NJPhA 2017 ANNUAL CONVENTION
POSTER CALL

Join the 5th annual Poster Session on
October 14, 2017 @ Harrah’s in Atlantic City, NJ

Encores Welcome!

The 2017 Poster Session is offered to our convention attendees for credit when they engage with presenters during the presentation hours. Posters submitted for consideration in 2017 must fall within the theme of “Advancing Pharmacy through Research,” and meet specific pharmacist and pharmacy technician objectives. Attendees will be required to discuss a minimum number of posters with presenters to receive credit. All abstracts must be reviewed by the CE committee prior to accreditation. Student posters authored with faculty or preceptor welcome.

Logistics: Poster set-up begins Saturday, October 14th at 7:30am and must be completed by 11:30am.* The formal poster session (required presentation) is scheduled for the afternoon of Saturday, October 14th. Posters must be on display through the end of the day. You are welcome to be available by your poster before or after the allotted presentation time. Posters may be removed at the end of the day or as late as 9:00 AM the following (Sunday) morning.

*Arrangements can be made for posters to be shipped to the venue at presenter’s expense. A presenter is responsible for installation and removal of the poster. Please contact the NJPhA office [609-275-4246] for instructions on shipping materials directly to the venue.

Submission Deadline & Details: Poster applications will be accepted until September 10, 2017. Accepted poster applicants will be notified on or about September 23rd after CE committee review.

Fee: Participation is included with a FULL or DAILY convention attendee purchase. All attendees who will be presenting the material are required to register for at least Saturday’s day of programming.

Journal Publication: Titles, abstracts and presenters for all accepted posters will be listed in The New Jersey Journal of Pharmacy.

See you there!

Carmela Silvestri, PharmD
NJPhA 1st Vice President & Convention Committee Chair

NEW JERSEY PHARMACISTS ASSOCIATION
609.275.4246
njpharmacists.org

2017 POSTER THEME:
ADVANCING PHARMACY THROUGH RESEARCH

To submit, call the the NJPhA office for a Poster Presentation Submission Form.

Poster presenters are invited to all sessions, social events, and more!
The New Jersey Pharmacists Association

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The New Jersey Journal of Pharmacy (ISSN0028-5773 USPS #380-360) is published seasonally by the NJ Pharmacists Association
760 Alexander Road, PO Box 1 Princeton, NJ 08543-0001
609-275-4246 Fax 609-275-4066 www.njpharmacists.org
Periodicals Postage Paid at Princeton, NJ and additional mailing offices. Subscriptions paid for through allocation of membership dues. US Subscription $50 per year; Foreign Rate $100 per year.
POSTMASTER: Send address changes to The New Jersey Journal of Pharmacy, 760 Alexander Rd., PO Box 1, Princeton, NJ 08543-0001, 609-275-4246. www.njpharmacists.org
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Table of Contents

2 President’s Letter
2 From The Editors’ Desks
3 Message from the Convention Chair
4 Venetoclax: A Novel BCL2 Inhibitor in the Treatment of Relapsed and Refractory Chronic Lymphocytic Leukemia
8 New Drug Update: Defibrotide Sodium (Defitelio) for Hepatic Veno-Occlusive Disease
11 A Comparison of the Antipsychotics Brexpiprazole and Aripiprazole
14 Continuing Education: Resources to Optimize Medication Adherence
22 Practice Spotlight: The Operating Room Pharmacist

Stay Connected with NJPhA

Mission Statement:
To advance the profession of pharmacy, enabling our members to provide optimal care to those they serve.
President’s Letter

As you read this, our Summer Journal 2017, perhaps many of you are on vacation or about to take a well-deserved one. Even during this “quiet” time, be assured that the New Jersey Pharmacists Association, THE voice for all pharmacists and technicians in ALL practice settings and our profession at large, is hard at work diligently preparing for the upcoming fall/winter period.

We are planning to provide focused CE programming throughout the state on timely topics that you have advised were of absolute importance to your practice. Striving to always be worthy of your support and membership, the NJPhA recently held a series of “Providing Value Initiative” meetings where we received suggestions from our membership on how best we can serve their individual needs. It was, I guess, equivalent to a pharmacy profession town hall meeting without the discourse.

We feel that networking among our peers is vital. Our Student Practitioner, New Practitioner, and Social Committees are finalizing +TonicRx meet and greet events at various venues. These are informal get-togethers where the issues of the day are addressed, job opportunities are mentioned, and the different aspects of each of our practice settings (pro and con) can be compared. I have personally implored our students and recent graduates to keep an open mind and explore any opportunity that might come across their path that may, at first, glance seem totally out of their comfort level. A pharmacist’s education allows different challenges to be explored and to be taken head on.

The NJPhA convention committee is now putting the final touches on this, our 147th Annual Convention, October 13-15 at Harrah’s Hotel and Casino in Atlantic City! We have three days crammed full of CE, various certificate programs and, of course, social events. If you have not as yet registered, please go online to njpharmacists.org. Our very appropriate convention theme this year is “STAND UP AND SPEAK OUT.” The NJPhA, via our Government Affairs Committee, and our lobbyist, stand up and speak out on your behalf year-round on the issues that benefit us all, and against those issues that consistently do otherwise. Now we need your help in this effort. To learn more about our advocacy efforts, legislative achievements, and how you can assist in these efforts, I refer you again to the NJPhA website.

