The 2016 NHIA Idea Exchange Poster Session with Abstracts  
March 21-23, 2016

NHIA is pleased to once again feature the Idea Exchange— an original poster session showcasing innovative solutions for many of today's challenging scenarios and improvement opportunities in our field. Posters chosen for the NHIA Idea Exchange discuss cutting-edge developments for alternate-site infusion best practices, quality improvement successes, clinical research as well as educational case studies! Posters will be on display in the Exposition Hall at the Ernest N. Morial Convention Center throughout the regular NHIA Exposition hours on March 21-23.

Meet and dialogue with poster presenters during one of the two moderated sessions:

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¹Allergy, Asthma & Immunology Clinic, PA, Irving, TX, USA;
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**FINAL ABSTRACT # 1**

**TITLE:** Home infusion therapy with a patient history of IV drug abuse: can it be done safely?

**AUTHORS:** Bridget Smith, RPh; John Nosach, RN; Nicole Braddock, RN. 1 Soleo Health; 2Bioscrip; 3 Care New England

**BACKGROUND:** Intravenous heroin usage has skyrocketed in the past decade; the CDC reports a 63% increase over the past 11 years. Patient cases with a history of recent drug abuse are often not accepted by home infusion providers because of associated liability, questionable compliance, risk, and preconceived judgment. Individuals who abuse intravenous drugs are at an elevated risk for complications, requiring intravenous antibiotics for issues such as soft tissue infections, endocarditis, abscesses, and sepsis. Patients admitted to the hospital for intravenous antibiotic treatment, which potentially may be long term, may benefit from home infusion therapy. The alternative is to keep patients in the hospital or send them to a rehabilitation facility. Healthcare costs can be significantly less when treating patients in a home setting compared to an inpatient facility.
PURPOSE: The purpose of this project was to identify a comprehensive model for the successful treatment of patients with a history of intravenous drug use (IVDU) in the home infusion setting, and highlight potential health care cost savings of this model.

METHODS: LR is a 28-year-old female with an extensive history of IVDU and methadone treatment. She had previously been drug free for a three-year period, relapsed after trying to wean off methadone, and is now admitted to hospital for sacroiliac (SI) joint infection. Patient had resumed methadone prior to admission, but she was found to be in possession of needles in the ER. LR remained hospitalized for approximately three weeks, with complications related to pain management and regulation of methadone. She required home management of IV cefazolin therapy for three additional weeks. This organization was contacted by the Case Manager after four other home infusion providers refused to take her on service for IV antibiotics via a peripherally inserted central catheter (PICC). Patient also refused to be placed in a rehabilitative facility to complete her antibiotic therapy because she was adamant about resuming her nursing courses on schedule. Our clinical team extensively discussed the risk vs. benefit of treating LR at home and developed a plan that encompassed: evaluating the patient and obtaining verbal assurances from her regarding remaining drug free; evaluating and obtaining parents’ consent and support; clearly communicating the consequences of non-compliance with the patient; coordinating weekly drug screens with the methadone clinic; clearly communicating the plan to the medical team; and closely monitoring the patient at home.

RESULTS: LR was discharged home to her parent’s care. She kept her commitment to complete a urine toxicology screen weekly. Methadone was regulated properly prior to discharge and administration resumed upon discharge through her methadone clinic. The patient completed 21 days IV cefazolin and remained heroin/drug free during the course of treatment. Pain resolved as did the SI Infection. Patient resumed her studies on schedule. Potential cost savings with home infusion therapy were approximately $48,000 (hospital vs. home).

DISCUSSION: Patients with a history of drug abuse may at times require IV therapy at home. These patients may benefit from a comprehensive plan, compassionate care, and a chance to succeed without judgment. Extrapolating data from this single patient case to a larger patient population is difficult, however it is an important first step.

CONCLUSION: This organization provided home intravenous antibiotic therapy to a recent IVDU patient successfully by 1) refraining from judgement and 2) instituting a comprehensive treatment plan. This success resulted in a significant cost savings for the hospital and the insurer.

FINAL ABSTRACT # 2

TITLE: Complications of Peripherally Inserted Central Catheters, tunneled Central Venous Catheters, and Midlines in the Home

AUTHORS: Sara Keller, MD, MPH, MSHP1; John Adamovich, MHA2; Mitra Gavgani, PharmD2; David Hirsch, RN, MSN, MBA2; Deborah Williams, BSN, MPH2; Mary Myers, MS, RN2; Dawn Hohl, PhD, RN2; Kathleen Pulice, BS1; Amanda Krosche, BS1; Sara Cosgrove, MD, MS1; Trish Perl, MD, MS1. 1Department of Medicine, The Johns Hopkins University School of Medicine; 2Johns Hopkins Home Care Group, Johns Hopkins Medicine

BACKGROUND: Central venous catheter (CVC) complications, such as central line-associated bloodstream infections (CLABSI) have been a focus of benchmarking and quality improvement among inpatients. However, few prospective studies have followed patients with CVCs in the home after hospital discharge to measure outcomes.

PURPOSE: The purpose of this project was to describe and quantify catheter complications and risks for catheter complications, and hospital readmissions among patients discharged from two academic medical centers with CVCs, and to quantify potential environmental exposures among patients discharged from two academic medical centers with CVCs

METHODS: We present an analysis of a prospective cohort study of patients discharged from two academic medical centers to home with CVCs, including information on CVC complications (CLABSI, catheter-associated venous thromboembolism [CA-VTE], catheter occlusion, catheter malposition, inadvertent catheter removal) and hospital readmissions. Patients ≥18 years of age, who were English-speaking, able to give consent, and not on hospice who were discharged with tunneled CVCs, peripherally inserted central catheters (PICCs), and Midline catheters to the home from two academic medical centers, one tertiary care and one community-based hospital, were consented in this IRB-approved study. Patients discharged between March 2015 and October 2015 were eligible, leaving 173 patients in the study. Telephone survey questions were pre-determined and were multiple choice and were repeated every other week for the duration their CVCs were in place. Surveys were performed by research assistants with responses placed in a secure electronic database. Chart abstractions were performed by a registered nurse who is also an infection preventionist as well as an infectious diseases physician and occurred...
METHODS: specific MTM program to a reimbursable MTM program.

PURPOSE: bypass the "face to face" requirement of some plans for performing CMRs, and their success in obtaining reimbursement for medication use interventions that were associated with findings of cost effectiveness and increased patient safety. We believe that it is possible to create a reimbursable MTM program at our site of care.

RESULTS: Outcomes MTM® was selected due to their experience in health plan collaboration, success obtaining prior authorization to bypass the "face to face" requirement of some plans for performing CMRs, and their success in obtaining reimbursement for pharmacist recommendations made to other clinicians on the patient's care team (TIPS). Pharmacist staffing was identified as a potential weakness and we elected to closely monitor workload. Support staff will be added to assist in preparation activities (appointment scheduling, printing out current medication lists, labs, etc.) to free up pharmacist time. Training was provided to the pharmacist currently providing MTM. Program impact will be measured in pharmacist time spent on MTM activities, reimbursement received, and cost avoidance for our health system.

RESULTS: In the first three weeks of implementation, two CMRs have been completed. Both were accepted for reimbursement ($75 each). Two of three pharmacy interventions made with a physician (TIPS) were accepted ($15 each).
Pharmacist time spent was approximately 3.5 hours (including preparation, patient interview, and documentation) at a staff cost of approximately $199.50 compared to potential reimbursement of $182.

**DISCUSSION:** While costs of staff time spent completing the MTM documentation exceeded the total reimbursement received, the project is still in the early phase of implementation and a reduction in time spent documenting is anticipated with ongoing use and practice.

**CONCLUSION:** It is too soon in the process to declare the transition to a reimbursable MTM program is a success, however, early results are encouraging and we will continue to assess.

**FINAL ABSTRACT # 4**

**TITLE:** Innovative Configuration and Electronic Pathways between Health System and Home Infusion Software to Facilitate Documentation Requirements

**AUTHORS:** Tricia C. Sirois, PharmD; Lisa R. Klein, PharmD; Warren S. Deppong, PharmD; Nicholas D. Thompson, BS; Kimberly R. Jacobson, BBA; Christopher J. Maksym, PharmD. University of Michigan Health System, HomeMed

**BACKGROUND:** As a home infusion pharmacy within a larger health system, orders fulfilling legal, dispensing, and billing requirements were received and processed within a paper based work flow. Recently, our health system transitioned its care management to a single, electronic health record (eHR). In order to gain efficiency, decrease time delays in order processing, realize compliant and complete order content, and augment communication between prescribers and home infusion staff, our pharmacy implemented electronic pathways designed to support the transfer of orders and billing documents requiring physician signature.

**PURPOSE:** The purpose of this performance improvement project was to: implement an electronic transfer pathway between health system and pharmacy software applications to yield complete, compliant orders and physician signed billing documents; eliminate time consuming paper based processes; and facilitate improved communication among all patient care providers.

**METHODS:** Health system based software templates were designed to require complete content for orders that could then be transmitted electronically to our department; prescriber use of the new templates served as the measurement to assess the number of complete versus incomplete orders received. Additionally, using pharmacy software data extraction and interface technology, payer required billing documents were developed, and routed electronically for physician signature; before and after volume comparisons of paper versus electronically generated billing documents served as the measurement to assess the reduction in paper based processes. Observational changes in the frequency of staff initiated order clarification with prescribers were used to measure any improvement in communication.

