Yoost & Crawford, 2016). Working with this population therefore necessitates providing a safe environment where they can thrive and improve their quality of life. Research estimates by Burdsall and his colleagues in 2016, show 1.6 million to 3.8 million infections at LTCFs annually. These statistics underscores the need for LTCF to adopt practices that will
prevent the spread of infectious agents and, improve the residents’ health by curtailing the risks of transmission of these agents.

Burdsall, et al (2016) further pointed out that infections in LTCFs result in approximately 388,000 deaths per year with an associated cost between $673 million and $2 billion annually. Another study conducted by Marchi and his colleagues in 2012, reported that LTCF residents have a high predisposition to developing hospital acquired infections (HCAIs) just like those seen in an acute care hospital. They also found that these infections, are increasingly the outcome of antimicrobial resistant organisms. Cohen, Choi, and Stone (2016), also stated that HCAIs stand out as a significant cause of morbidity and mortality for millions of Americans living in LTCFs. They explicitly stated that in the United States, the annual occurrence of HCAIs stands at 1.6 – 3.8 million (Cohen et al. 2016). The economic burden of HCAIs is enormous. The cost implication of anti-microbial therapy alone stands at an alarming value of $38 - $137 million, while $673 million - $2 billion is paid for yearly hospitalizations due to infections (Cohen et al, 2016).

Standard precautions (SPs) have been regarded as essential in the fight for control and prevention of infection and are considered an effective means of protecting healthcare practitioners, patients and the public (Gammon, Morgan-Samuel & Gould, 2008). One of the objectives of SP is to prevent and reduce HCAI’s (Valim, Marziale, Richart-Martinez, and Sanjuan-Quiles, 2014). The CDC’s focus on standard precautions is to promote health as well as to focus attention on infectious disease prevention and control (Yoost & Crawford, 2016).

Despite the knowledge that effective practice of SP reduces the rate of transmission of infectious agents, evidence continues to show that compliance with infection control precautions is unacceptably low (Gammon et al. 2008). Previous studies have identified factors resulting in
non-compliance to the effective practice of SP such as material and personnel structure, lack of management’s commitment and support for the practices of SPs, as well as certain individual variables like professional knowledge and experience (Valim et al., 2014). In an attempt to provide solutions to the identified constraints, recommendations such as the need for facilities to have an infection control committee to handle precautionary measures that should be adopted to curtail the infection transmission, and the need for organizations to provide health education and safety training on safety issues have been emphasized. Additionally, Gammon et al., (2008), suggest adopting the behavior change model that involves change in the attitude, beliefs, and self-efficacy among healthcare workers. However, there is still a significant gap in qualitative studies that address barriers that affect compliance to SP practices for infection control measures in LTCFs.

1.2. Problem Statement

The overall premise of standard precautions is safety for all stakeholders in healthcare environment (Knussen, 2005). The foundations of the provisions by CDC for infection control measures begin with hand-washing, use of gloves, gowns, and eye protection for healthcare workers (Elliot-Smith, 2007). However, there is evidence of a continuing increase in HCAIs resulting in morbidity and mortality of 2.5 million Americans residing in these LTCFs (Cohen et al., 2016). Therefore, there is a need to identify the specific challenges to the use of SPs for infection control in LTCFs compared to hospital-based environment.

1.3. Purpose Statement

The purpose of the integrative literature review was to identify the barriers preventing the use of standard precautions for infection control in long term care facilities, as well as preventive
measures to address the identified barriers to the use of standard precautions for infection control in long term care facilities.

1.4. Research Questions

The following research questions were addressed in the review of literature:

1. What are the barriers that limit the use of standard precautions for infection control in long term care facilities?

2. What are the current measures that address the identified barriers in order to increase the use of standard precautions for infection control in long term care facilities?

