Seamless Care Systems

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Editor's note: This article is based on a presentation given at the PSW Educational Conference on April 24, 2007. The author is a 1995 graduate of the Master's in Hospital Pharmacy/Advanced Administrative Residency Program at the University of Wisconsin Hospital and Clinics.

As patients transition across the health care system, gaps in medication use between physical environments, such as hospitals and community pharmacies, can adversely affect health outcomes. Although the terminology may vary with the context, seamless care is a concept mentioned frequently in the health care literature. Terms such as multidisciplinary care, transition of care, continuum of care and continuity of care all encompass some aspect of what we refer to in Canada as "seamless care." Seamless care has been defined by the Canadian Society of Hospital Pharmacists and the Canadian Pharmacists Association as "the desirable continuity of care delivered to a patient in the health care system across the spectrum of caregivers and their environments. Pharmacy care is carried out without interruption such as when one pharmacist ceases to be responsible for the patient's care, another pharmacist or health care professional accepts responsibility for the patient's care."[1]

In a seamless care system, responsibility for the patient is passed from one health care professional to another across various settings. The concept of seamless care is one to which all health care professionals can contribute, regardless of their professional designation. The philosophy of seamless care has been readily adopted by the pharmacy profession in recent years. In some cases, pharmacists have been part of the multidisciplinary team for a seamless care program that has extended beyond drug management. In other cases, medications management has been the primary focus of these programs. In Canada, we often refer to such initiatives as pharmacist-directed seamless care or seamless pharmaceutical care.

Seamless care is not an optional activity that occurs only when there is sufficient time, resources or interest. As argued by Dr. Charles D. Hepler, "Seamless care is an essential part of any health care system. Likewise, seamless pharmaceutical care is an essential dimension of any medications management system. One reason for the higher preventable drug-related morbidity rates in hospital readmission studies is the lack of coordination between hospital-based and community-based care."[2] Thus, pharmacists in all practice settings must ensure that seamless care is a reality for all patients.

WHAT IS THE RELATIONSHIP OF MEDICATION RECONCILIATION TO SEAMLESS CARE?

Medication reconciliation (med rec) is one component of seamless pharmaceutical care. It ensures the collection and communication of accurate patient medication information, with a goal to facilitate continuity of pharmaceutical care for patients at the beginning and/or the end of service.[3] Both the Institute for Healthcare Improvement (WWW.IHI.ORG) and the Safer Healthcare Now! campaign (WWW.SAFERHEALTHCARENOW.CA) websites contain practical "how-to" kits for pharmacists and other health professionals who may be interested in learning more about medication reconciliation and how to implement it for their own patients. The Pharmacy Society of Wisconsin has been active in medication reconciliation efforts, hosting a symposium on this topic on September 14, 2006 and by partnering with the Wisconsin Hospital Association in the medication reconciliation project team.

There is significant interest in medication reconciliation in both the United States and in Canada for at least two reasons. First, the hospital accreditation organizations in these two countries (JCAHO in the USA, CCHSA in Canada) have mandated that medication reconciliation be a required activity. That is the hammer driving this process. Second, the national patient safety campaigns (*100,000 Lives/5 Million Lives* in the United States and *Safer Healthcare Now!* in Canada) have included medication reconciliation as one of their main patient safety intervention strategies. That is the appeal to the heart driving this process. This combination of a mandatory accreditation requirement and a voluntary national patient safety campaign has been a powerful force, fostering the rapid adoption of medication reconciliation.

Still, there is more that can be done. According to the ASHP 2015 baseline data from Wisconsin (collected March to April 2006), 62% of hospital pharmacy departments in your state admitted that they fail to obtain medication admission histories for patients with complex and high-risk medication regimens.[4] Only 13% of hospital pharmacy departments do this for at least half of such patients.

While the emergence of medication reconciliation has been a positive development, there are some limitations that need to be acknowledged. First, patients with a completely reconciled medication profile can still experience adverse drug events. Second, the role of hospital pharmacists in medication reconciliation has been, and continues to be, questioned. One hospital pharmacy director in Canada was asked by her hospital's CEO, "What is the role of pharmacists in medication reconciliation? Why do we need them?" Third, not all community pharmacists have bought into the value of medication reconciliation. It is perceived by some community pharmacists as extra work without compensation. Finally, pharmacists should strive for seamless pharmaceutical care – medication reconciliation plus a complete pharmaceutical care work-up and communication of drug-related problems to the next care provider.

WHY DO WE NEED SEAMLESS CARE?