**RESULTS:** There are now over 50 orders in use. These order sets guide the prescriber to create complete orders; order data elements are no longer missing yielding complete documentation upon initial receipt of the order. Changes, modifications, and updates to the home infusion therapy regimen are now virtually available to all care providers accessing the health system eHR which has improved communication by decreasing the need for order clarification phone calls. The active medication profile is updated automatically at the time of electronic prescribing. All system extracted certificates of medical necessity (CMNs) are processed via an electronic work flow for “in system” patients rather than faxed or mailed for signature, resulting in the reduction of paper based processes and the ability to process claims closer to the date of service provision. Generation of paper CMNs decreased from 100% to 5%. Reports reveal and prompt the action necessary to obtain re-certification for CMNs prior to expired status and when payer requirements dictate therapy re-certification. The average turnaround time from CMN creation to return of a physician signed document has decreased from approximately 10 days to an average of 4.6 days.

**DISCUSSION:** This performance improvement project demonstrated that receipt of complete order documentation and efficient communication are achieved with replacing paper based processes with electronic pathways.

**CONCLUSION:** Development and implementation of electronic pathways between health system and home infusion pharmacy partners facilitates documentation requirements by satisfying complete order content, creating a more efficient electronic order process while also reducing provider-prescriber order clarifications. Corresponding improvements in revenue cycle performance are likely to follow.
FINAL ABSTRACT # 5

TITLE: Re-design of a home infusion focused pharmacy residency program for conversion to the ASHP 2014 standards

AUTHORS: Amy Lee, PharmD; Tom Rout, BS, RPh; Melinda Sater, PharmD, BCNSP; Brooke Schaat, PharmD; and Vicki Baer RPh. Option Care

BACKGROUND: In 2014, the American Society of Health-System Pharmacist (ASHP) updated criteria for Postgraduate Year One (PGY1) Pharmacy Residency Programs. The seven principles adopted in the 2005 ASHP Standards were revised to establish six primary standards to define the content and structure of an accreditable PGY1 program. Accredited residency programs are required to meet the new standards beginning with the 2016 residency cycle. Literature shows many medical programs and clerkships converted their curricula to a longitudinal format and reported improved learning objective outcomes over traditional block rotations. We expect similar results for our PGY1 program.

PURPOSE: The purpose of this project is to convert this national home infusion provider's PGY1 program to meet the revised 2014 ASHP Standards. The new standards will expand our current Learning Experience (LE) structure by adding a comprehensive set of activities designed to provide direction, enhance outcome measurability, and ensure quality resident performance evaluation and feedback. The revised LE structure will serve as a template to provide equivalent experiences at all residency sites.

METHODS: A survey will be conducted to assess preceptor and residents (past and current) perceptions regarding the strengths and weaknesses of our existing program structure. Results from completed surveys (n=25) will be considered in the selection of our program format (block vs longitudinal rotation design), usefulness of the current LE descriptions as a program tool, and timing of expected goal achievement. The ASHP 2014 Standards and related resources (such as ASHP Guidance documents and the August 2015 ASHP onsite survey results) will be applied in the revision of this organization’s PGY1 Residency Program Manual. To achieve compliance with the revised standards, we will increase the utilization of detailed activities for each LE that are measurable and support the 2014 ASHP Competency Areas. We will also incorporate the use of customized plans for each resident, reflecting their specific needs, strengths, and areas for improvement as related to the goals and objectives of the program. The revised PGY1 curriculum will provide structure and guidance through the development of tools containing parameters for the completion and evaluation of the 2014 ASHP Competency Areas.

RESULTS: Preceptor and resident survey results (n=25) indicated a longitudinal program format was preferred, and LE descriptions needed improvement. The final design includes a well-defined and organized set of activities. Tools were created to assist preceptors and residents, including a working grid and improved LE descriptions. These tools aid in the reduction of redundant evaluations and provide useful guidance on a daily basis for residents and preceptors. This design achieves compliance with the 2014 ASHP Standards.

DISCUSSION: The new PGY1 program design provides a template to both existing and new sites to meet the new accreditation standards. This will be implemented starting the 2016 residency cycle. Minor adjustments and improvements will be made following the implementation of this program format based on preceptor and resident feedback that will continue to be considered.

CONCLUSION: The purpose was accomplished with the re-design of the PGY1 program, compliant with the 2014 ASHP Standards.

FINAL ABSTRACT # 6

TITLE: Utilization of a new, proprietary molecular testing panel to guide anti-infective therapy at local wound care centers—research in process

AUTHORS: Robert Ross Harless Woods, PharmD1; Ed Eiland, PharmD, MBA, BCPS-ID, FASHP2; Bradley Gilchrist, PharmD2.
1Vital Care of Meridian; 2Vital Care, Inc.

BACKGROUND: Target enriched multiplex polymerase chain reaction (TEM-PCR) is a unique technology involving rapid molecular testing allowing for identification of pathogens in blood, sputum, or other bodily fluids. Wound infections are
challenging to treat and represent a significant healthcare concern due to antibiotic resistance and associated costs. TEM-PCR can be utilized to detect pathogens in the presence of antibiotics and offers one day results. Collaboration between medical laboratories utilizing TEM-PCR technology and outpatient pharmacies providing anti-infective recommendation services have not yet been studied to date.

PURPOSE: The purpose of this clinical research project is to establish a pharmacy consulting service and improve accuracy and timeliness of anti-infective recommendations provided through the use of TEM-PCR results. Additionally, this research seeks to evaluate the impact of the TEM-PCR panel in treatment of wound infections by comparing it to the standard phenotypic culture, timeliness of culture results for treatment guidance, anti-infective therapy changes due to TEM-PCR findings, clinical interventions resulting from the consulting service, and outcomes of therapy.

METHODS: Patients will undergo culture collection during admission or follow-up services at a wound care center between October 2015 and October 2016. A total of 25 TEM-PCR panels will be utilized for this study and the program and data evaluated, retrospectively. All patients with wounds deemed clinically necessary to culture by the physician will be included, and those who are not candidates will be excluded. A standard phenotypic culture and sensitivity test and TEM-PCR panel will be conducted for each wound cultured. Upon return of the results, a pharmacist will utilize the results in conjunction with available medical records to provide clinical recommendations for anti-infective therapy. Clinicians will compare TEM-PCR panel and phenotypic culture and sensitivity results and adjust therapy when warranted. Patient charts will be reviewed to evaluate patient wound healing and clinical resolution.

RESULTS: Currently, 13 TEM-PCR panels have been utilized on 12 patients. Clinical consultations resulted in 21 clinical interventions and a 92.3% acceptance rate. TEM-PCR returned 1.69 days sooner and identified more microorganisms than the phenotypic method. Both the TEM-PCR and phenotypic culture and sensitivity identified at least one of the same microorganisms 38.46% of the time.

DISCUSSION: Thus far, TEM-PCR has allowed identification of microorganisms in the presence of antimicrobials and returned on average greater than 1 day faster than phenotypic culture and sensitivity. These components were useful in the treatment of long-term wounds and establishment of a pharmacy antimicrobial consultation program with wound care clinics. The consultation program aided quicker guidance of antimicrobials, aided antimicrobial stewardship, and resulted in numerous clinical interventions. Acceptance of the clinical program was better than expected due to speed of identification and consistent follow up by clinicians.

CONCLUSION: Preliminary results indicate utilization of TEM-PCR offers more timely results for earlier guidance in antimicrobial therapy particularly in an outpatient wound care population. Overall, the established pharmacy consultation service in coalition with the TEM-PCR panel offers a unique method of antimicrobial stewardship and collaboration of health care professionals. The consultation service had a high rate of physician acceptance.

FINAL ABSTRACT # 7

TITLE: Pharmacy Residency Preceptor Development Program: Evaluation, Creation, and Implementation of a Unique Custom Tailored Plan

AUTHORS: Joshua Shane Jaussi, PharmD, MBA; Thomas Rout, BS, RPh; Robin Espiritu, RPh, BCNSP; Claudine Salanski, PharmD. Option Care

BACKGROUND: ASHP released new accreditation standards for postgraduate year one (PGY1) Pharmacy residency programs in September 2014. Having a sound plan and program in place that follows the standards of the accrediting body is essential. The current preceptor development program does not meet these standards. This project will specifically address improvement to this organization’s compliance, primarily with standard 4, which defines the requirements of the residency program director and preceptors. The project will address standards 4.4.d: evaluation, skills assessment, and development of preceptors in the program; 4.4.e: creating and implementing a preceptor development plan for the residency program; and 4.8.a-f: preceptors’ qualifications.

PURPOSE: The objectives and goals of this project are to ensure compliance with the new ASHP standards, and identify and address opportunities for improvement in our preceptor development program.

METHODS: The plan for accomplishing this performance improvement project will be conducted over a 5-month period. October 2015: Conduct an electronic pre-survey which measures the preceptors’ knowledge of the four ASHP roles of
RESULTS: The pre-survey was completed by 10 preceptors, of which 7 demonstrated knowledge of the four ASHP roles of precepting. Analysis of preceptor qualifications revealed the need for additional education or support in the areas of facilitating and modeling roles to achieve full compliance with the 2014 standards. Resources created to facilitate the necessary preceptor development included educational tools such as posters and job aids for each preceptor and job site, as well as frequent emails containing preceptor education and skills. Documents were also provided to facilitate and guide pre and post rotation discussions to identify areas for improvement. The post-survey was completed 6 preceptors, of which all 6 demonstrated appropriate knowledge of all four ASHP roles of precepting. Post-survey results showed preceptors were satisfied overall with the information and job aids provided.

DISCUSSION: The plan that we envisioned and defined by the pre-survey was successfully designed and implemented and deemed effective by the post-survey. This program will be considered successful if the standards for preceptor development are found to be sufficient upon the ASHP accreditation surveys.

