Chapter 31
Sun Country Regional Health Authority—Managing Medication

1.0 Main Points

Under *The Regional Health Services Act*, regional health authorities (RHAs) are responsible for the operation of hospitals and the services provided in those hospitals. Medications play a vital role in patient care and the operations of any hospital. If systems are not in place to effectively manage and administer medications in hospitals, patients could be adversely affected by medication errors. RHAs must have effective systems to manage these risks in order to provide safe, effective, and sustainable healthcare services to their patients.

We audited the effectiveness of Sun Country Regional Health Authority's (Sun Country) processes to manage and administer medications in its district hospitals. We concluded that Sun Country had effective processes except it needs to:

- Follow its established policies to gain access to the pharmacy after regular hours and properly dispose of medication
- Use its approved form to document patient medication history and weight
- Analyze medication errors and the contributing factors, and use that analysis to develop action plans to address the issues

We make five recommendations to help Sun Country improve its processes for managing and administering medications in its district hospitals.

We encourage other regional health authorities to use the criteria in this chapter to assess their own processes for managing and administering medication.

2.0 Introduction

The Regional Health Services Act gives RHAs the authority and responsibility for the planning, organization, delivery and evaluation of health services within their respective regions. Under this mandate, RHAs are responsible for the operation of Saskatchewan's hospitals and the services provided in those hospitals.

Sun Country, with a population of 56,890,[1] is located in Saskatchewan's southeast corner, along the Manitoba and North Dakota borders. Sun Country has two district hospitals in its two largest communities. Weyburn General Hospital is owned and operated by Sun Country. St. Joseph's Hospital in Estevan is an affiliated facility[2] that

[1] Saskatchewan Ministry of Health, *Covered Population 2012*. http://population.health.gov.sk.ca/rhalist.htm (17 September 2013).
[2] Under *The Regional Health Services Act,* an affiliate is the operator of a healthcare facility (such as a long-term care home or hospital) who was operating before the creation of the regional health authorities. Affiliate facilities are not owned or operated by regional health authorities, but receive funding from them to provide health services.

provides hospital services on behalf of Sun Country through a contractual agreement. In total, 2,962 patients were admitted to the district hospitals in 2012-13.

Hospitals require the use of medications for pain management and the treatment of a wide range of illnesses. Also, medications play a vital role in patient care and the operations of any hospital. Some medications, such as opioids,[3] are kept in hospitals and are highly addictive, potentially dangerous drugs. These drugs are listed in Canada's *Controlled Drugs and Substances Act.*

Effectively managing medications in a hospital setting requires the efforts of different healthcare professionals. The preparation (e.g., counting and crushing), storage, and labeling of medications is done by pharmacy staff. After the medication has been stored, labeled, and prepared, it must be dispensed and then administered by licensed professional staff, who must ensure that the right patients receive the proper amounts of the correct medication at the appropriate time, as prescribed.

Detection of medication errors (e.g., when an incorrect medication, or the wrong dosage of the correct medication is given to a patient) is an important part of managing medication. A strong system of error detection allows for facilities and RHAs to identify where mistakes are commonly made so that they may address them. When mistakes include the actual or potential loss of life or function, they are considered critical incidents and, under *The Critical Incidents Regulations,* must be reported to the Ministry of Health.

Medication errors can have serious consequences. Even a seemingly harmless medication error presents a risk for a serious incident. If a physician prescribes Tylenol to a patient and the patient mistakenly receives aspirin, the medication error will, in many cases, not be serious. However, if the patient is severely allergic to aspirin, the result could be hives, coughing, or life-threatening anaphylactic shock.[4]

Research shows that medication errors and drug-related adverse events can have wide-ranging implications, including increased length of stays for patients, discomfort, disability, or death. These scenarios could present serious risks to the health and safety of patients, public confidence in the healthcare system, and the use of public money.

