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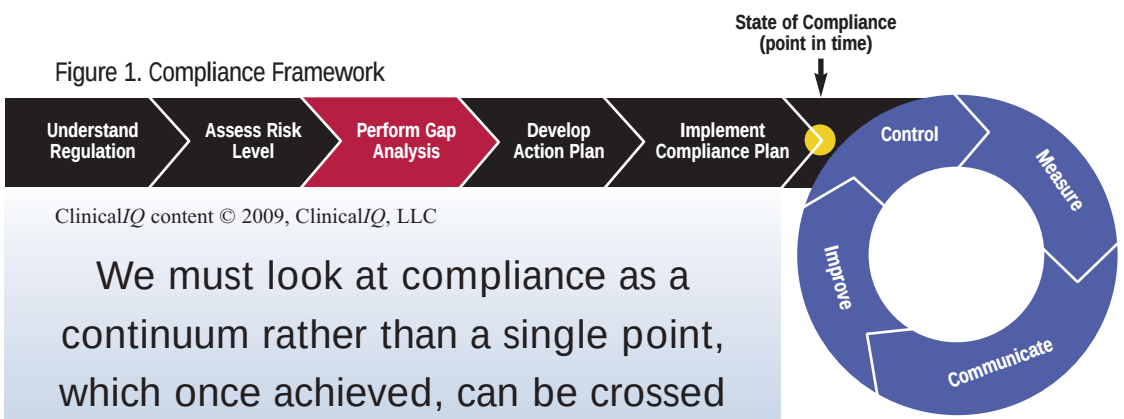
The Top 10 Gaps in **USP Chapter <797> Compliance**

It has been almost six years since USP Chapter <797> Pharmaceutical Considerations-Sterile Compounding was published, and almost three years since the chapter was modified, with the revised chapter becoming effective on June 1, 2008. Despite this passage of time, the need to continually review your pharmacy's state of compliance has not diminished. While you may have followed the guidance offered in earlier articles outlining processes to insure compliance,[1] you must continue to revisit your practices regularly as compounding operations, personnel, and physical plants change; scientific information and our understanding of it grows as the literature is updated and regulatory bodies respond by adapting statutes and laws; and professional best practices evolve. We must look at compliance as a continuum rather than a single point, which once achieved, can be crossed off our "to-do" list. The elements of the compliance continuum are outlined in Figure 1.

Figure 1. Compliance Framework



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Understanding the Regulations

What do the state boards of pharmacy, state departments of health, and the Drug Enforcement Agency require of sterile compounding operations? USP Chapter <797> is not law, rather it is a standard synthesized from accepted evidence-based science and best practices. Experts with diverse backgrounds in sterile compounding as well as the contamination and infection control industry worked in concert to furnish health care providers with a set of minimum practice and quality standards that are applicable when delivering compounded sterile preparations (CSPs). Because states have taken different approaches to the enforcement of USP Chapter <797>, it is incumbent upon each facility to fully understand its state's sterile compounding regulations.

Assessing Risk Level

The next step in the process is to assess the risk level of compounding that occurs at your organization. The pyramid in Figure 2 details the relative risk of microbial contamination and content errors, which increase with the complexity of the compounding.

Perform a Gap Analysis

It is important to determine how your current pharmacy compounding operations compare with those outlined in USP Chapter <797>. To perform this evaluation, or gap analysis, the requirements of <797> are compared line by line with current practices and operational facilities in order to identify differences or "gaps." The gap areas are then analyzed to identify specific practices that present the greatest risks and most significant deviations from <797> requirements.

Develop an Action Plan

To develop an action plan, use the gap analysis results to identify and document the activities necessary to close the gaps. Keep in mind that the more detailed your written plan is, the more likely it is to be implemented successfully. Developing a meaningful and detailed action plan requires a strong working knowledge of the USP Chapter as well as access to resources (e.g., articles, webinars and tools) that can be used to help identify strategies to close the gaps. The action plan will identify options that can immediately improve compounding practices, thus reducing vulnerability to microbial contamination and the risk of inaccurately compounding preparations.

Implement an Action Plan

An effective plan outlines the overall objectives and specific strategies of each plan element, and includes measureable criteria for success. Identifying key staff members to champion the process is a critical component. When employees view the plan as "theirs" rather than "management's," success will follow more quickly. Communication, requests for input, ownership, honesty, and addressing the "what's-in-it-for-me"

Photo courtesy of AnazaoHealth

Figure 2. Compounding Risk Levels

questions are all important aspects. Any compliance approach should integrate the "loved-one" rule, where staff are asked to picture loved ones as the recipient of the CSPs, making the patients they may never meet more real. Once the gaps are closed, compliance has been achieved for this point in time. Keep in mind, compliance is not an end-point or a finish line, rather it can only be maintained through continuous process improvement.

