November 2017 ■ Volume 15 Issue 11

ISMP

Nurse AdviseERR®

Educating the Healthcare Community About Safe Medication Practices

Alarming survey results from CDC: Unsafe injection practices continue

To safely prepare and administer an injectable medication, practitioners must follow aseptic technique, avoid reuse of single-dose or single-use vials, use needles and syringes just once for only 1 patient, and never reenter a medication container with a used needle or syringe. However, the results of a recently published survey[1] conducted by the Centers for Disease Control and Prevention (CDC) on injection practices in acute care, long-term care, and outpatient settings revealed dangerous knowledge gaps, attitudes, and practices by physicians and nurses; this despite widespread media coverage of more than 50 outbreaks associated with unsafe injection practices since 2001 and the launch of the national *One & Only Campaign* in 2009 by the Safe Injection Practices Coalition. The *One & Only Campaign* (www.oneandonlycampaign.org/) aims to raise awareness among patients and practitioners about safe injection practices. The national campaign provided funding to state health departments in Nevada, New York, New Jersey, and North Carolina to help promote the campaign due to high-profile outbreaks in these states linked to unsafe injection practices. While most surveyed physicians and nurses were aware of the outbreaks, awareness of the campaign was low (22.7% for physicians, 20.0% for nurses), although somewhat higher in physicians and nurses in states that received funding to promote the campaign (59.5% for physicians, 54.7% for nurses). Moreover, the survey revealed alarming misperceptions regarding the acceptability of injection practices that are clearly unsafe, along with unsafe practices in the workplace. Details from the published survey results[1] follow.

Survey respondent profile and questions

The survey was completed by 370 physicians with a median of 14.5 years of clinical experience, and 320 nurses with a median of 21 years of clinical experience. The physicians' specialties included anesthesiology-pain management, dermatology, gastroenterology, internal medicine, orthopedics, oncology, and radiology. All nurse participants were registered nurses who were working at least half of the time in a clinical setting. Participants were either from the 4 states that had received funding to promote the *One & Only Campaign* message or from 4 other states that had not received funding (Colorado, Tennessee, Montana, Wisconsin). Along with knowledge and attitudes associated with injection practices, nurses were asked about the frequency of their own injection practices in the workplace, and physicians were asked about the frequency of injection practices by all healthcare personnel in their work area, not just their own practices.

Highlights of survey results

While most physician and nurse responses to the survey aligned with CDC recommended injection practices, there is a dangerous minority of practitioners—perhaps many more than previously thought—who are violating basic infection control practices associated with the use of syringes, needles, single-dose vials, diluent containers, and other unsafe injection practices.

Syringe reuse: Survey responses indicated that 12.4% of physicians and 3.4% of nurses reuse a syringe for more than 1 patient, despite findings that most physicians (91.6%) and nurses (99.4%) do not agree that this is an acceptable practice. Almost

continued on page 2—**Survey results** >

Data submission extended to February 28 for new assessment

We are extending the date from December 15, 2017, to **February 28, 2018**, for healthcare facilities to submit their findings to ISMP for our new self assessment on high-alert medications. We launched the **ISMP Medication Safety Self Assessment for High-Alert Medications** about 8 weeks ago (www.ismp.org/sc?id=3032). Since then, we have received numerous requests from organizations for an extension on the date by which data from the assessment must be submitted to ISMP. While each section of the self assessment can be submitted to ISMP as it is completed, we want to be sure all organizations have enough time to assess all the categories of high-alert medications that are used in their facilities. Thus, we are extending the submission date to **February 28, 2018**, to allow organizations sufficient time to participate in the full assessment and submit their data to ISMP.

NANALERT

Misuse of standard insulin pen needles. We activated the National Alert Network (NAN) last month to warn about the misuse of standard insulin pen needles by patients at home (www.ismp.org/sc?id=3033). The NAN is a cooperative effort between ISMP, the American Society of Health-System Pharmacists, and the National Coordinating Council for Medication Error Reporting and Prevention to communicate critical safety information to leadership and member organizations that then can distribute the alert to their constituents. The alert warned practitioners that patients may not know to remove the needle cover on standard insulin pen needles, particularly if they have received insulin injections while hospitalized using retractable/safety needles. While hospitals often use pens with a needle cover that retracts upon injection, patients often use a standard in-

continued on page 2—**NANALERT** >

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> Survey results—continued from page 1

5.0% of physicians reported that this unsafe practice *usually* or *always* occurs in their work area. This unsafe practice was most frequently reported by oncologists; 17.9% of oncologists thought it was an acceptable practice, and 23.9% reported its occurrence in the workplace (13.5% reported this *usually* or *always* occurs). While statistical analysis comparing nurse practice locations did not occur in this study, little or no differences were seen in either attitudes or practices associated with syringe reuse in acute care, long-term care, or outpatient facilities.