In 2009, Sun Country identified medication errors as an area for improvement, and implemented a medication reconciliation program that is designed to ensure that the medication information for individual patients is accurately and consistently recorded and communicated as the patients visit different healthcare facilities and providers. In its 2011-12 annual report, Sun Country reported that 90% of staff had been educated on medication reconciliation and that a program for monitoring compliance had been initiated.

If systems are not in place to effectively manage and administer medications in hospitals, patients could be adversely affected by medication errors. RHAs must have effective systems to manage these risks in order to provide safe, effective, and sustainable healthcare services to their patients.

[3] Opioids refers to drugs with morphine-like actions and properties. Examples include codeine, morphine, hydromorphoine, oxycodone, and methadone.
[4] Anaphylactic shock is a severe and sometimes fatal allergic reaction to a foreign substance.

3.0 Audit Objective, Scope, Criteria, and Conclusion

The objective of this audit was to assess if Sun Country had effective processes to manage and administer medications in its district hospitals. We did not audit the individual decisions associated with the prescribing of medications to patients in hospitals. Our audit covered the period of September 1, 2012 to August 31, 2013.

To conduct this audit, we followed the standards for assurance engagements published in the *CPA Canada Handbook - Assurance*. We examined policies, procedure manuals, minutes, and other relevant documents. We interviewed key managers and staff. We also observed medication management practices, tested a sample of medication profiles,[5] and verified medication inventory levels at the two district hospitals.

To evaluate Sun Country's processes, we used criteria based on selected references in **Section 5.0**. The criteria are also consistent with Accreditation Canada standards. Sun Country's management agreed with the criteria (see **Figure 1**).

Figure 1—Audit Criteria for Managing Medications

1.	**Maintain an appropriate inventory of medications**
1.1	Have a system for keeping appropriate amounts of medications
1.2	Regularly track inventory of key medications
1.3	Store medication in a secure, organized area
1.4	Appropriately label and process medications
1.5	Properly dispose of expired or spoiled medications
2.	**Provide proper medications to patients**
2.1	Maintain up-to-date knowledge of medications in use
2.2	Maintain medication profiles for all patients
2.3	Distribute medication to patients based on medication orders and standard procedures
3.	**Detect and track medication errors**
3.1	Have a system for detecting medication errors
3.2	Use a detection system to improve medication management performance
3.3	Report medication errors to management and families
3.4	Report medication-related critical incidents to the Ministry of Health

We concluded that for the period of September 1, 2012 to August 31, 2013, Sun Country Regional Health Authority had effective processes to manage and administer medications in its district hospitals except it needs to:

- **Follow its established policies to gain access to the pharmacy after regular hours and properly dispose of medication**
- **Use its approved form to document patient medication history and weight**
- **Analyze medication errors and the contributing factors, and use that analysis to develop action plans to address the issues**

[5] A medication profile is the documented information on a patient's medication history.

4.0 Key Findings and Recommendations

In this section, we describe our key findings and recommendations related to the audit criteria in **Figure 1.**

4.1 Medication Appropriately Stored and Tracked but Some Improvements Needed

4.1.1 Appropriate Amounts of Medications Kept

The Ministry of Health updates and maintains a drug formulary listing of therapeutically-effective, high-quality drugs. Through Health Shared Services Saskatchewan (3sHealth),[6] all regional health authorities have entered into an agreement with HealthPro[7] to facilitate the purchase of drugs on the drug formulary listing.

Sun Country has a pharmacy in each of its two district hospitals. Sun Country uses a computer system to track the medication kept in its hospital pharmacies. Every medication has a minimum and maximum inventory level attached to it based on the drug formulary. We observed that at the end of each day, the system automatically generates a purchase order for those drugs that have reached their minimum inventory levels. Pharmacy staff review the purchase orders prior to submitting the order to HealthPro. When the medication is received, pharmacy staff update the inventory levels in the computer system.

We found that when a physician prescribes a medication that is not available in the pharmacy, pharmacists work with other healthcare professionals (i.e., nurses and physicians) to find an acceptable alternative or obtains the necessary medication (See **Section 4.1.3**).