Enjoy the rest of your summer. I look forward to seeing you in the months ahead.

Ronald J. Mannino, RPh
President

From The Editors’ Desks...

Dear Colleagues,

Salutations! Thank you for your continued support for the New Jersey Journal of Pharmacy – the official peer-reviewed journal of the New Jersey Pharmacists Association. The Journal Committee is excited to see an increased number of article submissions. Please keep them coming!!! It is our hope that you enjoy the summer edition of our journal.

Please consider becoming active in the development of the New Jersey Journal of Pharmacy, through either submission of an article, being the spotlight in pharmacy or becoming a peer-reviewer. If interested, please reach out to Elise Barry, one of the NJPhA officers, or us. You may email ideas and submissions to marcella.r.brown@gmail.com or j.kalabalik@gmail.com. We can help you with a topic consideration for the journal.

We wanted to say how much we enjoy reading the manuscripts and look forward to your submissions!

Marcella R. Brown, BS, MS, PharmD, MPH, CGP, BCACP
Julie Kalabalik, PharmD, BCPS, BCCCP
Co-editors of the New Jersey Journal of Pharmacy

We are grateful to the experts that review the submissions. Their recommendations greatly contribute to the quality of The New Jersey Journal of Pharmacy.

The Journal wishes to acknowledge the following pharmacists who participated in peer review for this issue:

Marlene Battle, PharmD, MS, BS
Brian Catton, PharmD
Mei H. Chang, BA, PharmD, BCPS-AQID
John L. Colaizzi, BSPharm, Ph.D.
Connie M. Garcia, PharmD, MSP, C.Ph.
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Christine Lam, PharmD, BCPS, CDE
Maria Leibfried, BS, PharmD, BCNSP
Alexandra Libman-Falbaum, PharmD
Stand Up-Speak Out…
To patients. To legislators. To healthcare decision makers.

It is my great pleasure to invite you to the 147th convention of the New Jersey Pharmacists Association. The convention this year has been planned by a group of pharmacists with diverse backgrounds and experience, and I am very grateful for their contributed ideas and activities. We put together a program that provides educational lectures and interactive learning experiences designed to inspire and enhance our ability to communicate as pharmacists with patients, legislators and each other.

The schedule starts on Friday morning with four certificate classes well-designed to increase our knowledge and ability to practice pharmacy. On Friday afternoon, convention programming begins with clinical and regulatory programs including an overview of the legal prescribing and dispensing of control substances and a pharmacists’ update on CMS mega-rule as it pertains to pharmacists in long-term care. As part of our annual meeting, NJPhA committee chairs will recap activities over the past year, take questions and lead discussion on the many ways members can be involved in the coming year. After, we will spend time networking with old friends and new, as we gather socially for our Welcome Reception.

Our Saturday programming will be particularly exciting. I am thrilled to announce that our keynote speaker is the original Pharmacist Advocate, educator, and Remington Medalist, Dan Hussar. Our legislative counsel, Laurie Clark, will moderate an interactive program to help us learn how to communicate our experiences and opinions to lawmakers in a mock legislative hearing. Sara and Jack Gorman, authors of “Denying the Grave. Why We Ignore the Facts that Will Save Us” will help us improve our patient communication skills by developing an understanding of the thought processes that make it difficult for many people to accept truths established through research. Education will also include a detailed program on pharmacists’ use of naloxone to protect patients.

Come join our sponsors in the Exhibit Hall, and check out the poster session with available CE credit! Support our PAC through the annual basket auction stationed at the reception desk. In addition, you can make a PAC donation and sit for a new headshot!

On Sunday, we will examine the complex process through which new drugs are developed, tested and approved. Additional programming will help pharmacists gain an understanding of the opioid crisis, and rationale and implications of The Opioid Treatment and Addiction Prevention Act.

At our Sunday luncheon, we will celebrate the accomplishments of NJPhA members who will receive awards and recognition for outstanding service to the public, their patients, the association and the practice of pharmacy. This will include introducing and swearing in our officers for 2018. It is our opportunity to thank members who have given of their time and expertise for the benefit of others.

Throughout the convention, you will find programs designed to help healthcare professionals understand the opioid epidemic and addiction, with the focus on ways that pharmacists can help the patients we vow to protect. We will learn how to communicate with legislators and stand up for our opinions and values. Join us at convention and learn how you can help shape the future of pharmacy.

NJPhA 2017 Convention Committee

We are grateful for the Convention Committee’s time and attention in the planning of a stellar 147th meeting and convention.

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Carrie Corboy Maurice Lobo
Grace Earl The NJPhA Officers
Osama El-Helw Ahmed Selevany
Brittany Harris Lou Spinelli
Venetoclax: A Novel BCL2 Inhibitor in the Treatment of Relapsed and Refractory Chronic Lymphocytic Leukemia

Shreya Mehta, Pharm D and MHS Regulatory Sciences Candidate 2018
Dr Anna Dushenkov, BS Pharm, Pharm D, BCPS

Introduction
Leukemia is cancer of the bone marrow, that is the site for production of blood cells. Approximately 340,000 people in the United States live with leukemia.1 These cancers are divided into four categories: Acute Lymphoblastic Leukemia (ALL), Acute Myeloid Leukemia (AML), Chronic Myeloid Leukemia (CML), and Chronic Lymphocytic Leukemia (CLL). Their common feature is uncontrolled division and accumulation of blood cells in the marrow cavity. According to the American Cancer Society, there are about 62,000 new cases of leukemia and among these there are 20,000 new cases of CLL diagnosed. Chronic lymphocytic leukemia is a common malignancy in adults, most frequently diagnosed among people aged 65 to 74.1 The BCL2 inhibitor, venetoclax (Venclexta®), has been studied to treat relapsed and refractory CLL, alone, as well as in combination with rituximab. This review will incorporate pharmacology, efficacy, safety and current place in therapy of the novel BCL2 inhibitor venetoclax.