Reentering a vial with a used syringe/needle: While 12.7% of physicians and 6.7% of nurses mistakenly believed that reusing a syringe to access a medication vial is an acceptable practice, even more reported its actual occurrence in the workplace: 43.2% of physicians and 24.1% of nurses reported reentering multiple-dose vials with a used syringe (7.3% and 5.0%, respectively, reported this *usually* or *always* occurs). Belief that this was a safe practice was highest with oncologists (25.5%) and radiologists (20.0%), and its practice was reported in the workplace by more than half of all anesthesia-pain management physicians (63.4%), radiologists (57.5%), and oncologists (53.7%). Nurses in long-term care facilities (27.3%) and outpatient facilities (21.8%) reported reentering a vial with a used syringe/needle more often than nurses in acute care facilities (16.1%).

Using single-dose vials for multiple patients: The misperception that using a single-dose vial for more than 1 patient is an acceptable practice was high with physicians (34.0%) and nurses (16.9%), although the frequency of occurrence in the workplace was reported by fewer, although still substantial, physicians (25.1%) and nurses (10.9%). This unsafe practice was reported most often by oncologists (34.4% overall, 10.5% reported this *usually* or *always* occurs) and anesthesia-pain management physicians (31.7% overall, 9.8% reported this *usually* or *always* occurs). Little or no differences were seen in using single-dose vials for multiple patients by nurses in acute care, long-term care, or outpatient facilities, although more nurses in outpatient facilities believed the practice was acceptable.

Using source bags or bottles as diluents for multiple patients: Using bags or bottles of IV solutions as a source supply of diluent for more than 1 patient was reported by 28.9% of physicians and 13.1% of nurses. This unsafe practice was reported by nurses more often in long-term care and outpatient facilities than acute care hospitals, and by oncologists (44.8% overall, 14.9% reported this *usually* or *always* occurs). However, orthopedists and dermatologists also reported that this practice occurs frequently (7.5% and 7.3%, respectively, reported this *usually* or *always* occurs).

Impact of campaign: When comparing the acceptability and frequency of unsafe practices of physicians and nurses located in the *One & Only Campaign* and non-campaign states, there were no statistically significant differences in responses (except regarding the acceptability of using a single-dose vial for more than 1 patient with physicians).

Comparison to prior survey

In December 2010, ISMP summarized the results of an online survey of more than 5,000 healthcare practitioners that revealed a lapse in basic infection control practices associated with injection practices.[2,3] Seven years later, the results of the CDC survey suggest that the lapses continue and may have significantly worsened. For example, in the 2010 survey, 1.0% of all respondents reported reusing a syringe for more than 1 patient, versus 12.4% of physicians and 3.4% of nurses in the 2017 survey. In the 2010 survey, 15% of respondents reported using the same syringe to reenter a vial numerous times, versus 43.2% of physicians and 24.1% of nurses in the 2017 survey. Keep in mind that, in the 2010 survey, healthcare practitioners were asked about their own practices, as were nurses in the 2017 survey. However, physicians in the 2017 survey were asked to report the frequency of unsafe practices by all healthcare personnel in their work area, not just their own practices. In the 2017 survey, physician

continued on page 3—Survey results >

NANALERT cont'd from page 1

sulin pen needle at home, which has a needle cover that must be removed prior to injection. Some patients have tried to inject insulin without removing the needle cover, thus failing to administer the insulin. In the most recent case, a patient developed diabetic ketoacidosis on two separate occasions and later died. Patients must be made aware that a standard pen needle is different from what may have been used in the hospital.

SAFETY wires

Dispense a needle with that pen. A diabetic patient visited an endocrinologist at an academic medical center, where she was prescribed **HUMULIN R** (insulin regular concentrate) U-500 pens. The patient was to administer 140 units 3 times a day. The prescription was dispensed by the medical center's ambulatory pharmacy, where the patient was given the pens but no pen needles. Since she didn't have any needles for the pens, when she got home she used one of her U-100 syringes that she had used with her previous U-100 insulin to draw her insulin dose from the U-500 insulin pen cartridge (essentially using the pen as a vial). It's possible that she may have measured and administered as much as "140" units (700 units of U-500). Her daughter found her unresponsive and called for an ambulance. When emergency medical technicians arrived, they gave the patient 12.5 g of 50% dextrose and transported her to the hospital, where she fully recovered.