CONCLUSION: This program is in compliance with the accreditation standards, and provides a foundation for future development and improvement.
infusion sites and 99.8% of infusions were completed without administration changes. Geometric mean serum IG trough levels (g/L) were 14.74 (IGSC 20% 1-week interval; n=57), 11.58 (IGIV 3-week interval; n=19) and 10.19 (IGIV 4-week interval; n=50). The ratio of the geometric means of AUC per week for IGSC 20% treatment over IGIV 10% was 109% (90% confidence interval: 104-113, n = 49).

DISCUSSION: In patients with PIDD who were treated with IGSC 20%, VASBI and infection rates were low, and infusions most administered into ≤2 sites were well-tolerated at relatively high infusion rates.

CONCLUSION: Final data from this phase 2/3 study confirms the efficacy, safety and tolerability of IGSC 20% treatment in patients with PIDD in North America.

FINAL ABSTRACT # 9

TITLE: The stability and sterility of repackaged intravenous lipid emulsions for unit-dose administration

AUTHORS: Alexandre Ivanov, PharmD; Michelle Simpson, PharmD; Thomas Rout BS, RPh; Julie Selfridge, RPh; Option Care

BACKGROUND: Intravenous lipid emulsions (IVLEs) play a vital role in nutrition support therapy by providing a source of calories and essential fatty acids. Emulsion stability is compromised when the final lipid concentration in a total nutrient admixture (TNA) is less than required for admixture stability, thus prompting repackaging of IVLEs for unit-dose dispensing (i.e., dispensing as the original concentration after transfer to a unit-dose container). The practice of repackaging lacks literature support and published recommendations limit the beyond-use-date (BUD) to 12 hours. USP Chapter <729> outlines stability globule size limits for commercially prepared IVLEs that may be applied to repackaged products to assess the impact of compounding and storage on emulsion stability. Pharmacies assign BUDs that represent the stability and sterility of the compounded product. For repackaged IVLEs, stability and sterility testing is warranted, in order to justify assigning a BUD of 9 days refrigerated at 2 °C to 8 °C.

PURPOSE: Assess the stability and sterility of 20% IVLEs repackaged into polypropylene syringes and DEHP free IV bags to support a BUD of 9 days refrigerated.

METHODS: Two independent laboratories performed stability and sterility testing. Stability testing was carried out in accordance with USP Chapter <729>. Dynamic light scattering technique was used to determine the mean droplet diameter (MDD), with an upper limit of 500 nanometers, and light obscuration technique was used to determine the percentage of volume-weighted particles with diameter greater than 5 microns (PFAT5), with an upper limit of 0.05%. Three samples per container type were compounded in the lab, one for background particulates, followed by two samples of 20% IVLE tested in triplicate at time of transfer for starting MDD and PFAT5, and then again on day 9 after refrigerated storage. Compounded sample sterility was assessed via standard tests for bacteria and fungi. Three samples per container type were compounded by three pharmacy branches on different days and at different times (i.e., beginning, middle, and end of compounding). Samples were refrigerated prior to shipment and during transport with temperature control confirmation upon receipt. Certificates of analysis and result summaries were provided by both laboratories upon test completion. Outcome parameters included pass/fail results for stability and sterility.

RESULTS: At point of transfer and after 9 days of refrigerated storage, repackaged unit-dose 20% IVLEs complied with limits for emulsion stability as set forth by USP Chapter <729>. Sterility was demonstrated after 14 days of incubation in all samples, as evidenced by no bacterial or fungal growth.

DISCUSSION: Reliance on extended stability data is essential to the dispensing and delivery of compounded sterile preparations for multiple days of therapy. Repackaged unit-dose 20% IVLEs are often dispensed on a seven day cycle, and this project provides evidence to allow such practice.

CONCLUSION: Compliance with USP set limits for emulsion stability and standard tests for sterility support the repackaging of 20% IVLEs into polypropylene syringes and DEHP-free IV bags with an assigned BUD of 9 days refrigerated. Compounding procedures should follow professional standards as set forth by USP chapter <797> related to sterile preparation quality assurance.
FINAL ABSTRACT # 10

TITLE: Effect of Text Message-Based Patient Communications on Pharmacy Lead Time—research in process

AUTHORS: Collin Chan, PharmD; Jane Gannon, MS, RPh; Jay M. Mirtallo, MS, RPh, BCNSP, FASHP, FASPEN; Tiffany Fancher, PharmD; Tarak Patel, PharmD; Collin Chan, PharmD; Jane Gannon, MS, RPh; Jay M. Mirtallo, MS, RPh, BCNSP, FASHP, FASPEN; Tiffany Fancher, PharmD; Tarak Patel, PharmD; 1Coram/CVS Specialty Infusion Services; 2Ohio State University

BACKGROUND: At its root, lead time is a concept that calls for processing of orders in advance. In the home infusion setting, it allows for reduced shipping costs, adequate time for compounds to reach appropriate refrigerated temperatures prior to shipping, and increased flexibility in processing stat orders. Timely communication with patients plays an important factor in lead time, as the current refill process requires communication with patients prior to dispensing. This organization has experienced challenges at times in reaching patients who are often not free to talk, unavailable, or generally hard to get a hold of, and this study will look to improve this communication by utilizing text messaging as refill reminders.

PURPOSE: This study will measure the effect on attaining lead time when using text message-based communications for processing refills.

METHODS: We conducted a study of prescription data obtained from one branch of this national provider organization. This is a performance improvement project that is approved by this organization’s Corporate Review Board. Data will be collected for 3 months prior to and 3 months post implementation of the use of text messages (January 1, 2016). An estimated 900 orders for each group will be gathered. All new and existing patients will be offered the opportunity to receive text message reminders. Prescription data will include specialty medications and antibiotics not dose-dependent on lab results (vancomycin and aminoglycosides are excluded). Flushes and orders filled for the first time will be excluded. The primary endpoint for this study will evaluate the percentage of prescriptions that attained lead time. Lead time will be attained when the compounding instructions for the IV room are printed before 12:00 PM, 2 days before the scheduled delivery date. Secondary endpoints will include an evaluation of the average number of days prior to shipment that the compounding instructions are printed and of the percentage of orders that attained lead time for patients who enrolled and did not enroll in text messages.

RESULTS: In the pre-implementation group, 936 orders were analyzed. In the post-implementation group, currently 320 orders have been analyzed, with 41 of those from specialty patients enrolled in text messages. The pre-implementation group had 72% (674/936) of orders attaining lead time versus the 60.9% (195/320) of orders in the post-implementation group. Orders from specialty patients enrolled in text messages reached lead time 82.9% (34/41) of the time and were printed on average 7.1 days prior to delivery, whereas orders from specialty patients not enrolled reached lead time 54.3% (110/171) of the time and were printed on average 4 days prior to delivery.

DISCUSSION: Although we did not see our expected increase in attaining lead time for orders overall, we did see a higher proportion of orders attaining lead time from patients enrolled in receiving text message alerts. More data, however, is needed to further pursue text messaging as a viable alternative in improving patient communication.

CONCLUSION: In conclusion, this preliminary data shows progress toward finding a solution for improved communication with patients to positively impact pharmacy lead time.

FINAL ABSTRACT # 11

TITLE: Vancomycin concentrations used in home infusion—experience of one national provider.

AUTHORS: Elizabeth Lagasse, PharmD; Gene Decaminada, RPh. Option Care

BACKGROUND: The current Home Infusion Pharmacy standard for the preparation of vancomycin to be administered in the home calls for a concentration of 4-5mg/mL when given via a central line. This is largely driven by the known infusion reactions associated with vancomycin. However, these have been primarily linked to the pH of the solution and the infusion rate of the dose. The FDA approved package insert recommends that vancomycin be reconstituted at concentrations less than or equal to 5mg/mL for adults which may be increased to 10mg/mL in fluid restricted patients. There has been an increased demand for intravenous vancomycin to be provided to patients in elastomeric devices to promote patient compliance and ensure a steady rate of infusion ranging from 50mL/hr to 250mL/hr in volumes from 50mL to 500mL. Current data shows that vancomycin is stable in one brand of elastomeric devices for up to 28 days at concentrations up to 15mg/mL. Increasing the
concentration of vancomycin will result in decreased infusion volumes, resulting in the use of smaller elastomeric devices. The use of smaller elastomeric devices may present a cost savings, decreasing the overall cost to the Home Infusion provider.

PURPOSE: The purpose of this project is to examine dispensing data from a multi-site national home infusion provider to determine if it is possible to use smaller elastomeric devices to administer vancomycin and the associated cost savings.

METHODS: Vancomycin data was compiled from all branch locations within this national home infusion organization from November 1, 2014 through October 31, 2015. Data was collected from 13,602 individual vancomycin orders provided for adults in BBraun Accuflo elastomeric devices from 92 branch locations. The orders were examined to determine the concentration that vancomycin was compounded at and the elastomeric size used. This was then used to calculate the potential cost savings per dose for each order if compounded at 10mg/mL and placed in a smaller elastomeric device.

RESULTS: Of the 13,602 dispenses, 3317 were dispensed at concentrations <5 mg/mL, 5624 between 5-7 mg/mL, 1340 at greater than 7 and less than 10 mg/mL, 1907 at 10 mg/mL and 1414 at >10 mg/mL. Analysis of the dispensing data showed that if all orders compounded at less than or equal to 10mg/mL were compounded at higher concentrations closer to 10mg/mL, there would be an average savings of $2.99 per unit dispensed.

DISCUSSION: The results of this study may lead to a shift in the generally accepted compounding concentration for vancomycin from 4-5mg/mL to 10mg/mL. In addition, the cost savings associated with increased vancomycin concentrations make elastomeric devices more accessible to patients due to decreased solution volume and smaller elastomeric device size required.