Pathogenesis of CLL
CLL is a form of non–Hodgkin’s Lymphoma (NHL) that affects B-cells.2 Like most cancers, one of the core roots of pathology for the development of CLL is the disruption of apoptosis, that is, programmed cell death, which is required for homeostasis. The process of apoptosis is regulated by proteins known as caspases. B-cell lymphoma 2 (BCL2) proteins regulate and delimit the activation of caspases. BCL2 proteins preclude polymerization of BAX or BAK, the apoptotic proteins in the mitochondrial membrane, that once polymerize trigger the release of cytochrome C, which in turn initiates biochemical reactions leading to apoptosis. Hence, BCL2 proteins impair the pathway that impedes apoptosis.3

CLL is characterized by accumulation of cancerous CD5+ and CD23+ B-cells. Chromosomal abnormalities in these B-cells trigger the BCL2 oncogene, leading to its overexpression.4 In the majority of CLL patients, the promoter region for BCL2 gene is hypo-methylated, which contributes to increased transcription and BCL2 protein expression in CLL.4

Mechanism of Action
Kinase inhibitors (KI) are the preferred agents in treatment of CLL. These drugs act on the B-cell receptors (BCR) specifically on Bruton’s tyrosine kinase (BTK), a signaling molecule of the BCR and cytokine receptor pathway. BTK signaling activates downstream pathways, that lead to cell survival and proliferation. The biggest challenge in the use of this class of agents is specificity – suppressing the activity of disease-causing kinases without affecting wild-type kinases that are needed to preserve healthy cellular functioning, which is necessary in order to mitigate side effects.5 Unfortunately, because the catalytic domains are very similar, precise specificity is not often possible.

Venetoclax is first in-class molecule, that targets BCL2 and inhibits the anti-apoptotic actions of BCL2. Venetoclax exerts this action by mimicking the BH3- only proteins, that inhibit the anti-apoptotic actions of BCL2, and activate BAX and BAK. Venetoclax is a selective inhibitor of BCL2, and it does not inhibit other proteins from the family (e.g., BCL-XL) that, in turn, prevents it from exhibiting toxic effects in platelets, confining its cytotoxicity to malignant B-cells.6 The schematics of venetoclax’s mechanism of action are depicted in Figure 1.

Methods
A literature search was conducted using key words ‘venetoclax,’ ‘relapse or refractory CLL,’ or ‘17p deletion’ in PubMed/ Medline full text. Other search terms included other drugs in current therapy of CLL, and allogenic stem cell transplantation. Also, articles from the bibliography of the searched articles were reviewed. The search focused on primary research articles, treatment guidelines, and national cancer statistics.
Pharmacokinetics
In the presence of food, venetoclax reaches maximum plasma concentrations within five to eight hours of administration. The exposure of venetoclax is highly affected by fat content in food. Low fat food increased exposure by 3.4 fold, while a high fat meal increased exposure approximately five fold. The elimination half-life of venetoclax is 26 hours. Venetoclax is highly protein bound and >99.9% is excreted in feces. Table 1 includes a summary of pharmacokinetics considerations with venetoclax.7

Table 1: Overview of pharmacokinetics of venetoclax7

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Venetoclax</th>
</tr>
</thead>
<tbody>
<tr>
<td>Absorption (at 400 mg once daily dose)</td>
<td>C&lt;sub&gt;max&lt;/sub&gt;: 2.1 ± 1.1 μg/mL</td>
</tr>
<tr>
<td></td>
<td>AUC: 32.8 ± 16.9 μg•h/mL</td>
</tr>
<tr>
<td></td>
<td>T&lt;sub&gt;max&lt;/sub&gt;: 5-8 hours</td>
</tr>
<tr>
<td>Food Effect</td>
<td>3.4 fold increased exposure</td>
</tr>
<tr>
<td>Low fat meal</td>
<td>5 fold increased exposure</td>
</tr>
<tr>
<td>High fat meal</td>
<td></td>
</tr>
<tr>
<td>Distribution</td>
<td>Highly protein bound (blood to plasma ratio: 0.57)</td>
</tr>
<tr>
<td>Metabolism</td>
<td>Predominately CYP 3A4/5</td>
</tr>
<tr>
<td>Elimination</td>
<td>Half-life : 26 hours</td>
</tr>
<tr>
<td>Excretion</td>
<td>&gt; 99.9% feces</td>
</tr>
<tr>
<td>Drug-drug interaction</td>
<td></td>
</tr>
<tr>
<td>• Strong CYP 3A4 inhibitor (Ketoconazole)</td>
<td>2.3-fold increase</td>
</tr>
<tr>
<td>• Strong CYP 3A4 inducer (Rifampin)</td>
<td>42% decrease</td>
</tr>
<tr>
<td>• Gastric acid reducing agents</td>
<td>No effect</td>
</tr>
<tr>
<td>• Warfarin</td>
<td>18-28 % increase</td>
</tr>
</tbody>
</table>