1.5. Conceptual Framework.

The epidemiologic triad model was used to explain how preventing exposure to infectious agents leads to disease prevention. This model highlights the factors and processes in the prevention of an infection. It also emphasizes the importance of standard precautions in infection control. The model was originally developed to study infectious disease processes and later applied to non-infectious disease processes (Cohen and Jingjing, 2015). With current focus on health promotion and disease prevention, the epidemiologic triad is useful in identifying infection prevention strategies, and enhancement of knowledge of causes of diseases (Cohen and Jingjing, 2015).

The epidemiologic triad shows the interrelationships among a disease-causing agent, the susceptible host, and the environment in which the individual functions. A break within this triad results in disease or infectious conditions. According to McEwen & Wills (2014), the prevention of disease conditions lies in preventing exposure to the disease-causing agent, improving the host’s resistance to diseases, and minimizing the environmental factors that culminate in disease
processes. The state of wellbeing in this model is achieved when the host has improved resistance to disease causing agents or microorganisms.

With regard to infection control measures, the essence of the epidemiologic triad framework is to bolster measures to change the environmental components by ensuring that there are no links between an infectious agent and a susceptible host. In LTCFs, healthcare professionals should implement infection control measures based on evidenced-based practices and teach the rest of the staff in order to promote quality care.

![Figure 1 Application of epidemiologic triad](image)

2. Methods

2.1. Design

An integrative literature review design was used to explore some of the barriers that limit use of standard precautions for infection control in LTCFs. Current measures used to address these identified barriers in order to increase the use of standard precautions control in these facilities were also explored. The literature review followed the process of identifying a problem, formulating a research question, literature search, and analyzing the data.

*Literature Search Strategies*
This review of literature utilized Cumulative Index to Nursing and Allied Health Literature (CINAHL), HealthSource Nursing Academic Edition, and PubMed databases. Also included in the search was the Centers for Disease Prevention and Control website for a more up to date information. The searches were performed using these keywords: infection, disease outbreak, control, prevention, precautions, protocol, procedures, methods, long term care, long term care facilities, barriers, road blocks, and obstacles. The selected articles related to the research questions posed in this study.

2.2. Data Synthesis

For the first research question relating to identifying the barriers that limit the use of standard precautions for infection control in LTCFs, articles were carefully reviewed to elicit salient information showing factors that hinder the adherence to the use of standard precautions. The inclusion criteria used in this search were:

- Journal articles published between 2004 – 2017
- Individuals in long term care facilities
- Incidence of infectious disease outbreaks and healthcare acquired infections
- Standard practices or protocols in long term care facilities
- Barriers to adherence on standard precaution protocols
- Source type was limited to academic peer-reviewed journals

The initial search on CINAHL and HealthSource databases elicited 92 articles. Of these articles, twelve met the inclusion criteria. However, after reading their abstracts by way of further review, seven of these articles were chosen to be used for further review (Figure 2). The
recurrent themes in these articles which hinder the effective practice of standard precautions for infection control were documented in Table 1.

![CINAHL and HealthSource search results](image)

**Figure 2. Literature search and results on barriers.**

In order to answer the second research question, searches were made in CINAHL and PubMed with keywords: infections, diseases, long term care facility, long-term care, prevention practices, disease prevention, best practice, control measures, and proposed protocols. These keywords were chosen to identify current measures designed to improve compliance with the practice of standard precautions in long term care facilities. The criteria for the search included:

- Journal articles published between 2006 – 2017
- Individuals in long term care facilities
- Identified preventive measures
- Age range of 65+ years
- Overcoming barriers to promote infection control
Source type was limited to academic peer-reviewed journals.

The initial search carried out in CINAHL database elicited 76 journal articles. Fifteen were selected to be reviewed based on their abstracts, and five were chosen for further review (Figure 3). The search in PubMed elicited 54 journal articles. Eighteen were selected based on review of their abstracts, and three were chosen for further review (Figure 3). Information about the measures and approaches that would improve adherence to the use of standard precautions were compiled into a matrix table that documented the objective of the study, the design and sample employed, and a description of how the measures, if adopted will led to increased compliance (Table 2).