4.1.2 Inventory Regularly Tracked

On a yearly basis, Sun Country counts all medication maintained in its hospital pharmacies, compares the counted amount to the inventory level in its computer systems, and documents and investigates any differences. We found inventory levels are correctly recorded in the hospital pharmacies' computer systems.

Narcotics are counted on a monthly basis in each hospital pharmacy. In addition, narcotics are tracked daily in other locations within the hospitals (e.g., intensive care, emergency rooms) by using a narcotics tracking sheet. Nurses record the types of narcotics, the dosage, and the time the narcotic was given to a patient. We observed that at shift change, two nurses at each location perform a physical count of the narcotics remaining and the narcotics tracking sheet is signed off.

[6] 3sHealth is a non-profit corporation established to provide province-wide shared services to support a high-performing, sustainable, patient and family centred health system in Saskatchewan. www.health.gov.sk.ca/3shealth (27 September 2013).
[7] HealthPro is a Canadian healthcare group purchasing organization.

4.1.3 Medication is Properly Stored but After Hours Access Needs Strengthening

During our audit, we found that each hospital pharmacy was secure and well organized. Only authorized personnel are granted access to the hospital pharmacies during regular pharmacy hours. The hospital pharmacies are well organized with each medication stored on shelves in clearly marked containers. Narcotics are kept in a separate secure area (e.g., a safe with a combination lock).

The hospital pharmacies are open Monday to Friday, eight hours each day. Policy states that if a medication is required after regular pharmacy hours, staff may use drugs that are kept in the locked emergency night cupboard located within each hospital. Staff may also contact senior pharmacy staff to obtain permission to enter the pharmacy to obtain the required medication. The policy requires that a form be completed that includes the date, time, pharmacist consulted, drug required, dosage, patient's name and location, and quantity taken. As an alternative, staff may contact the community pharmacy (e.g., Pharmasave) to obtain the drug they require. Upon the request from authorized staff, the community pharmacy will provide a supply of the required drug until the hospital pharmacy reopens.

We found that Sun Country does not consistently follow its policy for obtaining medication after regular pharmacy hours. One district hospital does not require staff to gain permission from senior pharmacy staff to enter the pharmacy after hours. Nursing staff at the one district hospital can enter the pharmacy when needed to obtain any medication. They complete a form noting the date, patient's name and location, the drug required, the dosage, and the quantity taken. The form used at this district hospital does not require staff to document the pharmacist consulted.

Lack of appropriate approval to enter the pharmacy after hours and the lack of follow up on verifying the completed form could result in improper tracking of medications and possible misappropriation.

1. **We recommend that Sun Country Regional Health Authority monitor that staff consistently follow its policy of obtaining proper authorization and documenting the pharmacist consulted before entering the pharmacy after regular hours.**

4.1.4 Medications Labelled and Processed Appropriately

Sun Country orders medications in single-unit doses where possible to limit the amount of repackaging required by pharmacy staff. If medication only comes in large stock (i.e., bottles), staff in the pharmacy will repackage the medications in single-unit doses. Each medication is then clearly labelled and stored in individual containers. Medications with names that sound like another are not stored next to each other. We found that Sun Country also clearly labels high-alert medications (i.e., those medications that have a high level of risk for causing significant patient harm) with a pink sticker. This helps staff to be more aware and attentive to high-risk medications when processing orders and preparing and administering this medication.

Upon seeing a patient, physicians write up physician orders (i.e., prescriptions). These prescriptions are collected from the nursing units and taken to the pharmacy to be processed. We observed pharmacy staff enter the information from those prescriptions into the computer system. If there is a potential conflict between prescribed medications, the computer system will create an alert. If the alert is not considered a serious risk, pharmacy staff can override the system. However, if pharmacy staff consider it a serious risk, an intervention form is completed prior to preparing the medication for administration. This form outlines the issue, and provides a recommendation to resolve the issue. A physician reviews the intervention form and writes up a new prescription, where necessary. We found that intervention forms were utilized when required.