Control-Measure-Communicate-Improve

This portion of the compliance framework is cyclical and should follow the process improvement concept known as Plan-Do-Study-Act (PDSA). The PDSA cycle is shorthand for testing a change by planning it, trying it, observing the results, and acting on what is learned. Finding gaps and closing them is great, but the part most often missed is the continuous monitoring to ensure that the next gap (and there will be one) is identified quickly. Too often, gaps are identified and changes are made to policies; however, the actual process in the work setting does not reflect the change. The PDSA model helps make the solutions stick.[2]

The Top 10 Gaps

Underscoring the inherent challenges in achieving and maintaining full compliance, following are the ten areas where gaps in USP <797> compliance are most commonly found:

1. Understanding USP <797>

In order to comply with the chapter, you have to understand it. There is no alternative to reviewing it methodically. In addition, the ASHP's Discussion Guides for both the original and revised chapters provide a comprehensive understanding of the chapter, including why it was written and revised.

2. State Regulations and USP <797>

It is critically important to understand your state's rules and regulations as a number of states have amended their laws relative to sterile compounding regulations. Contact your state board of pharmacy or visit their Web site to obtain the most current information regarding compliance with USP Chapter <797>. Currently, 20 states require compliance with USP Chapter <797> and these states are actively assessing compliance during inspections. Clinical IQ provides an online reference to determine the <797> regulation requirements for the various state boards of pharmacy. Additionally, many state departments of health are inspecting for compliance with the physical plant requirements of the chapter (e.g., ISO Class 7 buffer area and caulked ceiling tiles).

3. Meeting Facility Design Requirements

Complying with <797> has lead to a significant number of construction and renovation projects. Unfortunately, these builds are sometimes performed by vendors who may not fully understand the chapter. Building a negative pressure ISO Class 7 buffer area supported by a positive-pressure ISO Class 7 ante area requires significant expertise. Many pharmacies have been cited for buffer and ante areas that do not contain all of the required elements (e.g., seamless coved sheet vinyl floors). A number of articles have been published by *Pharmacy Purchasing & Products* magazine, *American Journal of Health-System Pharmacy,* and the *International Journal of Pharmaceutical Compounding*, all which provide excellent information relative to compliant design, build, and performance.

4. Caulked Ceiling Tiles

Chapter <797> requires that ceiling tiles be caulked in place to ensure they do not move, become dislodged, or get damaged during cleaning. The presence of caulked ceiling tiles is especially important in negative pressure ISO Class 7 buffer areas to mitigate the introduction of dirty, unfiltered air from the ceiling plenum. This design element is an easily identified requirement and is frequently cited by board of pharmacy and department of health inspectors.

5. Dating Multi-dose Vials

There continues to be significant confusion regarding the storage period for multi-dose vials subsequent to their initial puncture. Many organizations have been cited by The Joint Commission, state boards of pharmacy, and departments of health for not discarding multi-dose vials after 28 days. The Multiple-dose Containers Section of USP Chapter <797> states that the "BUD for an opened or entered (e.g., needle-punctured) multiple-dose container with antimicrobial preservatives is 28 days (see Antimicrobial Effectiveness Testing <51>), unless otherwise specified by the manufacturer." Many organizations have missed the "unless otherwise specified by the manufacturer" part of the section. The CDC's Vaccine Storage and Handling Toolkit is an excellent resource on the storage and handling of vaccines. The CDC states, "a vaccine or diluent may be used

up to and including the date on the vial unless otherwise stated in the product package insert."

6. Training in Hand Hygiene, Media Fill, Surface Sampling, and Gloved Fingertip Sampling

The activities associated with hand hygiene, media fill, surface sampling, and gloved fingertip sampling are often misunderstood. The purpose of these quality elements is to demonstrate proper aseptic technique for compounding personnel. Several studies have shown that staff aseptic technique and garbing practices contribute to contamination of CSPs more than the environment in which the compounding is being performed.[3-7] While controlled environments with ISO classified air are necessary to maintain a state of control, do not underestimate the ability of personnel work practices to positively (or negatively) affect the cleanliness of controlled environments. Staff must be trained on all of these elements annually for low- and medium-risk level operations, and semi-annually for high-risk level operations. There are a number of resources available on these topics, including articles published in *Pharmacy Purchasing & Products* magazine, the CDC Web site on hand hygiene, and the CriticalPoint Virtual Compounder series.

Once all compounding and supervisory personnel—including pharmacists and technicians—have completed their initial training (regardless of their previous experience), these elements can be integrated into each employee's annual or semi-annual training. It may be best to validate the competency of a few employees each month, avoiding a mass staff competency verification performed once a year. By dividing staff and performing these activities on a monthly basis, this process will also provide a baseline of microbial bioburden data for the controlled work areas. These data can serve as an early warning system to

prevent processes, personnel, and/or facility operations from migrating out of a state of control.