CONCLUSION: The results show that it is possible to increase the vancomycin concentration up to 10mg/mL to provide the dose in a smaller volume with a smaller, less costly elastomeric device. However, it is unclear at this time if increasing the concentration will lead to increased adverse events. Further studies are required to determine the patient outcomes of increased vancomycin concentrations.

FINAL ABSTRACT # 12

TITLE: Nutritional Response in Cancer Patients on Home Parenteral Nutrition: A Retrospective Review

AUTHORS: Ashley Tran, Pharm.D, R.Ph1; Charmagne Emeluwe, MS, RD, CNCSC, LD1; Jay Mirtallo, MS, RPh, BCNSP, FASHP, FASPEN2; Sharon Lockwood, MS, RD, LD, CD, CNCSC1.

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BACKGROUND: Poor nutrition status associated with cancer is often an indicator of poor prognosis. These patients may suffer from involuntary weight loss due to cachexia, fatigue and anorexia. Parenteral nutrition is often indicated in cancer patients when malnutrition, gastrointestinal obstruction are present, and as adjuvant support with oncology treatment. Total parenteral nutrition in some patients may be life preserving and even life prolonging depending on the patients’ disease state and/or progression. An established history of home parenteral nutrition (HPN) allows convenience and comfort for patients and is a safe alternative to hospital care.

PURPOSE: The purpose of this project is to determine whether adult cancer patients achieve a positive nutritional response when placed on HPN.

METHODS: This study is a retrospective, descriptive, chart review. Clinical data will be collected at the start of care for patients currently receiving HPN and 2 months after initiation of HPN. Patient charts, and the Registered Dietitians comprehensive nutrition assessments and nursing notes will be used to collect specific clinical information. The primary endpoint of this study is to assess the frequency of positive nutritional responses in adult cancer patients. A success in achieving a positive nutritional response will be defined as having no weight loss after 60 days of HPN start of care and receiving >60% of macronutrients based on facility’s registered dieticians’ assessment. Sixty days was determined to be the time period appropriate to assess the patients’ repletion of nutritional status. Study inclusion criteria captured patients who have a diagnosis of cancer, an indication for HPN, and an order to receive HPN for a minimum of 60 days. Patient demographics reported include age, gender, cancer diagnosis, and indication for HPN. Exclusion criteria included any patient not actively on service, on hospice care, pregnant or nursing, or under the age of 18 years old.

RESULTS: Fourteen HPN patients met the inclusion criteria. Females represented 64% overall. Mean age was 57 years. Nine out of fourteen (64%) patients that were included in this study experienced no weight loss after being on service for HPN after
CONCLUSION: HPN appears to prevent further weight loss in some cancer patients. Limitations of this study include sample size, reliance on and potential variation of data from medical records and weight documentation.

FINAL ABSTRACT # 13

TITLE: A Pediatric Training Program for Home Infusion Pharmacists: Approaches to Improve Confidence and Competency

AUTHORS: Marlee Andis, PharmD; Suzanne Kluge, B.S. Pharm.; Mintu Shah, PharmD; Julie Selfridge, B.S. Pharm. Option Care

BACKGROUND: Pediatric patients are at greater risk of medication errors compared to adults partly due to physiologic immaturity. Pediatric doses often result in small volumes, posing unique compounding challenges. The existing pediatric therapy education within this national home infusion organization is not pharmacist-specific. Additionally, physicians and payers have inquired about the pediatric therapy training our pharmacists receive which allow them to have competence in that patient population. A literature search revealed success of a lecture-based program in pediatric therapies for hospital pharmacists, but none exist for home infusion pharmacists.

PURPOSE: The purpose of this project is to develop and implement a pediatric therapy training program which will improve home infusion pharmacists’ confidence and competency by introducing a step-by-step approach and providing pertinent resources.

METHODS: Approximately 100 pharmacists within this organization were invited to complete a pre-assessment via an anonymous online survey tool. Confidence was self-reported on a scale from 0-10. Competency was shown by percent of correct answers from therapy-based questions as they related to pediatric patients. A slideshow presentation and job aids were distributed after completion of the pre-assessment. The presentation outlined a step-by-step approach for evaluating pediatric orders and the job aids included pertinent pediatric therapy and infusion device resources. Pharmacists had two weeks to review the resources and complete the post-assessment. Participants had the choice to select “I do not know the answer to this question” on all questions. Success of the program will be achieved if confidence scores increase by 25% and percent of questions answered correctly increase by 50%. Direct costs (~$300) included literature for the resident to review. Results were collected over 1 month.

RESULTS: A total of 52 pharmacists completed the pre-assessment. The four biggest areas of weakness were pediatric-specific infusion pump programming, knowledge of organization-specific maximum volume of administration, renal function concepts, and knowledge of maintenance fluid requirements. A total of 15 pharmacists completed both the pre- and post-assessments and were included in results. Average baseline confidence score was 5.4/10. On the pre-assessment, participants averaged 51% correct answers, 17% incorrect answers, and 31% “do not know” answers. Upon completing the program, confidence scores increased to an average of 7.3/10 (26% increase). Performance improved to an average of 85% correct answers (67% increase), 9% incorrect answers (47% decrease), and 6% “do not know” answers (81% decrease). In addition to direct resource costs, indirect costs included time for the resident to develop the program and pharmacists to participate. Time invested will translate to quality of care for patients and satisfaction for physicians and payers.

DISCUSSION: This program succeeded in increasing pharmacists’ confidence scores by 26% and percent of correct answers by 67%, indicating improved competency. The pre-assessment exposed deficiencies and resources provided were effective in meeting project goals. Program implementation is warranted for all pharmacists involved in pediatric care within this organization along with making the developed resources accessible for all pharmacists.

CONCLUSION: The addition of a pediatric therapy program for home infusion pharmacists will contribute to improved confidence and competency while providing medications to pediatric patients.
FINAL ABSTRACT # 14

TITLE: Piperacillin/Tazobactam: Continuous vs Intermittent Dosing in Home Infusion

AUTHORS: Michael Anderson, PharmD; Sherry Heinrichs, PharmD. Coram CVS/Specialty Infusion Services

BACKGROUND: The improvement of infectious disease outcomes is very important as it leads to increased patient wellness and overall reduction in healthcare costs. Differences in medication administration can often be clinically significant. The purpose of this study is to determine if continuous piperacillin/tazobactam dosing results in fewer complications and therapy failures. This will fill a gap in the literature as there are currently no published studies evaluating continuous dosing in the home infusion setting.

PURPOSE: The purpose of this research study is to determine if continuous dosing of piperacillin/tazobactam in the home infusion setting is associated with fewer complications and therapy failures than intermittent dosing.

METHODS: The study is a retrospective chart review. Data from electronic charting will be collected from November 2013 to November 2015. This study compared the two methods of administration in order to establish a difference in clinical outcomes. The information used to establish a clinical difference in outcomes included hospital admissions, change of therapy, and reinfection within 30 days of completing therapy. Hospital admission is defined as a need for hospitalization due to complications related to the primary infection. Change of therapy is defined as changing antibiotics due to failure of piperacillin/tazobactam to eradicate the infection. Re-infection is defined as a recurrent infection occurring within 30 days of the previous infection that has the same diagnosis as the previous infection. Inclusion criteria extended to patients age 18 years or older and treatment with piperacillin/tazobactam monotherapy. Exclusion criteria extended to patients with a diagnosis of cancer, pregnancy, or severe kidney disease. Data analysis was performed using a chi square test to determine statistical significance. Successful clinical outcomes were defined as completion of therapy with no changes in therapy, no hospitalizations, and no reinfections occurring within 30 days of therapy completion.

RESULTS: A total of 85 patients were included in this study. Forty-five patients received the drug by intermittent dosing and 40 patients received the drug by continuous administration. There were 4 (8.9%) changes to therapy in the intermittent group and 5 (12.5%) changes in the continuous group (P = 0.59). There was 1 (2.2%) hospitalization in the intermittent group and 2 (5%) in the continuous group (P = 0.49). There was 1 (2.2%) reinfection in the intermittent group and 1 (2.5%) in the continuous group (P = 0.93). Overall, 6 patients (13.3%) failed therapy in the intermittent group, and 8 patients (20%) in the continuous group (P = 0.40).

DISCUSSION: Continuous infusions were not associated with fewer complications or treatment failures, however other potential advantages of this route of administration may warrant further study. In the home where patients administer their own therapy, continuous administration may be advantageous for reducing the number of times the intravenous line is accessed each day, which could result in improved compliance and decreased risk of infection. However continuous infusion requires the use of a pump which adds complexity and cost to the regimen.

CONCLUSION: Continuous dosing of piperacillin/tazobactam was not associated with fewer complications or therapy failures than intermittent dosing.

FINAL ABSTRACT # 15

TITLE: Cathflo Activase Usage Rates In Catheter Care Across Different Medication Therapies In Home Infusion Care

AUTHORS: Alfred Olumba, PharmD; Lisa Seifert, RPh, FASHP, ASQ-CMQ/OE; Tom Rout, BS RPh. Option Care

BACKGROUND: Maintaining intravenous (IV) catheter patency is vital for timely administration of infused medications. Published protocols support normal saline and/or heparin as flush and/or lock solutions to reduce occlusion risk. Alteplase is used to restore patency when an occlusion is detected. Alteplase requires significant nursing resources such expertise and time to administer. It is a costly and inconsistently reimbursed treatment for catheter occlusions. In the past year, this
organization noted an increased usage of alteplase, necessitating a closer examination of factors that may be contributing to catheter occlusions in order to identify opportunities for reducing this complication.