Figure 3. Literature search and results on measures to adopt to increase the use of standard precautions.
2.3. Data Analysis and Presentation

Two data matrix displays, one for each research question, were created using the identified research articles. The analysis of data about barriers to SP involved a critical look and data extraction from the seven sources displayed in table 1. The table matrix includes, year of publication, title, objective of the study, the research design, findings, and the identified barriers by the authors. These seven sources deemed eligible for inclusion showed a common theme related to barriers and challenges to compliance with standard precaution measures in infection control.

The presentation of selected literature on preventive measures aimed at overcoming the barriers to SP were displayed in table 2. Eight articles deemed eligible to answer research question 2 are displayed with author, year of publication, objective of the study, design, and findings. Preventive measures commonly addressed in the chosen articles were reported in the results section.

3. Findings

3.1. Barriers that limit the use of SPs for infection control in long term care facilities.

Through the literature search, common barriers were identified and grouped under three categories: psychological barriers, physical barriers, and resource barriers.

3.1.1. Psychological barriers

Barriers grouped under this category include: 1) negative perception that protective equipment interferes with work skills, 2) anxiety that patients may experience distress with the use of PPEs, and 3) time factor in emergency situations. These barriers are antecedents to the
non-compliance in standard precautions. According to Ashraf et al (2010), Richards (2007), and Gammon (2007), the associated discomfort with repeated SP practices such as repeated handwashing and its effect on the skin, was seen as a barrier mitigating its adherence. Eftathiou, Papastavrou, Raftopoulos and Merkouris (2011), indicated that some health care workers associated the use of protective equipment with reduction in their skills. For example, they noted the perception that the use of PPEs like gloves for blood draw purposes was associated with reduction in dexterity. Those barriers identified affect compliance with SP and, tend to inhibit its use regardless of care activities with high risk patients (Neo, Edward, and Mills, 2012).

In addition, certain SP practices are perceived as time wasting especially in emergency situations because of the belief that the essential task of healthcare workers is to save and protect lives ((Eftathiou, Papastavrou, Raftopoulos and Merkouris, 2011). This personal decision by healthcare professionals undermines one of the essential components of a safety control measure instituted by the CDC especially in high risk situations. It exposes them and other long-term care residents to infectious microorganisms. Lastly, the idea that the use of certain use of PPEs result in anxiety-provoking situations for patients and promote patient discomfort was also a major obstacle (Eftathiou, Papastavrou, Raftopoulos and Merkouris, 2011).

3.1.2. Physical barriers

Physical barriers to the practice of SP found in selected studies include: shortage of protective equipment, different glove sizes not made available to staff, no nearby sink or soap and paper towel to facilitate hand washing, and poor work space design. Two studies vividly stated that the limited availability of essential items like PPEs, absence of nearby sinks or hand washing stations, and lack of appropriately sized gloves hinder the practice of SP (Ashraf, et al.
2010, and Richards, 2007). These supplies when available act as barriers to infectious agents. An absence of basic PPE supplies at the point of care in LTCFs clearly leads to increase in HCAIs and bolsters a culture of non-compliance.

According to another study conducted by Stevenson and Loeb (2004), the lack of protective equipment related to cost has a huge negative impact on keeping infection control measures in place at LTCFs where elderly residents are more susceptible to infections due to their debilitating conditions. What this also implies, is the lack of explicit commitment by management at promoting a safety culture (Neo, Edward, and Mills, 2012). The study by Stevenson and Loeb (2004), help raise awareness of the need for infection control practices that focus on the use of gloves for direct patient contact, PPEs for substantial contact with patients or body fluids, disinfection of equipment, dedicated use of non-critical equipment, and hand hygiene.

As Gammon, Morgan-Samuel, and Gould (2008) observe, compliance with SP is related to availability of needed protective equipment. When gloves, gowns / aprons, protective eyewear, and other protective clothing are not made available for healthcare workers due to lack of means, in addition to a work area that does not allow to proper coordination of task, not only is SP compliance impossible, but a message is being sent that a culture of safety is not priority. This lack of commitment to safety also reduces adherence to SP.