Once any alert is dealt with, the computer system will generate a label. We observed pharmacy staff filled the daily order based on the label (i.e., the correct number of doses). Another person from the pharmacy double-checked the order to ensure it was correct.

The medication for the day is then placed in a zip-lock type bag and the label is attached. Once the orders are processed, a medication administration record is produced from the computer system. It lists such information as the medication, dosage, and the time it should be administered. Pharmacy staff take the orders to the nursing units and provide any necessary explanations (e.g., how the medication is to be given).

4.1.5 Medication Needs to be Disposed in Accordance with Policy

Sun Country's computer system tracks drug expiry dates. On a monthly basis, the drug expiration report is printed off. Pharmacy staff compares the actual inventory stock against this list. Expired medication is sent back to the manufacturer for a refund or credit. If the medication cannot be returned, it is treated as biomedical waste and disposed of in biohazard containers.

When preparing medication to administer to a patient, some medication may be wasted. For example, a pill may be cut in half and the unused half is then wasted. Sun Country's policy states that expired or unused medications are to be disposed of in a biohazard container and medications are not to be flushed into the public sewage system. During our on-site visit, various staff indicated that wasted medication was disposed of by flushing it down the toilet or sink, put in the garbage, or put in a biohazard container. Lack of compliance with the policy for disposing of wasted medication increases the risk that people and the environment may be harmed.

2. We recommend that Sun Country Regional Health Authority train its staff to follow its policy to dispose of wasted medication properly and monitor compliance with the policy.

4.2 Proper Medication Provided to Patients but Medication Profiles Need to be Consistently Documented

4.2.1 Up-to-Date Knowledge of Medications Maintained

Professionals, such as medical and pharmacy staff, who work with medications must retain knowledge of medication as part of their profession. Staff are encouraged to keep abreast of new medications. In each hospital we visited, Sun Country had provided staff with the tools necessary to maintain up-to-date knowledge of the medications being used. We observed medication reference books, iPads, and computer terminals that are accessible to all staff.

In addition, if a particular medication is used more frequently in the region, Sun Country will hold a training session for medical staff. For example, Sun Country anticipated that there would be increased uptake for a medication used for autoimmune conditions. Therefore, it held a training session in August 2013 that included an overview of the conditions the medication is used for, the side effects, and how to administer the drug.

4.2.2 Medication Profiles Maintained but Improvements Needed

When a patient first arrives at the hospital, staff collect the best possible medication history on an approved form. The form is generated from the Pharmaceutical Information Program (PIP), a province-wide pharmaceutical system that provides a centralized source of patient medication obtained in retail pharmacies. The form lists the patient's prescribed medications from PIP over the last four months. To gather information about over-the-counter medications, vitamins, and other health-related supplements, nursing staff ask the patient questions and fill out the details on the form.

We found that one district hospital printed this medical history form from PIP as a starting point to collect the best possible medication history. Once this form was printed, staff then updated the form for the dosage, how the medication was to be taken, the frequency, and any other information obtained from the patient. However, we found that the other district hospital did not use this approved form. Instead, staff looked at PIP online and rewrote the listing of medication on another separate form, which is not approved for use by Sun Country. Rewriting the medications increases the risk that information may be written down wrong or a medication could be missed. This could result in medication errors and potentially harm the patient.

3. We recommend that Sun Country Regional Health Authority require all its hospitals to use the approved form generated from the province-wide pharmaceutical system to create accurate patient medication histories.

As part of gathering the best possible medication history, nursing staff are responsible for recording the patient's weight. They must record the patient's actual weight or an

estimate. In 36% of the files we reviewed, we noted that the patient's weight was not recorded. A patient's weight plays an important role in determining the dose of medication for the patient. Without recording the patient's weight, there is a risk that an improper dose could be prescribed and administered to a patient, resulting in harm.