PURPOSE: The purpose of this project is to identify any correlating factors within this provider's home infusion patient populations that can be linked to the recent increase in alteplase use.

METHODS: This retrospective cohort study examined medical records of patients’ dispensed alteplase (Cathflo Activase®, Genentech) between September, 2013 and September, 2015, from three pharmacy locations of this national infusion provider organization. Additional criteria included catheter type (peripherally inserted central catheter [PICC] or implanted port) and a service period of at least one week. Patients with peripheral catheters, or a cancer diagnosis, were excluded from the study. Secondary variables included: frequency of drug administration; flush protocol followed; dwell time of catheter before alteplase administration; number of catheter lumens; patient age; and source of nursing care (e.g., company nursing or contracted nursing).

RESULTS: A total of 210 patients received alteplase (84 in year one and 126 in year two), with the majority (72.8%) on antibiotic therapy (68 in year one, 86 in year two). Alteplase use with antibiotic therapies increased from 5.9% of all patients prescribed antibiotics in year one (n=1139 patients) to 8.4% in year two (n=1012 patients). Alteplase use with inotropes doubled from 13% in year one to 29.7% in year two, however this finding proved to be insignificant due to small sample size. Flushing protocols included: 13 (6% total, 7.1% antibiotic) saline-only; 161 (77% total, 56.5% antibiotic) saline + drug + saline + heparin 10 units/mL (SASH-low); 31 (15% total, 10.4% antibiotic) SASH-high (heparin 100 units/mL); and five (2% total, 0% antibiotic) other (i.e., D5W). PICCs accounted for 95.2% (100 double lumen, 92 single lumen and 5 triple lumen), and implanted ports were 4.8% of study patient catheters. Average dwell time until occlusion was 39.7 days for all patients, and 25.5 days for antibiotic patients. Patient age, dosing frequency and nursing provider findings were not significant.

DISCUSSION: Only antibiotics were associated with increased alteplase use, and flushing protocols may have an association with differences. In double lumen PICCs, use of saline-only versus final heparin flush was associated with a difference. Alteplase use in SASH-High for single lumen PICC also increased. Exact reasons for change was not evident.

CONCLUSION: This study demonstrated that antibiotic therapy was associated with an increased use of alteplase. Further study of this is warranted to explore additional variables that may contribute to this increase, such as patient compliance and flush technique employed by the nurses.

FINAL ABSTRACT # 16

TITLE: Adverse Drug Events in Infliximab Patients Infused in the Home Care Setting: A Retrospective Chart Review

AUTHORS: Sarah Smith, BSN, RN, MPA; Kendra Curry, PharmD; Tom Rout, BS, RPh; Heather S. Kirkham, PhD, MPh; Julia Zhu, MPH, MS; Steve Kennedy, PharmD, CSP. 1 Option Care; 2 Walgreen Co

BACKGROUND: Infliximab infusions have been administered in the home care setting for over 15 years, however, the safety related to adverse drug events (ADEs) in this site-of-care continues to be a topic of debate. Existing literature reports of ADEs when infliximab is administered in alternative sites of care, including the home, ranges from 2.5 – 5.6%. These same studies conclude that “infliximab can be safely and effectively administered in a home-care setting (Valdez R. PM, 2001)” that “Home infusion is practical, safe ... (Buchanan, 2006)”, and finally, Condino et al conclude that “infliximab infusions administered at home were safe (Condino AA, 2005)”. Despite the available evidence, additional studies documenting ADE occurrence in the home care setting are needed.

PURPOSE: The purpose of this study is to document rates of ADEs experienced by patients who received infliximab in the home care setting, which includes both home and ambulatory treatment sites (ATS), through this national home infusion provider. These data will be compared to published data in similar treatment settings using established FDA ADE categories.

METHODS: A retrospective chart review of pediatric and adult patients was conducted to determine the rate of ADEs for infliximab. Patient inclusion criteria: one or more infliximab infusions administered in the home care setting between May 1st, 2012 and May 31st, 2014, at any prescribed dose and frequency, with complete data sets available. 291 unique patients were included, representing 1,866 infusions. FDA ADE classifications were used to determine the rates of ADEs: Mild – nausea, fever, chills, headache, fatigue, dizziness, palpitations, flushing. Moderate – bronchospasm, angioedema, hypotension, rigors, urticaria, fever, chest discomfort. Severe– disabling or life threatening: hypoxia, ARD syndrome, myocardial infarction.
ventricular fibrillation, cardiogenic shock, fever with rigors, anaphylaxis (requiring hospitalization). In this study, safety is defined as an ADE rate consistent with previous reports. This study is approved by Quorum IRB (protocol number QR#: 29558/1).

RESULTS: 1,866 infliximab infusions were included in this study, 1,441 (77.2%) at home, 410 (22%) in an ATS, and 15 (<1%) were not identified specifically as home or ATS. None of these infusions were associated with a severe ADE. Thirteen (13; 0.7% of total) infusions, among 7 unique patients, were associated with a report of a moderate ADE, and sixty-five (65; 3.48% of total) infusions, among 30 unique patients, were reported as resulting in a mild ADE. The overall ADE occurrence was 4.2%.

DISCUSSION: ADE rates for infliximab administered by this provider were consistent with previously published reports deeming the home care setting as a safe site-of-care. These data are relevant to the home infusion industry by further documenting the safety of infliximab when administered in the home or ATS.

CONCLUSION: This study documents a 4.2 % occurrence of ADEs experienced by patients receiving infliximab in the home care setting between May 1st, 2012 and May 31st, 2014. This rate is consistent with results in similar studies and is consistent459(298,958),(797,981) with published statements describing home as a safe site-of-care for infliximab. Study limitations include the lack of an equivalent comparison group, control for age, and comorbidities.

FINAL ABSTRACT # 17

TITLE: Improving Patient Satisfaction: Matching Nurse Experience to SCIg Patient Needs

AUTHORS: R. Becky Gamez, RN, BSN, IgCN; Pamela Brown, RN; Javier Mendoza, RN; Isabella Wasciewisz, RN; Altrustix Nursing Services, Inc.

BACKGROUND: Challenges facing patients who self-infuse subcutaneous immunoglobulin (SCIg) include the management of previous health concepts, anxiety and a limited number of training visits to achieve confidence and competency while maintaining or improving general health outcomes. These challenges can impact the patient’s overall satisfaction and success with this therapy and can be compounded by institutional protocols, insurance reimbursement and staff experience and education. Our organization classifies infusion nurses according to three levels of experience with immunoglobulin therapy administration: accomplished (fewer than 3 visits annually and or 2 year(s) of experience), proficient (3 to 6 visits annually and or 3 to 5 years of experience), and expert (greater than 6 visit per year and more than 5 years of experience). New drug-specific protocols that represent a significant change from the usual may result in all nurses categorized as “accomplished” until competency and confidence are demonstrated in the new product/preparation and administration techniques.

PURPOSE: The purpose of this project was to determine whether there are any correlations between patient compliance/successful participation in SCIg therapy and the experience level of the nurse providing their SCIg training.

METHODS: A retrospective analysis was conducted of patient satisfaction survey results from 181 unique SCIg patients treated between January 2010 and December 2014. Surveys were sent when patients achieved independence with SCIg administration, and every three months thereafter for one year. Experience level of the nurse who performed the initial teaching visit was recorded for each patient who returned a survey at 3 months, as was the number of visits required until each patient demonstrated independence in self-administration, and whether the patient discontinued SCIg therapy during the study period. The patient survey utilized a five-level Likert scale (strongly disagree, disagree, neutral, agree, and strongly agree) and measured the patient’s recall of key teaching concepts, techniques and perception of care provided by nursing and pharmacy staff.

RESULTS: The survey response rate for independent patients at 3 months was 89%, with diminishing returns over subsequent intervals. Data revealed that prior experience with IVIG had no significant impact on SCIg satisfaction scores, compliance with self-infusion teaching, or patient retention. Number of visits to achieve patient independence were 4 for patients taught by accomplished nurses (23 of 181), 3 with proficient nurses (28 of 181) and 2 to 3 with expert nurses (130 of 181). Patients were more likely to remain on SCIg, and reported higher overall satisfaction scores when education was provided by a proficient or expert level immunoglobulin infusion nurse. These patients were more likely to work through infusion-related issues and stay on therapy, than patients who were taught by an accomplished nurse.
DISCUSSION: Our data suggests that nurses’ experience level had a greater impact on patient retention of teaching, satisfaction with the treatment, and their continuation with therapy, than any other factor. A review of nurse orientation and supervision in the first year of employment is indicated based on these findings.

CONCLUSION: In conclusion, this study demonstrated nurse experience level does correlate to patient compliance and successful participation in SCIG therapy. Favorable satisfaction responses may also be influenced by other selection biases, and further research is warranted—including a closer examination of the factors that contribute to nurse competency and expertise in administering and teaching self-administration of SCIG therapy.

FINAL ABSTRACT # 18
TITLE: Retrospective Review of Home Infusion Inotrope Patients: A Descriptive Report on Demographics, Readmissions, and Costs

AUTHORS: Noreen Chan, PharmD. Coram/CVS Specialty Infusion Services

BACKGROUND: The goal of home inotrope therapy is to provide an effective, cost-saving alternative to hospitalization for Stage D heart failure (HF) patients. Recent Congressional efforts to pass legislation changing the Medicare Part B reimbursement to Average Sales Price methodology would dramatically lower the reimbursement for home inotropic therapy, raising concerns about this treatment option’s future financial feasibility. While evidence exists demonstrating lower care costs with home infusion therapy versus hospitalization, further research is needed to validate the home inotrope cost-effectiveness beyond site-of-care including 30-day HF readmission impact.