3.1.3. Resource Barriers.

Barriers grouped under this category include: lack of resources dedicated towards infection control, absence of dedicated trained onsite infection control professional, no funding for professional development for assigned infection control personnel, poor staffing due to high
staff turnover, no proper infection control program in place and, lack of organizational support for such programs. The prevention of infections depends on the facility’s critical role in infection surveillance, and prevention interventions through a trained infection control professional. The lack of a dedicated onsite trained Infection Control Professional (ICP) in LTCFs to address adherence issues within the facility was seen as a major factor that continues to weaken commitment to best practices in keeping infection at bay (Gamage, Schall, and Grant, 2012). Stevenson (2004), also alluded to this fact. He pointed out that most LTCFs lack the foundation for infection control because there is no infection control program with dedicated personnel to ensure its provisions. LTCFs are mandated by the Centers for Medicare and Medicaid Services to have a functional infection control program and a trained infection control professional to provide support and resources because of the potential they have to improve infection control practices among health care personnel. A study by Richards (2007) indicated that most LTCFs resort to the use of registered nurses with minimal training in infection control to fulfil this role as against fully trained ICP in acute care facilities. These assigned nurses in LTCFs also fulfil other functions within the facility, and their multiple job functions detract from proper surveillance and identification of infectious diseases (Pogorzelska-Maziarz and Kalp, 2017).

3.2. Current preventive measures to increase the use of SP for infection control in LTCFs

In the 8 selected studies, identified measures currently used to promote SP compliance practices centered around addressing work load issues, availability of materials at the point of care, and the need for infection control professionals to focus on the positive impact of handwashing, compliance with isolation guidelines, and disinfection practices (Maas and Buckwalter, 2006). In addressing work load issues, five of the studies laid emphasis on enhanced staffing and staff training, the need for PPEs to be made readily available to improve adherence
to policies and guidelines and the need for organizational support to commitment to hand hygiene practices at the point of care (Martin, 2010).

In addition, three of the studies pointed out the importance of infection control programs and dedicated personnel as interventions for improving compliance (Mody 2007, Martin 2010, and Jayasekara, Leone, Sharp, and Frase, 2016). The need for administrative support of these programs by way of investing in properly trained professionals to control outbreaks, monitor compliance with isolation protocols, reduce incidence of exposure to blood borne pathogens, and audit facility’s guidelines and protocols were discussed (Mody, 2007). However, none of these studies considered how mandatory training should be tailored towards meeting the learning abilities of the different job categories in LTCFs. Also, follow-up studies to measure the effect of the intervention provided were not mentioned.

While the need for infection control program professionals was a recurring theme in the literature, no mention was made on the minimum educational standard requirements for such job function nor was there any mention of the resources that LTCFs should make readily available for ICPs. These unique challenges must be addressed for proper infection control culture or practices to be adopted by healthcare workers in LTCFs.

4. Discussion

Education of staff was identified in selected articles as a measure to address some psychological barriers to the practice of SPs. However, there is a dearth of research pertaining to the planning, content, and identified learning needs that such educational sessions should address in order to bring about desired behavior change (Means, 2006).
Psychological barriers can undermine any educational program if such intervention was not given proper thought in the planning stage. Careful thought and consideration need to go into how best the lessons of the training program can transfer to the actual work place setting to improve adherence to standard precautions. Harrison (2003), states that the need to tailor educational interventions according to the learning needs of the specific healthcare personnel is demonstrated by the fact that processes and techniques used in learning and development affect outcomes. Any staff training, and development program should involve self-reflective learning. This method will assist healthcare workers to challenge and change old mindsets.

In this vein, the training programs offered should center on work-based learning processes like quality circles, briefing groups, best practice exercises, and action learning program that exposes individuals to new ways of thinking and new situations that will make them question familiar operations and routines (Harrison, 2003). By way of emphasis, this method of unlearning and relearning can promote practices like efficient hand hygiene and, the use of gloves and PPEs, because the learning process consist of individuals redefining their current perspective in order to develop and provide rationale for new patterns of thinking and behaving.

