Smart Infusion Pumps

Implementation, Management, and Drug Libraries

Second Edition

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To B, E, M, and M.

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Preface

Former ASHP Special Publishing Director Jack Bruggeman and I had long conversations about whether the ASHP membership could benefit from another edition of *Smart Infusion Pumps*. After these conversations and surveys of the membership, we decided that there was enough significant new information to warrant another edition. I sincerely hope you agree!

As in the previous edition, the first chapter deals with the justification for smart pump technology. Whereas the majority of health systems across the nation now use smart pump technology, we are all over the spectrum in terms of our compliance with the software and use of the various safety attributes. This chapter now includes more references, to promote broader use of the safety features. In Chapter 2, we updated the list of positive attributes to look for in a request for proposal (RFP). This chapter includes a sample RFP and a sample pump scoring chart. Chapter 3 guides us through processes to use when conducting frontline user testing of smart pumps. It includes the use of human factors techniques, such as usability testing and failure modes and effects analysis, to aid in the decision-making process. The fourth chapter on guiding principles is intended to provide key points for consideration. Although these principles may not be the ones you choose, they represent examples of questions that should be asked prior to implementation. Chapters 5, 6, and 7, on building a general drug library, the patient-controlled analgesia library, and the pediatric drug library, have all been updated with new additions to the drug libraries, bolus dosing options, and references. These chapters are presented as a starting point; not all health systems will need to adopt the medications represented in these chapters, and different dose limits may be chosen based on different patient populations.

Chapter 8 on epidural and intrathecal drug libraries, written by Dr. Stephen F. Eckel, is new. It represents an important addition to the book not present in the first edition. Chapter 9 is also new, with the addition of an oncology drug library. Most oncology infusions now take place in the clinic setting, with special challenges for premedications, minimizing wait and infusion times, and maintaining failsafe processes. Chapter 10 is another new chapter, focusing on home infusion pumps. As the population ages and chronic disease management becomes more common, more care will be conducted in the home. The home infusion market is expected to almost double by the year 2020. Health-system pharmacists will need to familiarize themselves with home infusion to facilitate the continuum of care and meet their patients' needs. Most home infusions are conducted without smart pumps; however, use of smart pumps in the home will increase in the future. We feel this is an important topic to address.

Chapters 11 and 13, on conducting education and pump updates, have been updated. Chapter 12, on medication compounding, is new and has been written by a compounding pharmacist in a 503B-compliant facility, Dr. Joseph B. Stanek. Special attention is given to sterile compounding, storage, labeling, barcoding, and ensuring

product quality. Chapter 14 is a new chapter that incorporates the role of failure modes and effects analysis (FMEA) in pump implementation and creating failsafe processes. An example of a FMEA that we conducted when implementing a new epidural pump is included; you will see that this led to a number of process changes we feel added to the safety of the pump. We do feel that it is important that all health systems consider conducting a FMEA on their equipment to identify potential gaps in the processes.

Dr. Eckel also wrote Chapter 15, on validating pumps for accuracy. We found it essential to create checklists and redundancies in double-checking the drug library prior to "pushing" the library to pumps. Any inaccuracies in the pump library that are sent to active pumps can directly affect patients and cause unintended harm. It is, therefore, essential for health systems to put policies and procedures in place that ensure accuracy checks. These checks are best done by someone not involved in the library entry process, to avoid confirmation bias. Chapters 16 and 17, on monitoring pump quality and checklists for updates, have been updated with new scenarios and flow charts. Finally, Chapter 18, on pump integration, is new.

I am grateful to all of the chapter contributors. I am convinced their expertise will help others in making pump practices safer. I will call out in particular Burnis D. Breland, Stephen F. Eckel, and Virginia L. Ghafoor, who have spent much of their esteemed careers in making medication use safer for our patients. I also want to thank Michelle L. Borchart, who was a postgraduate year 1 resident in need of a project when I asked her "How about implementation of a pump library?" She probably did not know what she was getting into at the time; she is now a leader in pump utilization at our health system! Thanks also to Ruth Bloom, ASHP editorial project manager, who managed to keep us all very nearly on schedule.

I anticipate many more changes in the future. Growth in home infusion smart pump use and interoperability of pumps with electronic medical records are next on our list of challenges. As usual, pharmacists will be called on to take a leadership role in these new projects. I am grateful to be part of a profession that is so highly qualified and trusted to take on these difficult leadership challenges. I know we can do it!

Pamela K. Phelps
April 2017