Efficacy
Venetoclax was initially approved by the Food and Drug Administration (FDA) in 2016 based on a Phase 2 study presented at the American Society of Hematology in 2015. This clinical trial was based on a Phase 1 clinical trial that showed patients receiving venetoclax achieved higher than expected response rates in relapse or refractory CLL.8 The Phase 2 study included 107 patients with relapse or refractory CLL with 17p deletion, 70 of whom completed the trial. A response was achieved in 54 (77%) of the 70 patients and 11 patients (10% of 107 enrolled patients) achieved complete remission or complete remission with incomplete recovery of blood counts and nodular partial remission.9

Later, a Phase 1 B study was designed to assess safety, activity and pharmacokinetics of venetoclax combined with rituximab, a CD20-directed monoclonal antibody that is approved for the treatment of patients with NHL and CLL. The study enrolled 49 patients with relapsed or refractory CLL. Venetoclax was dosed weekly using a stepwise dose escalation ranging from 200 mg to 400 mg. Rituximab was given one week after each venetoclax dose. Responses were observed in 42 (86%) patients, which included 25 (51%) patients with complete response or complete response with incomplete bone marrow recovery. The median time for complete response was 9.2 months with the combination therapy.10 The study concluded that venetoclax and rituximab can be combined safely without any modifications in the dose of venetoclax to achieve higher response rates and a longer duration response.10

Thus, venetoclax, alone, or in combination with other targeted drugs for CLL, can produce significant responses. Currently, several clinical trials are in progress that aim to evaluate the combination of venetoclax with previously approved chemotherapeutic agents, including ibrutinib, obinutuzumab, and bendamustine.11

Safety
The first in-human study of venetoclax was designed to obtain the maximum tolerated dose and establish safety of venetoclax in patients with relapsed or refractory CLL/SLL (small lymphocytic leukemia) or non-Hodgkin’s lymphoma. A total of 116 patients were enrolled in the study, which included 56 patients in the dose escalation cohort and 60 patients in the expansion cohort. Tumor Lysis syndrome (TLS) was observed in ten patients out of 56 in dose-escalation cohort, 70 of whom completed the trial. A response was achieved in 54 (77%) of the 70 patients and 11 patients (10% of 107 enrolled patients) achieved complete remission or complete remission with incomplete recovery of blood counts and nodular partial remission.9

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The most common adverse reactions of grade 1 or 2 severity were diarrhea and nausea, which were self-limited. Neutropenia was the most common grade 3 or 4 adverse event, observed in 48 (41%) patients. Febrile neutropenia was the most common severe adverse event (SAE) which was observed in seven (6%) patients. Other SAEs were pneumonia, immune thrombocytopenia and upper respiratory tract infections. Febrile neutropenia was the most common severe adverse event (SAE) which was observed in seven (6%) patients. Other SAEs were pneumonia, immune thrombocytopenia and upper respiratory tract infections.7 A pooled analysis of adverse events of venetoclax showed that neutropenia was the most common adverse event of any grade followed by diarrhea, nausea, anemia, thrombocytopenia, and upper respiratory tract infections, all of which were observed in >20% (n = 240) of the patients.7
Table 2: Recommended prophylaxis for TLS associated with venetoclax based on tumor burden

<table>
<thead>
<tr>
<th>Tumor burden</th>
<th>Prophylaxis</th>
<th>Monitoring of TLS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low (All LN &lt;5 cm and ALC &lt;25 x 10⁹/L)</td>
<td>Hydration: oral 1.5 to 2 L OR allopurinolb</td>
<td>Outpatient: • Pre-dose, 6 to 8 hours, 24 hours after first dose of 20 mg and 50 mg • Pre-dose and subsequent monitoring at ramp-up doses</td>
</tr>
<tr>
<td>Medium (Any LN 5 cm to &lt;10 cm) or ALC ≥25 x10⁹/L</td>
<td>Hydration: oral 1.5 to 2 L and consider additional intravenousa or allopurinolb</td>
<td>Outpatient: • Pre-dose, 6 to 8 hours, 24 hours after first dose of 20 mg and 50 mg • Pre-dose and subsequent monitoring at ramp-up doses • Consider hospitalization for patients with CrCl &lt; 80 ml/min at first 20 mg and 50 mg dose and monitoring in hospital</td>
</tr>
<tr>
<td>High (Any LN &gt;10 cm or ALC ≥ 25x10⁹/L and LN ≥ 5 cm)</td>
<td>Hydration: Oral 1.5 to 2 L and intravenous (150-200 ml/hr) or allopurinolb or consider rasburicase (if baseline uric acid is elevated)</td>
<td>Inpatient: • At first dose of 20 mg and 50 mg Pre-dose, 4, 8,12 and 24 hours Outpatient: • Pre-dose and post-dose after subsequent ramp-up doses, 6 to 8 hours, and 24 hours</td>
</tr>
</tbody>
</table>

LN: Lymph node, ALC: Absolute lymphocyte count

a Intravenous hydration for patients who cannot tolerate oral hydration

b Start allopurinol or rasburicase 2 to 3 days prior to starting venetoclax

**Place in therapy**

National Comprehensive Cancer Network (NCCN) guidelines for CLL include ibrutinib as first-line treatment for relapsed/refractory CLL with 17p deletion. Other treatment options include: (1) venetoclax, (2) venetoclax plus rituximab, (3) idelalisib, (4) idelalisib plus rituximab, (5) lenalidomide, and (6) lenalidomide plus rituximab. Approval of venetoclax added a novel oral therapeutic option for patients with relapsed or refractory CLL, before considering hematopoietic stem cell transplantation.