Similarly, in our September 2016 issue, we described a patient who was previously using insulin glargine U-100 but switched to **TOUJEO** (insulin glargine U-300). In this case, he was given pen needles to use with Toujeo, but at home, he decided to use up the remaining supply of U-100 syringes. Using the insulin pen cartridge as a vial, he drew up a dose, filling the U-100 syringe to the 100 unit mark—the same daily Lantus dose (100 units) he had been taking. This resulted in a dose of 300 units of Toujeo, not the prescribed 100 units, which led to hypoglycemia requiring hospital admission.

Plans are underway at the medical center where the most recent error was reported

continued on page 3—SAFETY wires >

> **Survey results**—continued from page 2

reporting of unsafe practices by healthcare personnel in their work area is higher than nurse self-reporting of unsafe practices. While physician attitudes regarding the acceptability of unsafe practices in the survey are clearly their own and reflect the degree of knowledge deficit that needs to be addressed, the physician responses in the 2017 survey regarding the frequency of unsafe injection practices in the workplace are more reflective of practices by all healthcare personnel and may more accurately reflect the scope of the problem.

Conclusions

The results of this latest study demonstrate that a dangerous minority of healthcare practitioners are violating best practices associated with safe injections and are placing patients at risk of serious infection. Given these lapses in infection control practices, academic institutions and programs, licensing bodies, and healthcare providers must enhance their ongoing surveillance of proper technique and devote resources to ensure students and staff have the knowledge and skills associated with even the most basic concepts of infection control and injection safety. Given that a higher proportion of oncologists, anesthesia-pain management physicians, and radiologists reported unsafe injection practices occurring in their work areas and reported the most concerning attitudes related to injection practices, these practitioners should be included in surveillance and educational activities. **All staff should understand that any form of syringe and/or needle reuse is dangerous and should be avoided, and that syringes cannot be reused even if the needle is changed.** Healthcare practitioners should be vigilant in following the current CDC guidelines that recommend that syringes and needles be used only once. Single-dose or single-use vials should only be used for 1 dose for 1 patient, and then discarded after initial entry into the vial. If multiple-dose vials are used, they should be limited to single-patient use whenever possible, and both the needle and syringe used to access the vial must be sterile.

State licensing boards and professional specialty organizations could play a larger role in including injection safety training as a continuing education requirement. But until this happens, education on safe injection practices should be required during orientation and at ongoing intervals thereafter, and staff competencies in this important area of practice should be assessed regularly. Provider campaigns, such as the *One & Only Campaign*, are available to support safe practices in any setting where injections are delivered but should not be relied upon alone to promote safe injection practices. A multifaceted approach to surveillance and education is needed.

References

1) Kossover-Smith RA, Coutts K, Hatfield KM, et al. One needle, one syringe, only one time? A survey of physician and nurse knowledge, attitudes, and practices around injection safety. *Am J Infect Control.* 2017;45(9):1018-23.
2) Pugliese G, Gosnell C, Bartley JM, Robinson S. Injection practices among clinicians in United States health care settings. *Am J Infect Control.* 2010;38(10):789-98.
3) ISMP. Perilous infection control practices with needles, syringes, and vials suggest stepped-up monitoring is needed. *ISMP Medication Safety Alert!* 2010;15(24):1-3. www.ismp.org/Newsletters/acutecare/articles/20101202.asp

Transition adapters for ENFit syringes can defeat the purpose of ENFit itself

Some hospitals have finally begun converting to ENFit tubing, syringes, and administration sets for enteral feedings and medications to prevent misconnections with vascular access sites. But, in case hospitals and/or patients are not yet using ENFit feeding tubes, manufacturers are still distributing ENFit administration sets with transition adapters (**Figure 1**, on page 4). These transition adapters can be removed to expose an ENFit connector for patients who have an ENFit feeding tube, or can remain in place if the patient has a legacy feeding tube with a Luer connector. This temporary

continued on page 4—**ENFit** >

> **SAFETY** wires continued from page 2

to give pharmacists authority to dispense pen needles without a prescription whenever insulin pens are prescribed. Perhaps insurance providers that currently require a prescription for needles should take note and allow pharmacists to dispense appropriate pen needles whenever a pen device has been prescribed. Also, it is critical for prescribers, nurses, and pharmacists to educate patients about the proper use of insulin pen devices, the importance of using the correct pen needle with the device, and to never use the insulin pen cartridge as a vial. In addition, a process should be in place prior to discharge to ensure that patients have the medications or prescriptions, equipment, and supplies needed at home to manage their insulin therapy (e.g., insulin, syringes or pen needles, blood glucose meter and strips, lancets, lancing device, glucagon emergency kit).