In addition, best practice for any intervention carried out to facilitate learning should involve a follow-up assessment tool to measure the impact of training provided (Feil and Bradley, 2013). However, such follow-up assessments aimed at expanding and sustaining new learning are difficult in LTCFs, due to the high rate of staff turnover. These facilities should look into retention practices that will create the possibility for follow-up assessments in order to identify measures that work and, adapt them to promote adherence.
The articles reviewed indicate a growing trend towards LTCFs’ recognition of the need for professionally staffed infection control programs, and identification of disease processes (Pogorzelska-Maziarz and Kalp, 2017). However, the essential components of a good infection control program, which are comprised of a trained infection control practitioner and an oversight committee as emphasized by Mody (2007) and Richards (2007), are often non-existent in some LTCFs. They do not have the resources for such programs, and assigned personnel have multiple responsibilities and lack time and skill to dedicate to improving infection control. In some cases, the director of nursing services or other supervisory staff take on the task of an IPC in addition to their other roles. The net effect of this is the resulting difficulty in outbreak investigation and, prevention of new and future outbreaks.

5. Limitations

The limitations of this literature review are related to the inclusion criteria and the actual number of chosen research articles. Also, there was lack of follow-up assessments to measure the impact of current measures used to address the identified barriers in LTCFs. In addition, some of the selected articles that made use of surveys in their research design had research participants who self-reported what they perceived as barriers in adhering to SP guidelines. Other factors or barriers that affect compliance to SP could have been under-reported due to self-report bias.

6. Direction for Future Research

The findings of this research have provided insight into how healthcare workers perceptions towards the use of protective equipment, lack of availability of supplies, and lack of an established infection control program affect compliance to standard precautions in LTCFs. Future research should evaluate the effectiveness of the content of educational materials used for
knowledge improvement with the aim of identifying how such materials support the learning capabilities of the different job categories in LTCFs. Also, more studies need to be conducted to explore the reasons why LTCFs continue to shun the requirement for a well-established infection control program as mandated by Centers for Medicare and Medicaid Services.

7. Implications for Nursing Practice

Nurses working in LTCFs can reflect on their practices and improve care by adhering to the established guidelines for standard precautions. The establishment of an effective infection control program, and administrative support at ensuring supplies are made available will encourage the frequent use of PPEs when appropriate. Also, a careful design of work area will allow nurses to carry out their task in a coordinated manner such that care will be provided swiftly and effectively in these facilities. In addition, mandatory in-services will create insight about risk assessment skills recommended by guidelines for the use of PPEs with the aim of increasing compliance (Neo, Edward, and Mills, 2012).

8. Conclusions

The practice of standard precautions to reduce the risk of transmission of infectious pathogens should be the priority of all healthcare workers in LTCFs. The goal of this literature review was identifying barriers to the practice of SP which is a vital step in determining how proposed measures can strengthen its practice. Barriers identified in this review included: negative perception that protective equipment interferes with work skills, anxiety that patients may experience distress with the use of PPEs, time factor in emergency situations, shortage of protective equipment, lack of resources dedicated towards infection control, staffing issues, lack of an established infection control program, and lack of organizational support for such
programs. The evaluation of current practices designed to promote adherence to SP leads to the need for adaptation of effective interventions that will improve compliance. Mandatory education provided needs to be tailored to suit the learning abilities of each job category in LTCFs.

Administrators of LTCFs should follow a coherent approach to SPs. PPEs should be made available within reach and appropriate use should be encouraged during patient care activity. Lastly, there should be standard guidelines and curriculum that will provide a comprehensive infection control program in LTCFs, including an assigned infection control professional who has the education and competence to promote surveillance and, prevent contamination and transmission of infectious materials in these facilities.
References


http://dx.doi.org.ezproxy.depaul.edu/10.1016/j.ajic.2011.03.026


BARRIERS TO THE USE OF STANDARD PRECAUTIONS


Table 1. Summary of research on barriers that limit the use of standard precautions.