Recently, a retrospective analysis was conducted in 683 CLL patients treated with KI (ibrutinib, idelalisib) or venetoclax. Longer progression free survival was achieved with KI or venetoclax in comparison to chemo-immunotherapy, which included combinations of fludarabine/cyclophosphamide/rituximab and bendamustine/rituximab. Further, patients who received venetoclax achieved higher overall response rate (79%) than those receiving idelalisib (46%). This study laid the foundation for the hypothesis of sequential use of venetoclax after KI failure in order to achieve better outcomes.

The mechanism of action of venetoclax makes it a suitable candidate for other malignancies, in which BCL-2 overexpression is seen. Various clinical studies are underway evaluating efficacy of venetoclax in AML, NHL, relapsed/refractory diffuse large B-cell Lymphoma (DLBCL), and others.

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**References**


New Drug Update: Defibrotide Sodium (Defitelio) for Hepatic Veno-Occlusive Disease

Mirna Hanna, PharmD Candidate 2018
Julie Kalabalik, PharmD, BCPS, BCCCC

Introduction
Hepatic veno-occlusive disease (VOD), also known as sinusoidal obstructive syndrome (SOS), is one of the most common complications in pediatric and adult patients undergoing hematopoietic stem cell transplantations (HSCT). VOD is induced by conditioning regimens of cytotoxic chemotherapeutic agents that are often used prior to HSCT. Chemotherapy damages sinusoidal endothelial cells, which promotes further inflammatory responses, increased coagulation and decreased fibrinolysis. Data have shown a possible association of high dose gemtuzumab ozogamicin (Mylotarg®) and development of VOD. The diagnosis of VOD is based on two clinical standards, the modified Seattle and Baltimore criteria. With the modified Seattle criteria, patients must present with two of the following criteria within 20 days of HSCT: elevated bilirubin levels above 2mg/dL, hepatomegaly or right quadrant pain, and more than 2% weight gain from pre-transplant weight. With the Baltimore criteria, patients must present with elevated bilirubin levels above 2mg/dL within 21 days of HSCT with two of the following: hepatomegaly, ascites, and greater than 5% weight gain from pre-transplant weight.

Approximately 14% of stem cell transplant patients develop VOD. The incidence has been reported in up to 60% in patients at high risk. Multi-organ failure and mortality rates of greater than 80% are found in cases of severe VOD. The mortality rate for patients with moderate VOD is about 20%. Although chemotherapy induced VOD is the most common, other etiologies of VOD exist, some of which are hereditary. Risk factors associated with the development of VOD have been identified and included: 1) ages of less than 6.7 years, 2) history of osteopetrosis, 3) type of conditioning regimen, 4) primary hemophagocytic lymphohistocytosis, 5) pre-existing hepatic disease and 6) adrenoleukodystrophy.

Defibrotide sodium (Defitelio) was approved by the FDA with priority review status as well as orphan drug designation in March 2016 for the treatment of adult and pediatric patients with VOD post-HSCT. This drug is contraindicated in patients who are taking systemic anticoagulants or fibrinolytic agents. Defibrotide has been studied in several clinical trials. A Phase 3, multi-center, open-label, randomized controlled trial investigating the safety and efficacy of defibrotide in patients with VOD and advanced multi-organ failure was conducted by Richardson and colleagues. The primary endpoint was survival past 100 days following HSCT, indicated as day +100. One hundred and two patients, 43% pediatrics and 57% adults, were included. The survival at day +100 post-HSCT was 38% in the defibrotide group versus 25% in the historical group (95.1% CI, 3.5 – 34.6; p=0.0160). Adverse effects included hemorrhage or hypotension.

In a randomized Phase 2 dose-finding trial, investigators evaluated the efficacy and dosing of defibrotide in patients with severe VOD post-HSCT. Adult and pediatric patients were included in lower-dose (25mg/kg/day) or higher-dose (40mg/kg/day) groups. Daily doses were divided every six hours and administered for 14 days or more until complete response. Day +100 post-HSCT survival and complete response rates were similar in both groups, with 46% in the lower dose arm and 42% in the higher dose arm. No significant difference in rate of adverse events was observed between treatment arms.

In a Phase 3, open-label, randomized controlled trial, 356 pediatric patients who had undergone myeloablative conditioning before HSCT and who had at least one risk factor for VOD, were stratified to receive defibrotide prophylaxis or no drug (control group). Incidence of VOD by 30 days post-HSCT was the primary endpoint. Twelve percent of patients in the defibrotide arm developed VOD at Day 30 post-HSCT compared with 20% in the control arm (risk difference – 7.7%, 95% CI -15.3 to -0.1). The rate of adverse events was similar in both groups.