Before we discuss how to implement seamless care, some time should be spent on the rationale for change. Clearly, the body of literature demonstrating problems with our current medication-use

system has vastly grown in recent years. There have been several studies which have estimated the total economic impact of drug-related morbidity and mortality (DRMM). In 1995, Johnson and Bootman estimated that the annual cost of this in the United States to be $76 billion.[5] Ernst and Grizzle updated this study in 2001 and concluded that the costs had grown to $177 billion, over double the estimate six years earlier.[6] The total annual cost of DRMM in long-term care facilities in the U.S. has been estimated to be $7.6 billion.[7] The authors of this study conclude that for every dollar spent on drugs in nursing facilities, $1.33 in health care resources are consumed in the treatment of drug-related problems. Finally, a colleague and I concluded that the size of the problem is similar in Canada, were the cost of preventable DRMM in seniors is approximately $11 billion (CDN) annually.[8]

The adverse economic impact of a medication-use system which is not seamless is concerning. Still, the human element must not be overlooked. After being interviewed by one of our newspapers in Canada, I received an unsolicited email from someone who effectively conveyed these types of problems in layperson terms: "My mother just died on March 15. The cause was from her family physician giving her too much medication and not mixing it properly. Do you have any advice as to what I should be doing to report this and any other advice you can possibly give me as to what can be done so that no other family has to go through this? This incompetence must be stopped."

WHAT DOES A SEAMLESS MEDICATION-USE SYSTEM LOOK LIKE?

One framework for looking at the medication-use system was first proposed by Hepler's research team at the University of Florida and I have subsequently used it in much of my work.[9,10] According to this framework, described in Table 1, there are eight essential elements of a seamless medication-use system. If one or more of these elements is missing, the system is at risk of being unsafe and/or ineffective.

There are at least three practical ways by which you as a pharmacist can use the eight elements. First, they can be used at the individual patient level. A key question to ask is, "Are we ensuring that we are doing all eight things for this patient?" Second, the eight elements can be used at the pharmacy or patient care unit level. For this level, a key question to ask is, "In what percentage of patients do we ensure that all eight elements are present?" Third, the eight elements can be used to assess "sub-medication-use systems." These are specialized, distinctive systems contained within the medication-use system, such as the long-term care and drug sampling sub-medication-use systems. For this third level, the key question to ask is, "Are all eight elements in place for the sub-medication-use system?" I have previously written about how all eight elements are missing in the drug sampling sub-medication-use system, meaning that patients are at high risk for experiencing preventable

TABLE 1. THE EIGHT ESSENTIAL ELEMENTS OF A SEAMLESS MEDICATION-USE SYSTEM[9, 10]

Element	Comments
1. Timely recognition of drug indications and other signs and symptoms relevant to drug use, along with accurate identification of underlying disease	"Correct" therapy for a late or incorrect diagnosis cannot improve a patient's quality of life.
2. Safe, accessible, and cost-effective medicines	Safe and cost-effective (efficient) drug products must be legally and financially available.
3. Appropriate prescribing for explicit (clear, measurable, and communicable) objectives	Explicit therapeutic objectives simplify the assessment of prescribing appropriateness and are necessary for assessing (monitoring) therapeutic outcomes.
4. Distribution, dispensing, and administration of drug products with appropriate patient advice	This element encompasses ensuring that the patient has actually obtained the medicine, negotiating a regimen that the patient can tolerate and afford, ensuring that the patient (or caregiver) can correctly use the medicine and administration devices, and advising to empower the patient or caregiver to cooperate in his or her own care as much as possible.
5. Participation of patients in their own care (intelligent adherence)	The ambulatory patient or caregiver should consent to therapeutic objectives and should know the signs of therapeutic success, side effects, and toxic effects; when to expect them; and what to do if they appear.
6. Monitoring (problem detection and resolution)	Many problems can be detected before they become adverse outcomes or treatment failures.
7. Documentation and communication of information and decisions	Documentation and communication are necessary for cooperation in a system.
8. Evaluation and improvement of products and system performance	Practice guidelines, performance indicators, and databases are useful approaches to achieving and maintaining improved system performance (outcomes).

drug-related morbidity when they use drug samples.[11]

WHICH OF THESE ELEMENTS IS THE MOST IMPORTANT?

In the past, I have been asked which, if any, of the eight elements is the most important. Clearly, if even one of the elements is missing, patients are at heightened risk for adverse drug-related outcomes. Nevertheless, some insight was gained into the relative importance of the elements in a study that included 24 general practitioners, clinical pharmacologists and geriatricians.[12] In that study, these health care professionals were asked to choose any number of the eight elements (none, one, two, etc.) as strategies they thought would be effective in preventing specific clinical scenarios of drug-related morbidity in older adults. Element 6 (monitoring) was the most commonly chosen element. What was striking from this study, though, was that these clinicians chose, on average, about four of the eight elements as preferred intervention strategies for each of the clinical scenarios. This finding confirmed the hypothesis that using a combination of elements is the best way to prevent drug-related morbidity. There may be some situations in which one element is more critical than others but, on the whole, we need to aim for a medication-use system in which all eight elements are in place for all patients all the time.