<table>
<thead>
<tr>
<th>Author &amp; Year</th>
<th>Title</th>
<th>Objective</th>
<th>Design</th>
<th>Findings</th>
<th>Barrier(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pogorzelska-Maziarz, M. &amp; Kalp, E. (2017)</td>
<td>Infection prevention outside of acute care setting: Results from the megasurvey of infection preventionists</td>
<td>To explore long term care and ambulatory care settings commitment to infection control</td>
<td>Survey</td>
<td>Infection prevention control programs low in long term care facilities; lack of dedicated ICP;</td>
<td>Lack of resources directed towards infection control</td>
</tr>
<tr>
<td>Gamage et al. (2012)</td>
<td>Identifying the gaps in infection prevention and control resources for long-term care facilities in British Columbia</td>
<td>To identify infection prevention control resources available for LTC, and how it impacts patient’s care and safety.</td>
<td>Validated survey tool</td>
<td>Lack of leadership in implementing infection control programs; lack of training and support for ICP.</td>
<td>Absence of dedicated onsite trained ICP; no funding for professional development for assigned ICP.</td>
</tr>
<tr>
<td>Stevenson, &amp; Loeb (2004)</td>
<td>Performance improvement in the long-term-care setting: building on the foundation of infection control</td>
<td>A review of performance improvement through evidence-based interventions</td>
<td>Randomized trials of several representative studies</td>
<td>Poor compliance with recommended practices; lack of training made available to ICP.</td>
<td>High staff turnover; limited resources made available at the point of care;</td>
</tr>
<tr>
<td>Efstathiou et al. (2011)</td>
<td>Factors influencing nurses’ compliance with Standard Precautions in order to avoid occupational exposure to microorganisms: A focus group study</td>
<td>To evaluate factors that influences compliance</td>
<td>Descriptive-exploratory</td>
<td>Emergency situation as a major obstacle to the practice of SP; lack of availability of PPEs, negative influence of protective equipment on nurses; association of protective equipment with patient discomfort; lack of nursing personnel.</td>
<td>Anxiety that patients may experience distress with the use of PPEs; lack of time, absence of protective equipment; PPEs seen as uncomfortable</td>
</tr>
<tr>
<td>Author</td>
<td>Title</td>
<td>Objectives</td>
<td>Methodology</td>
<td>Barriers</td>
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<tr>
<td>Richards, C. (2007)</td>
<td>Infection control in long term care facilities</td>
<td>Assessing risk factors for infections in LTCFs</td>
<td>Integrative literature review</td>
<td>Non-adherence by LTCFs to the provisions of Centers for Medicare and Medicaid Services; Lack of administrative support and resources for ICP</td>
<td></td>
</tr>
<tr>
<td>Gammon et al. (2006)</td>
<td>A review of evidence of suboptimal compliance of healthcare practitioners to standard / universal infection control precautions.</td>
<td>To examine the extent to which practitioners comply with infection control precautions and the pertinent issues that are considered influential in compliance.</td>
<td>Literature review</td>
<td>Varying level of compliance with PPEs; poor handwashing practices; lack of structured training to improve knowledge and practice; shortage of protective equipment.</td>
<td></td>
</tr>
<tr>
<td>Ashraf et al. (2010)</td>
<td>Hand hygiene in long term care facilities: A multicenter study of knowledge, attitudes, practices, and barriers.</td>
<td>To explore practical barriers reported by employees of LTCFs in the course of their clinical duties.</td>
<td>Survey research</td>
<td>Employees perception that SP guidelines are not practical; attitudes of employees regarding SP practices largely due to lack of structured intervention.</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Absence of protective equipment at the point of care; no nearby sink or soap and paper towel; time factor; urgent medical attention; lack of organizational support.</td>
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</tbody>
</table>
Table 2. Research on measures that increase the use of standard precautions.