PURPOSE: The purpose of this project is to describe demographics, readmissions, and daily care costs from three major teaching institutions for home inotrope patient population managed by a national home infusion company.

METHODS: A retrospective analysis of patient medical records referred by three centers yielded 61 inotrope patients. Study inclusion criteria were all inotrope patients from October 1, 2014 to September 30, 2015 to align with Medicare statistical reports. Demographic data included gender, age, length of therapy and payer. Patient outcomes included 30-day readmissions, unplanned hospitalization rates and primary reason. Daily cost data was calculated from a low and high range divided by the average length of stay reported in state database 15-day readmissions, starting April 2014 through March 2015 for patients at least age 18 and previously published home inotrope costs.

RESULTS: The results showed the average inotrope patient was a 55 year old male receiving milrinone for 173 days with commercial insurance. There were 13 female patients (21.3%) and 48 male patients (78.7%). 48 patients (78.6%) received milrinone and 13 patients (21.3%) dobutamine. Reimbursement coverage demonstrated 31 commercial insurance patients (50.8%), 21 traditional Medicare patients (34.4%), 6 Medicaid patients (9.8%), 2 self-pay patients (3.4%), and 1 hospice patient (1.6%). The 30-day readmission rates comparing home inotrope data to Medicare data were 7.1% and 21.5%; 6.7% and 23.4%; and 12.2% and 25.2% for Hospital A, B and C, respectively. The most common unplanned <30 day hospitalization reason was insufficient response (62.5%). The daily cost range of a HF readmission was $3,382.94-$7,191.18 for Hospital A, $4,364.64-$10,943.21 for Hospital B, and $2,623.15-$6,485.96 for Hospital C. Literature reports home infusion daily cost range for the first month of dobutamine and milrinone as $72-$127 and $184-$734, respectively.2,3

DISCUSSION: There were study data acquisition challenges. Date ranges did not align between cost, home inotrope, and hospital data. Other limitations included single state data used for readmissions costs and 30-day Medicare HF readmission rates do not include all payers. Home inotrope costs varied widely due to insurance, weight based dosing, and drug choice with literature estimates based on a 75 kg patient dosed at 0.5 mcg/kg/min (milrinone) and 5mcg/kg/min (dobutamine).2

CONCLUSION: This study provides a descriptive report of demographics, readmissions, and costs for home inotrope patients. The results demonstrate lower 30-day readmission rates and reinforce lower site-of-care costs providing a foundation for further examination and demonstrate the need for thoughtful legislation to preserve this cost-effective therapy option.

FINAL ABSTRACT # 19
TITLE: A Team Approach to Establishing a Specialty Pharmacy Center of Excellence Model in Immune Disorders
BACKGROUND: Centers of Excellence share common elements and have been established for a variety of health care services. These elements include leadership, commitment, focus, interdisciplinary involvement, qualifications, competence, volume, standardization, outcomes, performance, research and publication. While practice guidelines have developed standards of care for immune therapy, providers may find it difficult to establish concrete criteria that predict and describe the quality of the immune therapy support services they provide. The Specialty Pharmacy and Home Infusion Center of Excellence program is a voluntary process by which a home infusion pharmacy organization can assure inclusion of therapy standards into its practices, develop and promote staff expertise, foster interdisciplinary collaboration, and demonstrate excellence in specialized care.

PURPOSE: This provider’s interdisciplinary home care team set out to achieve a Center of Excellence qualification in Immune Disorders that reflects the organization’s mission, which is to empower clients and caregivers to be self-sufficient in the treatment of their chronic medical condition, improving clinical outcomes while being a good steward of the patients’ health care dollar.

METHODS: This accredited organization’s interdisciplinary team has a designated team leader and representation from sales, marketing, pharmacy, nursing, intake, reimbursement, and operations, including two members certified in a relevant professional specialty. During the three months leading up to the criterion submission for qualification, weekly and monthly meetings were implemented to define success, in addition to opportunities for improvement. Program success was determined by the team’s ability to assess clinical and support staff competence using accreditation standards, measure and report all humanistic, clinical and financial outcomes including referral patterns, create program specific marketing materials, evaluate patient and referral source satisfaction, and actively participate in patient support groups and professional societies.

RESULTS: This organization was awarded the designation Specialty Pharmacy and Home Infusion Center of Excellence. The organization maintained a 5 out of possible 5 rating on patient satisfaction to meet the humanistic outcome. The measurement chosen for clinical outcome is hospitalization rate. During the three months prior to qualification, the organization had not experienced any hospital readmissions for immune disorders. During the third and fourth quarters of 2015 the organization has experienced 300% referral growth.

DISCUSSION: The Center of Excellence model helps the immune disorders team identify and correct deficiencies, track progress, and achieve specific goals. The organization learned that in order to win one must keep score. Humanistic challenges can be overcome if they are measured. Clinical barriers such as adherence and infection rates can be addressed if the team collaborates on these issues. Organizations can meet their financial goals if they create growth initiatives centered upon clinical best practices, in addition to internal and external marketing.

CONCLUSION: The Specialty Pharmacy and Home Infusion Center of Excellence model has provided a systematic approach for implementing the organization’s mission to empower clients and caregivers to be self-sufficient in the treatment of their chronic medical condition, improving clinical outcomes while being a good steward of the patients’ health care dollar.

FINAL ABSTRACT # 20

TITLE: Retrospective Review of Needle Length During Hyaluronidase-facilitated Subcutaneous Administration of Immune Globulin G

AUTHORS: Peg Gruenemeier, RN, CRNI, CHC1; Carol Ernst, RN1; Kimberly Duff, RN, BSN2.
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BACKGROUND: Patients requiring immune globulin G (Ig) replacement may receive Ig intravenously (IVIG) every 3-4 weeks; subcutaneously SCIG; (conventional), usually every 1-2 weeks (multiple needle sticks); or subcutaneously, facilitated by recombinant human hyaluronidase (IGHy; HYQVIA) every 3-4 weeks (1-2 needle sticks). Needle length is an important consideration to enhance local tolerability and prevent IgG leakage. Currently, needle length selection for IGHy administration is based on clinical judgment. No objective needle length data exists for SCIG and IGHy replacement, for which infusion volumes can be as low as 10mL or as high as 600mL.
**PURPOSE:** The purpose of this retrospective review is to present data on needle length in relation to tolerability and body mass index (BMI) in IGHy-treated patients, to assist in providing guidance for choosing appropriate needle length.

**METHODS:** Data were collected from IGHy-treated patients affiliated with a multi-site specialty pharmacy. Patient characteristics (height, weight, calculated BMI, sex, initial needle length at start and end of ramp up phase), IGHy dosing, number of infusion sites, patient reports of leakage or side effects and correlation of different needle length to mean BMI are reported.

**RESULTS:** Overall, 66 PIDD patients (aged 13-74 years; mean BMI 29.3 [15.1-61.4]) received IGHy. Patients previously received IVIG (26%), conventional SCIG (42%) or were treatment-naive (32%). Patients completing IGHy ramp-up (N=58) were evaluated. For patients using a 6 mm, 9mm- or 12mm-length needle, mean Ig infusion volumes were 250 mL, 325mL and 385mL and mean sites/infusion were 1.5, 1.39 and 1.22, respectively. Nine (15%) patients switched from a 9-mm to a 12-mm needle; the most common reason for this switch was due to IG leakage from the infusion site, which was resolved with use of a longer needle. The mean BMI for patients using a 9 mm needle was 27.8 while the mean BMI for patients using 12 mm needle was 39.1.

**DISCUSSION:** In conventional SCIG the needle length stays the same for subsequent weekly dosing unless leakage occurs requiring a longer needle. Unlike conventional SCIG, for Hyaluronidase-facilitated Subcutaneous Administration of Immune Globulin G, the doses change throughout the ramp-up phase and the total volume when the ramp-up phase is completed is larger than conventional SCIG. This should be kept top of mind when transitioning patients to IGHy, therefore a longer needle may need to be available to achieve better patient tolerability.

**CONCLUSION:** This study provides insight into needle length considerations in patients treated with IGHy, particularly when switching from SCIG, since IGHy allows for larger infusion volumes into a single site. Data from IGHy-treated patients suggest that, although the majority of patients switching from SCIG do well with their original needle length, some (particularly those with a higher BMI) may require a longer needle for improved tolerability and leakage prevention at the infusion site.

**FINAL ABSTRACT # 21**

**TITLE:** Monitoring On-Call Pages for Home Infusion Pharmacists as a Continuous Quality Improvement Measure

**Authors:** Jesse S. Peterson, PharmD; Dana Simonson, PharmD, BCPS; Colleen Blissenbach, MBA. Fairview Home Infusion, Minneapolis, MN

**Background:** This organization utilizes an after-hours pager system to provide appropriate patient care in time of need. The after-hours system takes calls between 5:01pm and 7:59am weekdays, and all day on holidays and weekends. The on-call service takes a message from the caller and sends a text message to the pharmacist on call. If the patient does not receive a response within 15 minutes, the pharmacist is called. All of this data is maintained and stored electronically, but not characterized based on the reason for call. For the past several months, on-call pharmacists have mentioned that most after-hours calls have been logistical problems.

**Purpose:** The purpose of this study was to characterize on-call data to see what issues occurred and identify potential changes that could be made to workflow to enhance both patient care and employee satisfaction.

**Methods:** A six-month period of time was analyzed. Calls were categorized into the following definitions: “clinical calls” (calls that could potentially require a pharmacist’s expertise), “logistical calls” (calls that could impact patient care, but do not need to be handled by a pharmacist), or “other calls” (no information provided). Calls were sorted by when they were received on weeknights (5pm – 5:59pm, 6pm – 7:59pm, 8pm – 11:59pm, midnight and 7:59am). Weekends and holidays were analyzed separately because the on-call service was being utilized 24 hours a day.