How, then, can we perform monitoring for all patients who need it? At the individual patient level, a good starting point is simply to follow up with patients after each health care encounter. This need not be complicated or costly. A couple of years ago, a pharmacy student at Dalhousie University implemented a simple call-back program for patients with depression during her summer practice experience. She asked patients who had a new prescription for an antidepressant whether she could call them at home three to five days later. Upon calling one patient, the patient remarked, "Isn't it sad that the only thing that kept me going this week was knowing you were going to call today?" At the population level, we need to ensure policies are in place that clearly delineate who is responsible for monitoring patients as they move across transitions of care. These policies should extend beyond just the hospital-to-community transition.

HOW CAN WE ADOPT SEAMLESS CARE SYSTEMS?

Canada is not a perfect model for the adoption of seamless care services. However, in a little more than a decade, these services have progressed from being evaluated in pilot studies to now being the focus of national patient safety efforts. I would like to share some details of our success with you with the hope that these services can also be widely implemented in the state of Wisconsin.

In the mid to late 1990s, several independent pilot projects aimed at determining the feasibility of medication reconciliation and seamless care services were conducted by innovative hospital and community pharmacists across Canada. Sensing the need for coordination of activities in this area, the Canadian Society of Hospital Pharmacists (CSHP) and the Canadian Pharmacists Association (CPhA) formed a joint task force on seamless care and co-hosted a national workshop in 1998 in Ontario. The aims of the workshop included increasing awareness of the experience of providing seamless care and identifying mechanisms to move the seamless care effort forward. A second workshop was held in Quebec in 2000, and aimed to share and develop tools to assist in the delivery of seamless care. Several regional workshops followed to share more success stories and to train other community and hospital pharmacists. A randomized, controlled trial consisting of 253 patients testing these services was conducted at the Moncton Hospital in New Brunswick.[13] In this study, the pharmacist-directed seamless care service was found to have a significant impact on drug-related clinical outcomes and processes of care.

Lessons from these studies were incorporated into a "how-to" book – *Seamless Care: A Pharmacist's Guide to Providing Continuous Care Programs*[14]– that was published by CPhA in 2003. In 2004, CSHP released an official statement supporting the implementation and provision of seamless care services.[15] Further evaluation of pharmacist-directed seamless care services is presently occurring with a randomized, controlled study involving cancer patients in Newfoundland and Labrador.

Looking back, what were the keys to success for the adoption of seamless care systems? Several are apparent, and include:

- The uptake of seamless care and medication reconciliation by front line pharmacists who believed in these concepts and were able to convince others of their value;
- The cooperation of hospital and community pharmacists at the local, provincial and national levels;
- Engagement of the pharmacy practice research community so evidence of the value of these services could be obtained;
- A proactive effort to shift participation from the idea champions and change leaders to others through the use of national and regional workshops; and
- The training of future pharmacists on these services.

THE MONCTON HOSPITAL SEAMLESS CARE STUDY

One of the best examples of a real-life seamless care initiative to date is the service in place at the Moncton Hospital in New Brunswick, Canada. As previously mentioned, this service was first evaluated in a randomized, controlled trial to determine the impact of a pharmacist-directed seamless care program on economic, clinical, and humanistic outcomes and processes of care.[13] A total of 253 patients (119 in the control group and 134 in the intervention group) completed the study. In the intervention group, a mean of 3.59 drug-therapy problems for seamless monitoring were identified per patient, and 72.1% of these problems were scored as having a significant or very significant clinical impact. In addition, 99 drug therapy inconsistencies and omissions were identified and resolved in the intervention patients by the seamless care pharmacist before discharge and 91.5% of these events were judged to have a significant or very significant severity level. Disappointedly, there was minimal impact on emergency room visits, readmissions and physician office visits post discharge (up to 12 months). Participating community pharmacists believed that the seamless care service helped them to better provide

pharmaceutical care and improved efficiency in their pharmacies. The study researchers concluded that a pharmacist-directed seamless care service can effectively resolve many drug-therapy problems and improve drug-related processes of care in hospital and community pharmacies.

One of the best outcomes of this study is the support it received from the hospital-based physicians and nurses. One physician commented, "My patients who were involved in the program benefited greatly and they had a good impression of the program." A nurse commented, "Who better than a pharmacist would be able to tell the patient all they need to know about their medication?" These were not isolated comments, but rather indicative of the type of support we witnessed. In fact, within weeks of the study formally ending, the physician and nurse demand for the seamless care service was so strong that senior administration at the hospital decided to reinstate the program. Today the program continues and has expanded to include other patient care units.