Name mix-up: rifAMPin and rifapentine. A patient was started on outpatient therapy with a weekly dose of rifapentine (**PRIFTIN**) and isoniazid for 12 weeks to treat a latent *Mycobacterium tuberculosis* infection (www.ismp.org/sc?id=2963). The initial prescriptions covered the first 8 weeks of therapy, and the patient was adherent to the prescribed regimen. A problem occurred when a prescription for the final 4 weeks of rifapentine therapy was sent electronically to a pharmacy, and rif**AMP**in was dispensed in error. Apparently, the dispensing pharmacist had not compared the new prescription with the original prescription and dispensed the wrong medication.

A persistent clinical pharmacist at the patient's health plan, who was monitoring the therapy, discovered the error. He first contacted the dispensing pharmacy to confirm that the treatment had been changed to rif**AMP**in. He then contacted the patient's provider for clarification, but for some unknown reason, an office staff member incorrectly verified that the prescription had been changed due to gastrointestinal (GI) issues. Then, the clinical pharmacist contacted the local public health officer to inquire if the use of weekly rif**AMP**in in place of rifapentine was appropriate therapy in this case. The public health officer confirmed that this was not appropriate therapy

continued on page 4—**SAFETY** wires >

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> **ENFit**—continued from page 3

measure is necessary to assure compatibility with either system. The transition adapters will eventually be eliminated when all are using feeding tubes with an ENFit connector.

In addition to the above, we have recently learned that other types of adapters have now become available to facilitate a connection between legacy oral syringes and the new ENFit connectors on feeding tubes. Alarmingly, some of these adapters even fit parenteral syringes that have a Luer-slip or Luer-lock tip (**Figure 2**).

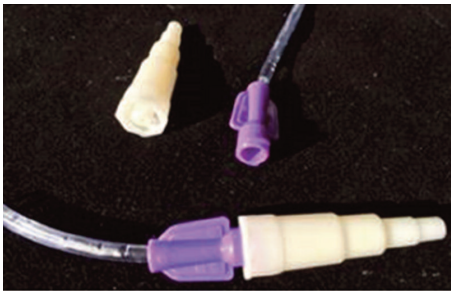

Figure 1. Transition adapter now accompanies enteral feeding administration sets. It can be removed for use with feeding tubes that have an ENFit connection, or left in place to use with legacy feeding tubes that have a Luer connector.

Figure 2. Oral syringe with add-on adapter (top) to make it compatible with ENFit connector on feeding tube. Same add-on adapter fits on a parenteral syringe (bottom).

ISMP has long advocated prohibiting preparation of any oral liquid medication in a parenteral syringe. If this unsafe practice occurs, these add-on adapters would need to be applied after the dose has been prepared in the parenteral syringe. If this step is omitted, and the adapter is not applied to the parenteral syringe, the oral liquid would be in a syringe that could be connected to an intravenous (IV) port, allowing for the possibility of administration by the IV route.

In addition to the risk of inadvertent IV injection of oral liquids or suspensions when using these adapters with a parenteral syringe, the adapters may also be a choking hazard if left at the bedside, similar to caps from syringes that have been left at the bedside or lost in the bed sheets during administration (www.ismp.org/sc?id=3002).

Furthermore, these add-on adapters can undermine the low dose ENFit syringe tip (on ENFit syringes of 5 mL or less) that was specially designed to minimize the dead space and associated volume retention during drug administration. The add-on devices appear to have significant dead space that will allow the accumulation of fluid during administration, which will never reach the patient. Thus, these adapters can cause inaccurate liquid dosing of small volume liquids in neonates and pediatric patients, and in adults who are receiving drugs that have a narrow therapeutic index. For more information about the low dose tip, please visit: www.ismp.org/sc?id=3001.