**Results:** Between May 1st and October 31st of 2015 (184 days), 1006 calls were received by the on-call pharmacist. Of these calls, 465 (46%) were classified as clinical, 514 (51%) as logistical and 27 (3%) as other. A total of 389 calls were received on weekends and holidays, while the remaining 617 calls were received on weekdays. Of the 617 weekday calls, 196 calls were received between 5-5:59pm (83 clinical, 110 logistical), 240 calls between 6-7:59pm (36 clinical, 140 logistical), 148 calls between 8pm – midnight (63 clinical, 82 logistical), and 33 calls between midnight and 7:59am (14 clinical, 18 logistical).

**Discussion:** We found it difficult to quantify the true nature of after-hours calls based on the level of categorization being provided by the answering service. Moving forward, it will be important to work with our answering service to generate a
standard set of reasons patients called. With the majority of calls pertaining to logistics, promise (delivery) time windows and workflow could be reevaluated. Communicating a delivery window of 6-9pm to patients while holding staff accountable for a 6-8pm delivery window is one potential example of an improvement that may decrease logistics calls. Finally, staffing hours could be reevaluated to better account for workload.

**Conclusion:** From this six-month analysis, there is evidence that the on-call pharmacist is receiving more logistical than clinical calls. While we accomplished our objective of analyzing call data and identifying opportunities to improve, we learned that more specific data is needed to facilitate analysis and identify areas of improvement that would enhance patient care and employee satisfaction. Future studies could focus on the amount of time spent resolving logistical calls, as they are taking time away from patient care activities.

**FINAL ABSTRACT # 22**

**TITLE:** Characterizing Outcomes Data for Home Parenteral Nutrition Patients

**Authors:** Jesse S. Peterson, PharmD; Theresa Rahn, RN, BSN; Dana Simonson, PharmD, BCPS. Fairview Home Infusion

**Background:** Unplanned hospitalizations represent a significant (and potentially avoidable) cost to this nation’s health care system. For this reason, unplanned hospitalizations have become a target for cost reduction in many pay-for-performance initiatives. The NHIA Outcomes Definitions include unplanned hospitalizations “related” to the infusion therapy provided, with reason codes for these hospitalizations, and outcomes codes to describe their resolution. Use of these codes by all providers within the industry would allow for the benchmarking of potentially preventable hospitalizations. Individual providers could then examine these reason and outcome codes as they seek to understand what aspects of patient care (provided or not provided) may have contributed to each related hospital admission.

**Purpose:** The purpose of this study was to collect and characterize outcomes data, specifically unplanned hospitalizations in chronic HPN patients.

**Methods:** A report was generated in CPR+, this organization’s electronic health record (EHR), for all HPN patients placed on hold (with a reason) during a two-month period. A chart review was conducted to include only patients receiving HPN service during this period. For patients who were admitted to this home infusion provider’s affiliated hospitals, medical charts were examined for admission reason and subsequent discharge diagnosis. That information was then characterized according to the NHIA outcome definitions. For those patients with line infections, charts were reviewed to identify nursing agencies for any patterns. Access device events, interventions, and outcome codes were also assigned.

**Results:** Over a two-month time period, there were 32 related unplanned hospitalizations for HPN patients. Further investigation revealed 6 unplanned hospitalizations were for patients who were not receiving HPN during the specified time period. Of the HPN patient unplanned hospitalizations (n=26), 17 were admitted within our health system (13 patients with 1 unplanned hospitalization, 2 patients with 2 unplanned hospitalizations). Of those 17 unplanned hospitalizations, 7 were related to home infusion care with 6 confirmed infections and 1 dislodged device. None of the HPN therapies were changed, however 6 unplanned hospitalizations resulted in a discharge home on antibiotic therapy. Of those infections, 3 unplanned hospitalizations (2 patients) were receiving pharmacy only services, 3 unplanned hospitalizations (3 patients) were receiving regional nursing services, and 1 unplanned hospitalization was receiving nursing services from our hospital system’s home health agency.

**Discussion:** Collecting and classifying outcomes data in home infusion presents numerous challenges. Patient admission to outside hospitals prevented the collection and reporting of outcomes data for some patients. According to NHIA outcomes definitions, each patient who was admitted on HPN was also discharged on HPN (and resumption would technically occur without changes). However, patients returned home with an additional infusion therapy (antibiotics). This subtle nuance highlights the importance of clearly defining outcome categories early in the process to ensure a consistent analysis.

**Conclusion:** From this two-month analysis, there is evidence that some unplanned hospitalizations are related to home infusion care, specifically intravenous access devices. While we accomplished our objective of collecting outcomes data, this study exposed some of the challenges associated with its characterization.
FINAL ABSTRACT # 23

TITLE: Increasing Patient Referral Acceptance Rate Throughout a National Home Infusion Organization

AUTHORS: Logan Davis, PharmD, MBA; Christian VonDrehle; Chris Newlin, PharmD; Anna Thompson; Brandi Semmes, CPhT; Tim Doner; Michele Winstead. VITAL CARE, INC.

BACKGROUND: The success and growth of this organization is dependent on activating as many patient referrals as possible. The organization collected patient referral acceptance rate data throughout 2014, and in Q4 2014 the average acceptance rate was 83.2%. Common reasons for inactivation included therapy cost issues, payer network issues, and pharmacy operation issues. In late 2014, the organization created a process called “Code Blue” in an attempt to accept patient referrals at risk for inactivation. The process is initiated by a Patient Account Representative when a pharmacy receives a referral that is at risk for inactivation, also referred to as a “No-Go”. The Code Blue team consists of multiple department directors, managers, staff and the CEO. Members of the team have experience and expertise in pharmacy operations, payer contracting, drug therapy selection, and reimbursement.

PURPOSE: The goal of this project is to increase the percentage of home infusion referrals that are accepted onto service (“activated”).

METHODS: Data was collected from the organization's pharmacy operations software system to measure our progress and the impact of Code Blue throughout the year. Metrics measured were 1) monthly referral acceptance rates; 2) Quarterly sum of all referrals involving Code Blue and 3) Quarterly acceptance rate of referrals involving Code Blue. Common Code Blue team interventions utilized to increase referral acceptance rate included: therapeutic drug substitutions to lower therapy costs; utilization of a patient's pharmacy benefit plan for drug coverage when medical benefit coverage was unavailable; and initiating partnerships between the organization's pharmacies in an effort to access more payer networks. It was noted that knowledge of the Code Blue procedure could be improved. Steps were taken to increase pharmacy awareness of Code Blue, as well as internal awareness, and the completion of Code Blue requests in a timely manner. The organization's awareness of Code Blue was measured by tracking the overall utilization of Code Blue.

RESULTS: Utilization of Code Blue has increased 500% throughout 2015 as this project has been carried out. The percentage of Code Blues converted into accepted referrals has increased from 15% in Q4 2014 to 45% at the end of Q3 2015. The referral acceptance rate between January and September 2015 is 85.8%, an improvement of 2.6% from Q4 2014.

DISCUSSION: The project has demonstrated that a heightened awareness of reasons for non-acceptance and patient referrals and common interventions to troubleshoot referrals can increase referral acceptance.

CONCLUSION: The increased use of Code Blue processes has positively affected and is directly correlated to an increase in the patient referral acceptance rate.

FINAL ABSTRACT # 24

TITLE: Development of electronic assessment tools for patients with chronic inflammatory demyelinating polyneuropathy receiving immune globulin therapy

AUTHORS: Barbara Prosser, RPh; Christine Miller, PharmD; Todd E. Hare, RPh; Nicholas Bertsch, PharmD; Kevin Ross, RN. Soleo Health

BACKGROUND: Chronic inflammatory demyelinating polyneuropathy (CIDP) not only affects a patient by its physical symptoms, but the chronic nature of this disease also has a lasting impact on quality of life. The progressive and irreversible nature of CIDP warrants the early initiation of immune globulin therapy to help prevent permanent disability. Quality of life investigations tend to be subjective in nature and difficult to quantify. Ongoing data collection in this specific patient population is minimal, which highlights the importance of collecting and analyzing the effect of first-line immune globulin therapy for the treatment of CIDP. The development of electronic assessment tools will assist in streamlined data collection so that response to therapy can be trended and appropriate interventions can be made.

PURPOSE: The purpose of this project was to design electronic assessment tools for future utilization in trending quality of life and the improvement or progression of symptoms associated with CIDP in patients receiving immune globulin (IG) therapy.
METHODS: Existing assessment tools used in the evaluation of CIDP symptoms were researched by a multidisciplinary team. Instruments such as the RAND 36-Item Health (SF-36) Questionnaire and the inflammatory neuropathy cause and treatment (INCAT) scale were examined because of their use in clinical trials and their focus on activities of daily living and quality of life. Free text content was limited, helping to facilitate streamlined electronic data collection for use in future research.

RESULTS: A total of three standardized assessments were created in this provider’s electronic medical records system: an initial assessment, and ongoing assessment, and a lifestyle assessment. The parameters included in these assessment tools were developed based on this provider’s experience as the most significant considerations within this patient population in regards to clinical outcomes and payor requirements. The responses to questions assessing subjective information, such as pain level and difficulty balancing, were assigned a numeric scale in order to quantify symptoms that may otherwise be challenging for patients to convey. The use of these tools will be tested by one site of this national provider before being made available for use within all sites.