4. We recommend that Sun Country Regional Health Authority consistently complete patient medication profiles by documenting patients' weights.

Once the patient's best possible medication history has been gathered, the form noting each medication is reviewed by the physician. The physician indicates which medication can continue, be stopped, or changed. Once the review is completed and signed by the physician, it becomes the physician's order (i.e., prescription) and is sent to the pharmacy to be filled. See **Section 4.1.4** for the process used to fill physician orders.

4.2.3 Medication Distributed Appropriately

On a daily basis, every patient's medication administration record is printed from the pharmacy computer system and the required medication is prepared by pharmacy staff. The medication administration form lists the medication, how it is to be administered, the dose, and the time of day. We observed nursing staff use this form to administer the medication to each patient.

The nursing staff check the medication administration record before administering the medication. They prepare the medication as required (e.g., crushing pills or filling syringes) and then administer the medication to the patient. They observe the patient taking the medication before completing the medication administration record (i.e., they note on the medication administration record the dosage given, the time it was administered, and any other notes considered necessary).

4.3 Medication Errors Tracked and Detected but Need to Analyze Results

4.3.1 System in Place for Detecting Medication Errors

Sun Country uses self-reporting and other voluntary reporting mechanisms (i.e., patients and family) to identify medication errors. Staff are encouraged to self-report medication errors, including those that are near misses.[8] When a medication error is detected, staff are required to fill out a Patient Safety Report. This report details the type of medication error (e.g., incorrect dosage, administered to wrong person) and the contributing factors that led to the error (e.g., rate/dose calculation error, improper patient identification).

The Patient Safety Report also requires staff to classify the seriousness of the incident. For example, medication errors can be classified as Code 1, which means the incident did not result in harm or injury, up to a Code 4 which means there was a tragic incident

[8] A "near miss" is an adverse health event (i.e., a complication, unintended injury, or death) that did not reach the patient because of timely intervention or good fortune.

that could include unanticipated deaths. We found that Sun Country did not have any Code 4 incidents related to medication errors during our audit period. According to Sun Country's records, for the 2011 – 2013 fiscal years, there were no Code 4 incidents related to medication errors.

Sun Country also conducts monthly medication reconciliation audits, performed by someone independent of medication administration. For the reconciliation audits, Sun Country randomly selects approximately 75 patient charts each month. Each chart is reviewed to ensure that the form used to collect the best possible medication history is on file, properly completed (e.g., the dose, how the drug is to be taken, and the frequency), and appropriately approved by physicians.

The results of the audits are tracked and reported to the Board on a quarterly basis. Our review of the reports to the Board indicated that the compliance[9] rates in the medication reconciliation audits fluctuated from quarter to quarter with the overall trend for compliance increasing (e.g., 69% in 2011-12 Quarter 2; 85% in 2013-14 Quarter 1).