7. Personnel Equipment Training

A variety of equipment may be used in the buffer and ante areas, including primary engineering controls (e.g., LAFW, BSC, CAI, or CACI) and automated compounding devices, such as TPN compounders. Any personnel using this equipment must be properly trained on each device and be able to successfully demonstrate proficiency in use and troubleshooting. A record of training and competency verification must also be kept.

8. Documenting Temperatures and Reporting Excursions

Maintaining proper storage conditions for CSPs is critical to ensuring their integrity. All storage environments where ingredients and finished CSPs are stored need to be closely monitored. One of the most overlooked quality elements is documenting the temperatures of each controlled storage area or device on a daily basis. This activity is equally critical on the patient-care units where medications are stored. This deficiency is easily identified and often cited by board of pharmacy or department of health inspectors, but it is also easily remedied. Strategies to remediate this deficiency can include the purchase and installation of a wireless temperature monitoring system or electronic documentation system (e.g., Simplifi 797).

9. Having a Properly Tested and Certified Facility

USP Chapter <797> requires that a program be in place to sample nonviable airborne particles to directly measure the performance of the engineering controls used to create the various levels of air cleanliness (e.g., ISO Class 5, 7, or 8). Since non-viable particles serve as transport mechanisms for viable contamination, particle sampling is an essential component of the overall contamination control strategy for aseptic compounding. A qualified individual must perform certification procedures such as those outlined in "Certification Guide for Sterile Compounding Facilities" (CAG-003-2006) no less than every six months and whenever a device is moved, the room is relocated or altered, or major service to the facility is performed. There are no industry-based accreditation programs for certifiers of sterile compounding facilities at this time, however, the National Sanitation Foundation International's accreditation program for certifiers of BSCs can be used as a barometer of a certifier's knowledge and skill. One valuable resource is James Wagner's article titled "Choosing a Certification Professional to Evaluate Your Cleanroom and Engineering Controls," published in *Pharmacy Purchasing & Products* magazine.[8] Ensuring that all primary and secondary engineering controls are operating properly and meet the design requirements of USP Chapter <797> is a fundamental aspect of sterile compounding. It is important that pharmacy leadership take an active role in understanding, monitoring, and documenting the certification process.

10. Complying with BUDs

The BUD on a CSP identifies the time by which the preparation, once compounded, must be used before it is at risk for chemical degradation, contamination, and permeability of the packaging. To exceed the BUD limits published in USP Chapter <797>, each batch of CSP must be subjected to sterility testing according to the CSP risk level and to the requirements of USP Chapter <71> Sterility Tests. Patricia Kienle's article titled "Understanding Beyond-Use Dating for Compounded Sterile Preparations" in *Pharmacy Purchasing & Products* magazine is an excellent resource on this topic.[9]

Putting It All Together

Each step in the compliance framework provides specific guidance intended to ensure a compounding operation is under control, in compliance with USP Chapter <797>, and provides controls that measure changes implemented as a result of the action plan. Continued observation is necessary to confirm the changes made resulted in the desired outcome and that those changes remain in place. Only after a period of sustained and confirmed success can one be confident that the new procedures and activities have been integrated into the fabric of the compounding facility and employee work practices. A state of compliance only exists at the point in time it is measured, so routine monitoring is necessary to control variables that will certainly evolve over time and may negatively affect the compounding environment. Only through organizational dedication to performing the activities of the final, continuous curve of the process improvement cycle (see Figure 1 for the control, measure, communicate, and improve phases), can a state of control and true continuous quality improvement of compounded sterile preparations be realized. ■

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Additional Resources:

- **The Top Ten Gaps in USP <797> Compliance webinar**
  http://www.pharmacyonesource.com/images/simplifi797/Top_10_Gaps.wmv
- **USP Chapter <797>**
  http://www.usp.org/products/797Guidebook/
- **The ASHP Discussion Guides on USP Chapter <797>**
  http://www.ashp.org/compounding
- **CDC Vaccine Storage and Handling Toolkit information**
  http://www2a.cdc.gov/vaccines/ed/shtoolkit/pages/inventory_management.htm
- **CDC's Guideline for Hand Hygiene in Healthcare Settings**
  http://www.cdc.gov/Handhygiene/
- **CriticalPoint Virtual Compounder series**
  http://www.criticalpoint.info/
- **Clinical IQ's State Boards of Pharmacy's <797> Regulation Requirements Map**
  http://www.clinicaliq.com/component/option.com_google_maps/Itemid,111

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