DISCUSSION: The initial assessment is designed to obtain baseline data for each patient. In this circumstance, baseline is defined as the initiation of services with this provider of IG therapy. The initial assessment will assist in differentiating between patients naïve to IG therapy in comparison to those who have received IG therapy in the past. It will also allow for the patients to express their goals and expectations related to IG therapy. The ongoing assessment will operate as continuing clinical evaluation of the patients’ symptoms prior to each infusion. The lifestyle assessment is designed to assess the patient’s mood, energy level, sleep, stress, and activities of daily living.

CONCLUSION: Standardized electronic assessment tools were developed to assess the symptoms and quality of life for CIDP patients receiving IG therapy. Companywide implementation is currently pending with the goal of outcomes data collection and analysis in the future.

FINAL ABSTRACT # 25

TITLE: Temperature variation in the home setting: implications for continuous ambulatory infusions

AUTHORS: Janet K Sluggett, BPharm (Hons), GradDipClinEpid, PhD1; Nicholas A Sharley, BPharm2; Karen J Reynolds, FTSE, FAHMS, FIEAust, PhD, MSc, MA, BA(Hons), Grad Cert Tert Ed3; Andrew J Sluggett, BPharm BSc(Hons) DipMgt, Chief Pharmacist/General Manager1

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BACKGROUND: In Australia, patients receiving extended treatment with parenteral drugs in the home are generally visited once daily by nursing providers and 24-hour continuous infusions are common practice. Clinicians need to consider whether a patient’s home environment is suitable for drug administration and if drug stability will be maintained; however, only two Australian studies have assessed temperature variation during an extended infusion in the home. Neither study simultaneously assessed outside, ambient and infusion solution temperatures during the study period.

PURPOSE: The purpose of this study is to investigate temperature changes during a 24 hour period and assess the effect of ice packs on infusion solution temperature.

METHODS: Six healthy volunteers (without intravenous access) wore a waist pouch containing an elastomeric infusion device for 24 hours during autumn in Adelaide, South Australia. The infusion device contained 250mL 0.9% sodium chloride injection solution and it remained full during the study period as no infusion took place. The infusion device was connected to temperature data loggers which measured infusion solution temperature and ambient temperature every ten minutes. Outside temperatures, measured at 30 minute intervals, were obtained from the Bureau of Meteorology. Volunteers recorded their activities every hour during waking hours. In a separate experiment, an infuser was placed inside a waist pouch containing two reusable dry ice packs (approximately 4” x 4”) and incubated at 77°F or 90°F for 24 hours. The incubation temperatures were selected based on the ambient temperatures recorded when volunteers carried the infusion devices. The ice packs were replaced every eight hours.

RESULTS: The mean temperature of the infusion solutions worn by the volunteers ranged from 72.9°F to 82.2°F, and the cumulative time the infusion solution exceeded 77°F ranged from six to 20 hours. Examination of the activity diaries showed volunteers spent most of their time indoors, in an air conditioned environment. Spikes in ambient temperature occurred when
volunteers went outside during the day, travelled in a car, or moved to a room without air conditioning. The infusers surrounded by ice packs usually maintained a solution temperature below 68°F when incubated at 77°F, while infusers incubated at 90°F maintained a solution temperature greater than 68°F for up to eleven hours.

DISCUSSION: Infusion solutions administered over a 24-hour period in the home can reach temperatures above 86°F during autumn in South Australia, particularly when patients are exposed to environments without air conditioning. Ice packs are commonly recommended to keep infusion solutions cool during a 24-hour continuous infusion in the home; however, clinicians still need to consider whether stability will be maintained when ice packs are used, as temperatures of up to 77°F were observed when ice packs were changed three times a day.

CONCLUSION: The high ambient and infusion solution temperatures observed in this study highlight the need to further explore drug stability at high temperatures for medicines administered by continuous infusion in the home, and determine whether exposure to high temperatures has a negative impact on therapeutic outcomes. In the absence of this information, clinicians need to carefully consider local conditions when assessing patient suitability for continuous infusions in the home.

FINAL ABSTRACT # 26

TITLE: Demonstrating the Need for Adjustable Flow Rate Control with Mechanical Pumps during SCIG Infusion Therapy

AUTHORS: Neal de Beer, PhD; Joe Barbrie; Carlos Gutierrez; Paul Lambert, MBA. EMED Technologies Corporation

BACKGROUND: Studies of primary immunodeficiency (PID) patients treated with subcutaneous immune globulin (SCIG) reveal advantages over the intravenous infusion (IVIG) route, including: patient ability to self-administer SCIG; low risk of systemic adverse reactions; and increased cost effectiveness of the home site of care. Several challenges have also been identified, including management of local infusion reactions, and difficulty in achieving the desired infusion duration when using mechanical pumps with fixed rate control (FRC) sets. Matching the FRC set to each patient’s prescription and desired infusion duration often requires home infusion providers to carry a wide range of FRC set sizes, which has inventory cost and control implications. Priming FRC sets can also be difficult for patients due to the narrow tubing diameter and drug viscosity. An adjustable flow regulator could provide a cost-effective alternative to FRC sets for providers, while facilitating patient control of the infusion duration and priming process.

PURPOSE: This study sought to demonstrate the functionality of an adjustable flow regulator device when used in combination with mechanical pumps in the lab, comparing its performance to FRC sets in terms of flow rates and force required to prime.

METHODS: Viscosity and density of various Ig products were analyzed at different temperatures to create simulant fluids for bench flow rate testing, using the VersaRate® adjustable flow regulator and various FRC sets. SCIG60 Infuser (EMED Technologies) and Freedom60 (RMS Medical Products) mechanical pumps were tested using both the adjustable and FRC sets (which are FDA cleared for this use). Force required to prime a 24 gauge bifurcated needle set in combination with two comparable FRCs and the adjustable rate set was analyzed using a handheld force gauge.

RESULTS: Ig product viscosities ranged from 12.5cP at 25°C (77°F) to 15.5cP at 20°C (68°F). Flow rate tests using the adjustable flow regulator at different position settings provided repeatable results ranging from 7ml/hr (single 24ga needle set, position 1) up to 220ml/hr (6-site 24ga needle set, position 6). In comparison, at least 6 different FRC sets were needed to achieve the same range of flow rates. Priming force results showed a 76.5% reduction in force required when using the adjustable flow rate set at position 6 (4lb) compared to using fixed rate sets (17lb).

DISCUSSION: Variations observed in drug viscosities indicate a dependency on temperature with a potential impact on flow rates. If viscosity increases during therapy or from one treatment to the next, mechanical pumps using FRC sets are unable to increase pressure to maintain a preset flow rate, which can lead to longer infusion times. A variable flow regulator could be adjusted during therapy if necessary to achieve expected infusion times. The range of flow rates could also allow for a significant reduction in product inventory which would positively impact providers.

CONCLUSION: This study demonstrated that variable flow regulators used in combination with mechanical pumps are capable of providing a consistent range of flow rates, performing the function of at least six FRC sets, and needing three times less force to prime the infusion setup.
Title: A Rural Home Infusion Provider's Experiences Using Smart Infusion Pump Technology

Authors: Julie Lyon, RN; Dave Grady; Heather Peacock, PharmD; Peter Kratz, MS; Laura Seiberlich, MS

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Background: Recent data has been published describing the advantages of smart pump technology (SPT) for large home infusion providers. With fewer patients in a rural setting, questions remain about the amount of work and value the technology brings to smaller home infusion providers (HIP). Patients serviced by this provider cover a 200 mile radius, and the ability to have a device that is well-accepted by patients, with the potential to decrease home care visits, would improve the efficiency of an HIP's operations.

Purpose: The purpose of this study was to determine if SPT is a feasible alternative to previous ambulatory infusion pump technology in a rural HIP setting.

Methods: Following IRB approval, the provider was trained on a new ambulatory smart pump and medication safety software (MSS) (CADD®-Solis VIP, Smiths Medical, St. Paul, MN). Clinicians documented all training, and time spent creating and validating the drug library. The staff performed 10 scenarios simulating pump programming using the final library and answered 10 assessment questionnaires. Eligible patients included those requiring an infusion pump from Jan-Oct 2015. Patient consent was obtained, followed by training, then patients recorded pump interaction details for 5-7 days after their infusion began. A telephone survey assessing patient satisfaction with the pump was conducted 7-10 days after start of care. Library creation efforts were reviewed and summarized. Descriptive statistics were used to summarize pump programming and patient satisfaction data.

Results: After manufacturer training, provider staff (one pharmacist and two nurses) spent a total of 7 hours creating a fully validated drug library containing 16 of the most commonly administered protocols. For the programming evaluation, clinicians agreed the pump was easy to program (29/30, 96.7%) and felt comfortable with programming after an average of 7.67 times. Nine patients were enrolled in the study, providing data from 59 pump use days. Infusions were total parenteral nutrition (4) or Continuous (Ancef 4, 5FU 1). Patients reported they were 100% satisfied/very satisfied with the pump on all 59 pump use days and satisfied overall after completing the study. Patients experienced a total of 53 alarms [low reservoir (17), low battery (1), and infusion complete (35)]. 52 of the 53 alarms were resolved without contacting the HIP. Ease of resolving was rated in 41 instances as very easy (33), easy (7), or somewhat difficult (1).

Discussion: Staff effort required to create a drug library and establish safety parameters was minimal, and the pump programming exercise was beneficial to establish familiarity before using on patients. Patients both new and experienced with home infusion were able to independently use the new pump with minimal calls to the HIP. Easy to follow help screens on the pump allowed a greater level of independence. Patients reported they did not want to go back to using the pump they had used previously.

Conclusion: Smart ambulatory infusion pump technology can be successfully implemented into operations of a rural HIP and can effectively be used by patients to a high level of satisfaction. These data provide confidence that smart pumps are a feasible alternative for a rural HIP with wide service area.