4.3.2 Detection System Used but Further Analysis Needed

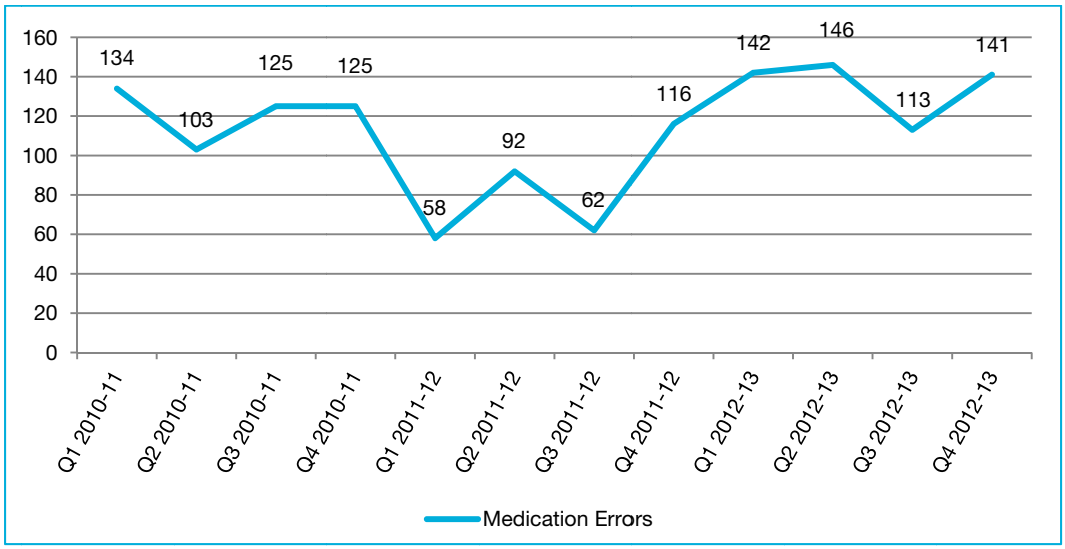
Once a medication error has been identified and documented on the Patient Safety Report, the information is entered into a database. This database allows Sun Country to track the types of errors and the contributing factors. Certain areas within the district hospitals summarize medication errors and their contributing factors on a monthly basis. However, Sun Country does not do this for the region as a whole. Sun Country should use the database information to analyze trends for the region and develop action plans to address the errors.

On a bi-monthly basis, Sun Country distributes the quality improvement report to staff. The report includes the total number of medication errors for those two months, but provides no further breakdown. The reports include a section on lessons learned. For example, the May/June 2013 report noted that two patient identifiers (e.g., name and birthdate) needed to be used when administering medication to ensure medications are not given to the wrong patient.

The quarterly reports to the Board also include the total number of medication errors. **Figure 2** shows the total number of medication errors reported per quarter from 2010-11 to 2012-13.

[9] Compliance means the form with the patient's medication history was on file, properly completed, and appropriately approved.

Figure 2—Number of Medication Errors Reported Per Quarter



Source: Sun Country Regional Health Authority, *Patient Safety and Risk Management Dashboard*, (2013)

As **Figure 2** shows, the number of medication errors fluctuate from quarter to quarter. The Board reports do not provide reasons for the fluctuations, or a breakdown on the types of medication errors, the contributing factors, risks, or areas requiring action. Senior management needs to provide better analysis of the medication errors and trends. This would make the reports more useful and would help to outline emerging risks and actions to reduce medication errors.

5. **We recommend that senior management of Sun Country Regional Health Authority analyze the medication errors and the contributing factors, and use that analysis to develop action plans to address the reasons for serious and reoccurring errors.**

4.3.3 Medication Errors Reported to Management and Families

Each time a medication error occurs, the Patient Safety Report is supposed to be sent to management for review. The error is then to be discussed at staff huddles, the root causes identified, and recommendations made to prevent the error from occurring in the future.

Medication errors are to be reported to patients and/or families verbally. When completing the Patient Safety Report, staff are required to indicate that any such medication errors were discussed with the patients and/or families by noting who the family member was and the date the discussion took place. We found that documented errors were reported to patients and/or family members on a timely basis.

4.3.4 Critical Incidents Reported to the Ministry of Health

The Regional Health Services Act and Sun Country policies require staff to report critical incidents to the Ministry of Health. A critical incident is a serious adverse health event; a complication, unintended injury, or death caused by healthcare management rather than the patient's underlying disease process.[10]

In 2012-13, Sun Country reported no critical incidents (one in 2011-12; two in 2010-11)[11] to the Ministry of Health that related to medication errors.

5.0 Selected References

Accreditation Canada. (2013). *Standards: Managing Medications*. Ottawa: Author.

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[10] Ministry of Health, *Saskatchewan Critical Incident Reporting Guideline, 2004*. www.health.gov.sk.ca/critical-incident-guidelines (25 September 2013).
[11] Critical incidents reported in the prior years did not occur in Sun Country's district hospitals.