ISMP stands behind the need for full conversion to ENFit devices to reduce the risk of accidental connection of syringes and administration sets meant for other routes of administration. Transition adapters for feeding tubes must be considered a temporary measure only. Adapters for syringes add risk, especially when the adapter allows compatibility between Luer-tip syringes that should never be used for preparing or administering oral liquids or suspensions. As soon as possible, full conversion should occur to feeding tubes and administration sets that use only integrated ENFit connectors. In the meantime, all risks, even if temporary, should be fully explained and outlined to staff.

> **SAFETY** wires continued from page 3

and suggested having the health plan medical director contact the provider. The conversation between the health plan medical director and the provider confirmed that the regimen should not have been changed to rif**AMP**in, that the office staff had misspoken regarding the change in therapy due to GI issues, and that the pharmacy had made a dispensing error.

It is easy to see how this error could occur, as both rifapentine tablets and rif**AMP**in capsules are available in 150 mg doses, and both are rifamycin-class antibiotics with a US Food and Drug Administration (FDA)-approved indication to treat tuberculosis (TB). While there was no immediate harm to the patient, it is possible that left undiscovered, the patient would have been inadequately treated and may have eventually developed active TB. Rif**AMP**in has also been confused with rif**AXIM**in, a name pair that is included on *ISMP's List of Confused Drug Names* (www.ismp.org/sc?id=492).

Please take our *smart pump survey*

ISMP is conducting a survey on smart infusion pumps, and we could really use your help to understand how these devices are currently being used in US healthcare settings. We plan to use the information we collect from the survey to update and develop guidelines for organizations that want to maximize smart pump technology to improve patient safety.

Please see **pages 5 and 6** to preview the survey questions. Submit your responses online by **January 19, 2018**, by going to: www.ismp.org/sc?id=3037. Thank you for your participation!

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ISMP Nurse AdviseERR (ISSN 1550-6304)

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ISMP SURVEY ON SMART INFUSION PUMPS

ISMP is conducting a survey to gather information about current smart infusion pump usage patterns and related practices in healthcare organizations across the US. For the purpose of this survey, smart pumps are defined as: programmable pumps with dose-error reduction software including those used for general intravenous (IV) infusions, syringe infusions, epidural infusions, MRI infusions, and patient-controlled analgesia (PCA). Please complete the survey and submit your responses to ISMP by **January 19, 2018**, via our secure web-based portal at: www.ismp.org/sc?id=3037. Thank you for your assistance!

Demographics

Please select the best responses that describe your practice setting, number of licensed beds, professional discipline, staff level, and whether you help manage smart pump drug libraries.

Practice setting: ☐ Hospital ☐ Ambulatory surgery center ☐ Ambulatory infusion center ☐ Other (please specify): _____
Licensed beds: ☐ NA (e.g., ambulatory center) ☐ Up to 25 ☐ 26-99 ☐ 100-299 ☐ 300-499 ☐ 500 and over
Professional discipline: ☐ Nurse ☐ Advanced practice nurse ☐ Pharmacist ☐ Physician
☐ Patient/medication safety officer ☐ Risk/quality/safety professional ☐ Other (please specify): _____
Staff level: ☐ Staff level ☐ Manager level ☐ Director level ☐ Administration
Do you help manage smart infusion pump drug libraries? ☐ Yes ☐ No

Survey

1 How long have smart infusion pumps been available in your organization?
☐ Do not use smart infusion pumps ***(End of survey)***
☐ Less than 1 year ☐ 1 to 5 years ☐ More than 5 years ☐ Don't know

2 For which types of infusions does your organization use smart infusion pump technology (select all that apply)?
☐ IV medications ☐ IV fluids ☐ Syringe infusions ☐ Parenteral nutrition (PN) ☐ Epidural infusions
☐ Patient-controlled analgesia (PCA) ☐ MRI infusions ☐ Other (please specify): _____

3 Does your organization use smart infusion pumps for the administration of blood products?
☐ Yes ☐ No ☐ Don't know

4 Does your organization use the same smart infusion pumps for both the administration of parenteral infusions and the administration of enteral feedings to neonates and pediatric patients?
☐ Yes ☐ No ☐ NA (We don't treat neonates or pediatric patients)
If **No**, does your organization have dedicated enteral pumps for small volume enteral feedings? ☐ Yes ☐ No

5 Has your organization implemented bi-directional smart pump integration with the electronic health record (EHR)? (Infusion parameters are wirelessly transmitted from the EHR to prepopulate the smart pump, and infusion data is also wirelessly sent back into the EHR.)
☐ Yes If **Yes**, list the types of patient care units (e.g., medical/surgical, emergency department) with smart pump integration: _____
☐ No If **No, do you plan to** integrate within the next 12 months? ☐ Yes ☐ No ☐ Don't know
☐ Don't know

6 Are smart infusion pumps in use in the following patient care areas? (Select NA [Not Applicable] only if you do not have the specified unit in your facility.)