<table>
<thead>
<tr>
<th>Author &amp; Year</th>
<th>Title</th>
<th>Objectives</th>
<th>Design</th>
<th>Finding (s)</th>
<th>Measure (s) identified</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kemeny et al. (2006)</td>
<td>Using experiential techniques for staff development: liking, learning, and doing.</td>
<td>To evaluate whether role playing techniques are effective in increasing knowledge in person-centered care</td>
<td>Cross sectional survey</td>
<td>Role play and exercises in staff development programs provide assistance with learning new information and skill transfer.</td>
<td>Enhanced staff training</td>
</tr>
<tr>
<td>Maas &amp; Buckwalter (2006)</td>
<td>Providing quality care in assisted living facilities: Recommendations for enhanced staffing and staff training.</td>
<td>To provide background information and describe assisted living staffing and training.</td>
<td>Literature review</td>
<td>Staff education and awareness are critical elements in infection control programs.</td>
<td>Adequate staffing; better staff patient ratio &amp; staff training; leadership support</td>
</tr>
<tr>
<td>Martin, (2010)</td>
<td>Infection control in long term care facilities</td>
<td>To examine the different aspects of infection control programs in LTCFs</td>
<td>Literature review</td>
<td>Lack of well-established infection control programs in LTCFs; inadequate attention given to mandatory staff education that should serve as an infection prevention resource</td>
<td>Hand hygiene; protective equipment should be made available; qualified ICP; organizational commitment in improving infection control program.</td>
</tr>
<tr>
<td>Mody (2007)</td>
<td>Infection control issues in older adults</td>
<td>To explore elements of infection control program in aged care facilities</td>
<td>Integrative literature review</td>
<td>Clear guidelines on responsibilities and certain minimum qualification of an ICP were non-existent; Most LTCFs lack</td>
<td>Staff education; availability of protective equipment; trained</td>
</tr>
<tr>
<td>Authors</td>
<td>Title</td>
<td>Objective</td>
<td>Methodology</td>
<td>Findings</td>
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<tr>
<td>Powers et al. (2016)</td>
<td>Factors influencing nurse compliance with standard precautions</td>
<td>To examine reasons for non-compliance to SP in order to determine a strategy for improving behavior</td>
<td>Descriptive correlational study</td>
<td>The need for stricter enforcement of SP guidelines; adequate knowledge through staff training provide a more realistic perception of risk. Education as a tool for behavior change.</td>
<td></td>
</tr>
<tr>
<td>Koo et al. (2016)</td>
<td>Making infection prevention education interactive can enhance knowledge and improve outcomes: results from targeted infection prevention (TIP) study</td>
<td>To assess the effectiveness of an interactive educational program in increasing knowledge of key infection prevention and control principles</td>
<td>Randomized control study</td>
<td>Variable results obtained across job categories following education in-services; the need for further refinement of infection control education to match knowledge and skills of healthcare workers. Education as a tool to bring about change in behavior.</td>
<td></td>
</tr>
<tr>
<td>Jayasekara et al. (2016)</td>
<td>Preventing and controlling human noroviruses in South Carolina long-term care facilities: An analysis of institutional policies and procedures</td>
<td>To determine alignment of policies and procedures in LTCFs in South Carolina with CDC recommendations.</td>
<td>2-part coding manual</td>
<td>Most LTCFs were not consistent with CDC SP recommendations; Lack of expansion of the types of contamination events requiring handwashing in LTCFs; healthcare workers are not given proper education about outbreak and control strategies for infection control. Focus on worker’s hygiene in preventing cross-contamination; organizational commitment in making protective equipment available; staff education.</td>
<td></td>
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<tr>
<td>Cohen et al. (2016)</td>
<td>Cost of infection prevention practices in long term care</td>
<td>To evaluate cost estimates reported in scientific literature of the structure</td>
<td>Integrative literature review</td>
<td>Absence of sufficient funding for infection prevention activities that Enhanced staffing; mandatory staff education on clear.</td>
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</tbody>
</table>
settings: a systematic review and processes intended to prevent infection in LTCFs.

will reduce morbidity; inadequate staffing and training in LTCFs account for suboptimal compliance to SP.

specific goals; availability of protective equipment.