Product Information
The exact mechanism of action for defibrotide remains unclear; however, it protects endothelial cells from injury induced by chemotherapy, perfusion, serum starvation and tumor necrosis factor- (TNF-). Defibrotide also increases fibrinolysis due to its effect of increasing plasmin, decreasing von Willebrand factor, as well as increasing tissue plasminogen activator. These effects contribute to the hydrolysis of fibrin clots and endothelial cell mediated fibrinolysis. The recommended dose of defibrotide is 6.25 mg per kilogram every six hours for at least 21 days, and up to 60 days by intravenous administration. The most common adverse events in pediatric and adult patients are hypotension, diarrhea, vomiting, nausea, hemorrhage and epistaxis. The use of defibrotide is contraindicated in patients who are taking systemic anticoagulants or fibrinolytic agents.
Place in Therapy
Currently, defibrotide is the only FDA-approved drug in the United States for the treatment of hepatic veno-occlusive disease with renal or pulmonary dysfunction following HSCT.10 According to the British Committee for Standards in Haematology and the British Society for Blood and Marrow Transplantation (BCSH/BSBMT) 2013 guidelines on the management of VOD following HSCT, defibrotide is recommended for prophylaxis of VOD in children and adults with risk factors such as: pre-existing hepatic disease, second myeloablative transplant, allogeneic transplant for leukemia beyond second relapse, conditioning with busulphan containing regimens, prior treatment with gemtuzumab ozogamicin, diagnosis of primary haemophagocytic lymphohistiocytosis, adrenoleukodystrophy or osteopetrosis.4 According to the BCSH/BSBMT guidelines, defibrotide is first line for the treatment of VOD in children and adults.

Post Marketing Requirements and Commitments
The FDA required a randomized open-label, multi-center post-approval trial to compare the efficacy and safety of defibrotide compared to current supportive care practices available.13 As part of the FDA approval, the manufacturer must submit an immunogenicity report based on an analysis of anti-defibrotide neutralizing antibodies.

Conclusion
Defibrotide is the only FDA-approved medication for the treatment of veno-occlusive disease in pediatric and adult patients. Defibrotide has shown positive results in clinical trials, increasing the rate of survival more than 100 days after HSCT in VOD patients. A randomized study versus best supportive care is ongoing. This newly-approved drug fills a need for clinicians providing care for patients with VOD following HSCT.

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References:


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A Comparison of the Antipsychotics Brexpiprazole and Aripiprazole

Hamza Sarwar, PharmD Candidate 2018
John L. Colaizzi, BSPharm, PhD

Introduction
Brexpiprazole is a new atypical antipsychotic that was approved by the Food and Drug Administration (FDA) in July 2015, and it is marketed as the brand name product Rexulti®. It is similar in many respects to the older drug, aripiprazole, that was introduced in the U.S. in 2002 as the brand name product Abilify®. The introduction of brexpiprazole coincided with the generic availability of aripiprazole and many of the older second-generation antipsychotics. The FDA approved the first generic versions of aripiprazole in April 2015. Therefore, it has become important for pharmacists and other healthcare professionals to be aware of any potentially significant differences between brexpiprazole and aripiprazole that could affect therapeutic outcomes in patients. Rexulti® and Abilify® are both products of Otuska Pharmaceutical Co. Ltd., with headquarters in Tokyo.

Formulation Considerations
Brexpiprazole exhibits an absolute oral bioavailability of 95%, indicating that it is readily absorbed. A standard high-fat meal has not been shown to alter the Cmax or AUC. Brexpiprazole can be administered with or without food. Aripiprazole is reported to have an absolute oral bioavailability of 87% which indicates that it is also readily absorbed. A standard high-fat meal has been shown to have no measurable effect on Cmax or AUC, but did delay the Tmax by three hours. Aripiprazole can also be administered with or without food.

Rexulti® is available as compressed tablets in six strengths, 0.25 mg, 0.5 mg, 1 mg, 2 mg, 3 mg and 4 mg. Each of the six strengths has a different color for ease of identification, and to avoid dosage errors. Abilify® is similarly supplied in six color-coded strengths of 2 mg, 5 mg, 10 mg, 15 mg, 20 mg, and 30 mg. Both drugs are administered once daily. Abilify® had been available as “discmelt” orally disintegrating tablets (ODTs) in 10 mg and 15 mg strengths, and as an oral solution, 1 mg/mL, but the FDA “Orange Book” indicates that the brand-name products have been withdrawn from the market, although generic formulations of the ODTs and oral solutions are available. Aripiprazole is also available in two strengths as extended-release, long-acting formulations for intramuscular injection. The availability of injectable dosage forms of aripiprazole is a distinct advantage over brexpiprazole because nonadherence to medication is high in patients with schizophrenia. Brexpiprazole is currently only available in compressed tablet dosage forms.

At least 15 different manufacturers supply generic versions of aripiprazole. Thirteen generic versions of each of the six strengths of aripiprazole tablets are listed with “AB” therapeutic equivalence ratings in the “Orange Book,” which indicates that they are immediate-release dosage forms that meet the FDA’s bioequivalence requirements. There are also three generic versions of aripiprazole oral solution with “AA” ratings, indicating that there are no known or suspected therapeutic equivalence problems. Although Abilify® brand of ODTs of aripiprazole have been discontinued, generic versions of ODTs are available.

Indications
Brexpiprazole has FDA-approved indications for schizophrenia and as adjunctive therapy for major depressive disorder (MDD). Oral aripiprazole has the same two indications, but it is also approved for Tourette's disorder, irritability associated with autistic disorder, and acute treatment of manic and mixed episodes of type-one bipolar disorder. Long-acting intramuscular aripiprazole is approved to treat schizophrenia. It is possible that brexpiprazole may be approved for additional indications in the future.