CONCLUSION: RESOURCES TO AID WITH IMPLEMENTATION

I realize that a presentation at a meeting such as this only has limited value in helping you in your own practice setting to implement seamless care services. Therefore, I would like to draw your attention to some resources that provide more detail and strategies and solutions for those interested in transforming their practices.

As previously mentioned, a "how-to" book on this subject – *Seamless Care: A Pharmacist's Guide to Providing Continuous Care Programs*[14]– was published by the Canadian equivalent of the American Pharmacists Association. I served as editor of this text and it contains chapters written from multiple perspectives, including those of a hospital director, clinical coordinator, hospital pharmacist, nurse and community pharmacist. There is also one chapter entirely devoted to barriers to seamless care and how to overcome these barriers. Second, there is an excellent document from Australia called *Guiding principles to achieve continuity in medication management* that was released in 2005.[16] Finally, I have edited a new text, to be released in June 2007 called *Safe and Effective: The Eight Essential Elements of an Optimal Medication-Use System* (WWW.PHARMACISTS.CA/SE) that reviews the eight elements in greater detail and also includes two case studies on medication reconciliation.[17] ●

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REFERENCES

1. Canadian Society of Hospital Pharmacists and Canadian Pharmacists Association. 1998. Proceedings of the Seamless Care Workshop. Ottawa, ON: Canadian Society of Hospital Pharmacists and Canadian Pharmacists Association.
2. Hepler CD. Foreword. In: Seamless Care: A Pharmacist's Guide to Providing Continuous Care Programs. MacKinnon NJ, ed. Canadian Pharmacists Association, Ottawa, ON; 2003; pg. 7-11.
3. Canadian Council on Health Services Accreditation. Patient Safety. Frequently Asked Questions. Last accessed May 14, 2007. http:// http://www.cchsa.ca/default.aspx?page=114&cat=30
4. ASHP Health-System Pharmacy 2015 Initiative Survey. Wisconsin baseline data. Pharmacy Society of Wisconsin. Last accessed May 14, 2007. http://www.pswi.org/ASHP%202015%20Survey%20Results.pdf
5. Johnson JA, Bootman JL. Drug-related morbidity and mortality. A cost-of-illness model. Arch Intern Med 1995; 155:1949-1956.
6. Ernst FR, Grizzle AJ. Drug-related morbidity and mortality: updating the cost-of-illness model. J Am Pharm Assoc 2001; 41:192-199.
7. Bootman JL, Harrison DL, Cox E. The health care cost of drug-related morbidity and mortality in nursing facilities. Arch Intern Med 1997; 157:2089-2096.
8. Kidney T, MacKinnon NJ. Preventable drug-related morbidity and mortality in older adults: a Canadian cost-of-illness model. Geriatrics Today 2001; 4:120.
9. Grainger-Rousseau TJ, Miralles MA, Hepler CD, et al. Therapeutic outcomes monitoring: application of pharmaceutical care guidelines to community pharmacy. J Am Pharm Assoc (Wash) 1997; NS37(6):647-661.
10. MacKinnon NJ. Risk assessment of preventable drug-related morbidity in older persons [dissertation]. Gainesville (FL): University of Florida; 1999.
11. MacKinnon NJ. Use of drug samples as a threat to seamless health care. Am J Health-Syst Pharm 2004; 61:1497-1500.
12. Flanagan PS, MacKinnon NJ, Hanlon N, Robertson H. Identification of intervention strategies to reduce preventable drug-related morbidity in older adults. Geriatrics Today 2002; 5:76-80.
13. Nickerson A, MacKinnon NJ, Roberts N, Saulnier L. Drug-therapy problems, inconsistencies and omissions identified during a medication reconciliation and seamless care service. Healthcare Quarterly 2005; 8:65-72.
14. MacKinnon NJ, ed. 2003. Seamless Care: A Pharmacist's Guide to Providing Continuous Care Programs. Ottawa, ON: Canadian Pharmacists Association.
15. Canadian Society of Hospital Pharmacists. 2004. Statement on Seamless Care. Ottawa, ON: Canadian Society of Hospital Pharmacists.
16. Australian Pharmaceutical Advisory Council. Guiding principles to achieve continuity in medication management. Canberra: Publications Production Unit, Commonwealth Department of Health and Family Services, 2005.
17. MacKinnon NJ, ed. 2007. Safe and Effective: The Eight Essential Elements of an Optimal Medication-Use System. Ottawa, ON: Canadian Pharmacists Association. (www.pharmacists.ca/se)

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