Patient Care Units	Yes	No	Don't Know	NA
Medical/Surgical				
Adult Critical Care				
Pediatric Critical Care				
Neonatal Critical Care				
Pediatrics				
Inpatient Oncology				
Ambulatory Infusion				
Surgical Suites				
Post Anesthesia Care Unit				
Obstetrical Unit				
Emergency Department				
Endoscopy				
Radiology				

continued on page 6—Survey >

> Survey—continued from page 5

7 Does your organization use wireless connectivity for any of the following smart infusion pump-related activities (select all that apply)?

☐ Do not have a wireless system ☐ Updating drug libraries ☐ Obtaining system reports and data
☐ Tracking pump locations ☐ Other (please specify): _____ ☐ Don't know

8 How many times in the past year has your organization modified the smart infusion pump drug library?

☐ 0 ☐ 1-3 ☐ 4-6 ☐ More than 6 ☐ Don't know

9 Smart infusion pump drug library/profile selections are based on which of the following (select all that apply)?

☐ Patient care area ☐ Patient weight ☐ Therapeutic drug class ☐ Other (please specify): _____ ☐ Don't know

10 Are your organization's smart pump drug libraries built with bolus dose limits?

☐ Yes ☐ No ☐ Don't know ☐ Our organization does not permit bolus dosing via the smart pump

11 For each type of drug infusion listed, please indicate the number of concentrations included in the adult critical care drug library, and whether you employ a soft stop (can bypass the warning), hard stop (cannot bypass the warning), or no stop (no warning) if a maximum dose is exceeded when programming the pump. Skip this question if you do not treat adult critical care patients.

Drug	Number of Concentrations in the Drug Library (Select one)						Type of Stops if Maximum Dose Exceeded (Select all that apply)			
	1	2	3	More than 3	No Standard Concentration	Don't Know	Soft Stop	Hard Stop	No Stop	Don't Know
Insulin										
Heparin										
Propofol										
DOPamine										
HYDROmorphone										
EPINEPHrine										
Morphine										
Vancomycin										

12 Does your organization employ a hard stop (cannot bypass the warning) for minimum concentration limits for one or more medication infusions where the user selects the drug but must then enter the custom concentration (e.g., xx mg/xx mL)?

☐ Yes ☐ No ☐ Don't know
If **Yes**, please list the medications that have a hard stop for a minimum concentration limit:_____

13 Has your organization designated any IV medications that must be administered as a primary infusion?

☐ Yes ☐ No ☐ Don't know
If **Yes**, please list the IV medications that must be administered as a primary infusion: _____

14 How often do you review compliance data from the smart infusion pumps?

☐ Daily ☐ Weekly ☐ Monthly ☐ Quarterly ☐ Every 6 months ☐ Yearly ☐ Less often than yearly ☐ Don't know
☐ No data available ☐ Data not reviewed

15 What is the organization's overall compliance with use of the smart infusion pump drug library?

☐ Less than 50% ☐ 51-75% ☐ 76-90% ☐ Greater than 90%
☐ No compliance data available ☐ Data not reviewed ☐ Don't know

16 How frequently are plain IV fluids (e.g., normal saline, Lactated Ringer's, 5% dextrose in water, large volume IV solutions with potassium chloride) programmed as a basic infusion (i.e., NOT in the smart infusion pump drug library)?

☐ Less than 5% of the time ☐ 5-25% of the time ☐ 26-50% of the time ☐ 51-75% of the time
☐ Greater than 75% of the time ☐ This data is not available ☐ Don't know

17 In the past 12 months, despite the use of smart pumps, which of the following error types have you experienced in your facility (select all that apply)?

☐ Wrong rate errors for secondary infusions
☐ Secondary infusions delayed/omitted due to roller clamp being closed
☐ Dose-rate confusion during pump programming
☐ IV line or channel mix-ups
☐ Omission of a decimal point (e.g., 1.2 entered as 12, 1.0 entered as 10)
☐ Selection of a zero instead of a decimal point (e.g., 1.2 entered as 102)
☐ Other (please specify): _____

18 What is the biggest challenge you have with the use of smart infusion pumps in your facility?

_____