Pharmacology
Brexpiprazole and aripiprazole are partial agonists at dopamine D2 receptors and serotonin 5-HT1A receptors, and they exert antagonist activity at serotonin 5-HT2A receptors. Actions at receptors other than D2, 5-HT1A and 5-HT2A may possibly explain some of the other effects of aripiprazole such as orthostatic hypotension. Brexpiprazole exhibits partial agonist effects with lower intrinsic activity at D2 receptors and stronger antagonism at the 5-HT2A receptors than aripiprazole. These differences in pharmacodynamics suggest the possibility that brexpiprazole could have a lower potential to induce D2–partial agonist-mediated adverse effects such as akathisia, insomnia, restlessness, and nausea. The potential to induce D2 antagonist-like side effects, including extrapyramidal symptoms such as tremors or involuntary muscular twitching, hyperprolactinemia or tardive dyskinesia, is also considered to be lower than with full D2 antagonism. Such differences in the receptor binding and receptor affinity profiles of brexpiprazole and aripiprazole could theoretically result in a lower incidence of neuromotor adverse effects and sedation effects with brexpiprazole. However, since brexpiprazole has not been directly compared with aripiprazole in clinical studies, it is too early to know for certain whether brexpiprazole results in a clinically significant improvement in terms of adverse side effect profile.

Warnings, Precautions, and Adverse Effects
The FDA-approved labeling for both brexpiprazole and aripiprazole includes the same black box warnings. These warnings pertain to increased mortality in elderly patients with dementia-related psychosis, and suicidal thoughts and behaviors in patients up to 24 years old. Neither product has a notable contraindication, except the usual contraindication, about patients with known hypersensitivities. Both products have similar warnings and precautions related to cerebrovascular adverse reactions in elderly patients with dementia.
related psychosis; neuroleptic malignant syndrome; tardive dyskinesia; metabolic changes including hyperglycemia, dyslipidemia, and weight gain; leukopenia, neutropenia and agranulocytosis; orthostatic hypotension; falls; seizures; body temperature dysregulation; dysphagia; and potential for cognitive and motor impairment that may require that patients be cautioned about driving or operating hazardous machinery. One item that is included in the “warnings and precautions” section for aripiprazole that does not appear for brexpiprazole has to do with a risk of pathological gambling, and other compulsive behaviors that have been suggested in post-marketing case reports. Brexpiprazole does not appear to have an increased risk of pathological gambling and other compulsive behaviors. Both agents have similar adverse effect reaction profiles, but aripiprazole has additional side effects of nausea, vomiting, constipation, headache, dizziness, akathisia, anxiety, and insomnia.

Drug Interactions and Metabolism
Brexpiprazole is affected by strong CYP3A4 inhibitors such as clarithromycin, fluconazole, itraconazole, and ketoconazole, and by strong CYP2D6 inhibitors such as duloxetine, fluoxetine, paroxetine and quinidine. Clinically significant interactions between such CYP-enzyme inhibitors and brexpiprazole would require a reduction in the dose of brexpiprazole. Another potentially significant drug-drug interaction for brexpiprazole involves strong CYP3A4 inducers (e.g., carbamazepine, rifampin, St. John’s wort), in which case the dose of brexpiprazole may need to be increased. Clinically important drug-drug interactions for aripiprazole include the same interactions as described for brexpiprazole. However, the FDA-approved labeling for aripiprazole also mentions the possibility of a clinically important interaction between aripiprazole and antihypertensive drugs due to the alpha-adrenergic antagonism effect of aripiprazole. The recommendation is that blood pressure should be monitored, and a dosage adjustment of the antihypertensive drug(s) should be made, if necessary. No such mention of an interaction with antihypertensive drugs appears in the approved labeling for brexpiprazole, although one might assume that a similar admonition could apply. Approved labeling for aripiprazole also notes the possibility of an interaction with benzodiazepines, such as lorazepam, that could cause an enhancement of the sedation effect and increase the risk of orthostatic hypotension, requiring an adjustment of the dose of the benzodiazepine. Whether these potential interactions involving benzodiazepines or antihypertensive medications will eventually be added to the approved labeling for brexpiprazole remains to be seen, but some caution might be warranted when administering brexpiprazole with such drugs.

As is apparent from the information for drug-drug interactions, both brexpiprazole and aripiprazole undergo hepatic metabolism via CYP-enzymes, the major subtypes being CYP3A4 and CYP2D6. FDA-approved labeling for brexpiprazole recommends that dosage reduction could be needed when administering brexpiprazole to patients who are poor CYP2D6 metabolizers. Dosage reductions are also recommended for patients who have hepatic or renal impairment. Dosage adjustments recommended for aripiprazole pertain to dosage reductions for patients who are known to be poor CYP2D6 metabolizers.

Special Populations
Brexpiprazole has not been studied in pregnant women and pediatric patients. Aripiprazole has been classified as pregnancy Category C. Neonates exposed to aripiprazole during the third trimester of pregnancy are at risk for extra-pyramidal and/or withdrawal symptoms. Aripiprazole is present in human breast milk, and because of the potential for adverse effects in nursing infants, it is advisable either to discontinue nursing or discontinue the drug, depending on the importance of aripiprazole therapy to the mother. The safety and effectiveness of aripiprazole have been established in pediatric patients who are being treated for schizophrenia, bipolar mania, irritability associated with autistic disorder, and Tourette’s disorder. The safety and efficacy of aripiprazole has not been established in pediatric patients with MDD or agitation associated with schizophrenia or bipolar mania.

