Background

Multiple studies have shown that pharmacy-compounded products are at risk for quality issues resulting in sub-potency, supra-potency, and even contamination. This project aims to identify important considerations for compounding non-sterile preparations in community pharmacy practice by referring to the newly revised United States Pharmacopeia (USP) Chapter <795> Pharmaceutical Compounding – Nonsterile Preparations (as of May 2011) and the National Association of Pharmacy Regulatory Authorities (NAPRA) Guidelines to Pharmacy Compounding (as of October 2006). The USP <795> Chapter defines the specific criteria required to compound preparations of acceptable strength, quality, and purity with appropriate packaging and labelling in accordance with regulatory agencies. In Canada, drug manufacturing is regulated by Health Canada and compounding is an authorized act regulated by provincial authorities.1 The NAPRA Guidelines to Pharmacy Compounding, developed in collaboration with provincial pharmacy regulatory bodies, set the expectations for the quality and safety of compounding practices in Canadian pharmacies.2

Before compounding a non-sterile preparation, the need for the compounded product is confirmed by checking for commercially available preparations in the Health Canada’s Drug Product Database, and contacting manufacturers. To comply with the Health Canada policy on compounding, this confirmation is required in order to validate the lack of product availability and avoid duplicating an approved drug product.3

Methods

An analysis of medication incidents related to non-sterile compounding was performed by reviewing reports anonymously submitted to the Institute for Safe Medication Practices Canada (ISMP Canada) Community Pharmacy Incident Reporting (CPhIR) Program from April 2010 to April 2012. Selected medication incidents were used to highlight potential considerations for compounding non-sterile conditions not followed.

Results

4 areas of concern identified:

(1) PERSONNEL

After confirming the need to compound a preparation, designated managers need to ensure compounders (who are responsible for compounding preparations that are accurate and adhere to provincial standards) have accurate knowledge and expertise.4 The compounder must use professional judgement when deciding whether they have the expertise to compound a specific product.5

(3) PROCEDURES AND RESOURCES

Sample Case: A pharmacist intended to compound an oral suspension of clonidine (using clonidine powder) for a 15-year-old male. The pharmacists incorrectly compounded the clonidine suspension (due to mixing up the concentration) when preparing the compound and the product used the preparation containing the waxes paper. In this incident, the pharmacy used pre-made stock to fill the prescription. Unfortunately, the pre-made stock contained wax paper that was included in the dispensed container. Although the wax paper did not cause harm to the patient, compounders are responsible for ensuring the final product appear as expected.6 If discrepancies are found in the final preparation, compounders need to resolve such discrepancies in preparation and appearance before dispensing to the patient.

(2) ENVIRONMENT

Compounders need to prepare non-sterile preparations in designated areas with adequate space, lighting, and storage to prevent cross-contamination and the inadvertent addition of extraneous material to the medication.7 The designated area should have access to potable water (i.e. drinking water) for hand and equipment washing.8 The NAPRA Guidelines to Pharmacy Compounding support this practice by including provisions for sanitation.9

(4) STABILITY ASSESSMENT

Table 1. Recommended maximum beyond-use dates for non-sterile compounded preparations.10

<table>
<thead>
<tr>
<th>Type of Non-Sterile Preparation</th>
<th>Beyond-use Date</th>
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<tbody>
<tr>
<td>Non-aqueous Formulations (such as ointments, suspensions, lotions, and creams)</td>
<td>Not later than the expiration of the earliest expiration date of any ingredient or 6 months, whichever is earlier</td>
</tr>
<tr>
<td>Water-containing Oral Formulations</td>
<td>Not later than 14 days for liquid preparations stored at controlled cold temperatures (less than 2°C and 8°C, or less than 2°C and 20°C, not simultaneously monitored between 2°C and 8°C)</td>
</tr>
<tr>
<td>Water-containing Topical/External and Parenteral Liquid and Semisolid Formulations (such as preparations for topical application, lotions, ointments, gels, creams, plasters, etc.)</td>
<td>Not later than 30 days</td>
</tr>
</tbody>
</table>

Discussion

Inappropriate compounding practices can put patients at risk for potentially harmful outcomes. Compounding ingredients have defined chemical and physical properties, but the compounding process can change ingredient properties resulting in altered quality, stability, and potency. These changes are highly dependent on the compounding formulation. It is vital for compounders to understand the impact of these alterations on the final product before patients are dispensed the compounded preparations.