Summary and Conclusion
The choice between aripiprazole and brexpiprazole in prescribing decisions needs to take into account any clinically significant differences between these two drugs which share many similarities. Comparative advantages of the older drug aripiprazole include its availability in dosage formulations beyond oral tablets. ODT and oral solution forms of aripiprazole are available for patients who have difficulty swallowing tablets, and long-acting extended-release intramuscular aripiprazole is a valuable option for patients who present nonadherence problems. Aripiprazole also has FDA-approved indications for conditions beyond schizophrenia and MDD, including Tourette’s disorder, autistic disorder and type one bipolar disorder. Aripiprazole has been classified as pregnancy Category C by the FDA, and the safety and efficacy of aripiprazole has been proven in pediatric patients. Brexpiprazole has not been studied in pregnant women or pediatric patients.

The differences in the pharmacologic activity of brexpiprazole compared to aripiprazole suggest the possibility that brexpiprazole could have a lower potential to produce a number of adverse side effects including akathisia, insomnia, restlessness, nausea and extrapyramidal symptoms such as tremors, twitching, hyperprolactinemia and tardive dyskinesia. Aripiprazole includes warnings and precautions concerning the risk of compulsive behaviors and pathological gambling based on post-market cases. Post-marketing surveillance has not shown this to be a risk with brexpiprazole. Clinically significant drug-drug interactions for aripiprazole involve antihypertensive drugs, as well as benzodiazepines, while these interactions are not reported for brexpiprazole.

In an evaluation of brexpiprazole shortly after its introduction in 2015, “The Medical Letter on Drugs and Therapeutics” noted that brexpiprazole was effective in reducing symptoms of schizophrenia and depression, and that it was generally well tolerated with relatively mild metabolic adverse effects. However, it also noted that there were no clinical studies di-
rectly comparing brexpiprazole with aripiprazole or with other antipsychotics. The Medical Letter article concluded that “there is no reason to prescribe brexpiprazole over generic aripiprazole, which has a much longer record of efficacy and safety and should cost much less.” Nonetheless, in the same article, it is pointed out that “patients who do not respond to one antipsychotic may respond to another.” For example, based on the differences in pharmacodynamics, patients who experience adverse effects from aripiprazole may be able to tolerate brexpiprazole. Therefore, brexpiprazole appears to be a valuable addition to the list of second-generation antipsychotic medications.

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10Brexpiprazole (Rexulti) for schizophrenia and depression. Med Lett Drugs Ther. 2015; 57 (1475): 116-118.

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Resources to Optimize Medication Adherence

Sibyl M. Cherian, PharmD; Christine Lam, PharmD, BCPS
Clinical Assistant Professors, Fairleigh Dickinson University
Rupal Mansukhani, PharmD
Clinical Assistant Professor, Ernest Mario School of Pharmacy, Rutgers University

Learning Objectives:
After participating in this activity, the participant shall be able to:

Pharmacist:
1. Identify barriers to medication adherence
2. Describe management systems and accountability system for coupons, vouchers and patient assistance program
3. Describe different strategies for improving patient education

Pharmacy Technician: (if applicable to article)
1. List common medication adherence barriers
2. Describe coupon options, vouchers and patient assistance programs
3. Explain patient education strategies

Author disclosures: None
UAN: 0136-0000-17-019-HO4-P; 0136-0000-17-019-HO4-T
CEU Hours: 1.0 contact hour of continuing education credit (0.1 CEU)
Activity Type: Knowledge-based

Introduction to Medication Adherence
Former US Surgeon, C. Everett Coop, best summarizes medication non-adherence in the following quote: “drugs don’t work in patients who don’t take them.” Unfortunately, this is the painful truth in healthcare worldwide. The World Health Organization (WHO) reports that “adherence to long-term therapy for chronic illnesses in developed countries average 50%.” In the United States, the rate of medication adherence drops after the first six months.3

Patients face many barriers when taking medications. The breakdown of medication adherence can begin in a provider’s office. Patients can decide not to fill a prescription, take their medication incorrectly, or even discontinue medications.4 Some examples of common barriers to medication adherence that are under the patients’ control. These include forgetfulness, conflicting priorities, deciding to omit doses, emotional factors, and lack of information.5 Healthcare providers can contribute to patients’ non-adherence in various ways. They may inadequately explain the risks and benefits of the medications. Healthcare providers may also prescribe a complex regimen, fail to consider their patients’ lifestyles, or even the cost of the medications. In order to improve the patient’s ability to follow a medication regimen, all potential barriers must be addressed.

Healthcare professionals can help improve adherence (Table 1) by optimizing dose schedule, educating patients, and enhancing communication with their patients.1,4 Optimizing patients’ dosing schedule includes switching to once daily dosing if possible, and encouraging adherence aid use (Table 2). Furthermore, healthcare
professionals should take into consideration patients’ schedules when recommending a medication regimen.\textsuperscript{7} Patient education about their disease state and medication therapy can further enhance medication adherence.\textsuperscript{6,7} After communicating healthcare information, clinicians can utilize the teach-back method to check patient understanding by asking them to reiterate the information in their own words.\textsuperscript{8}

Medication adherence may also be affected by other factors including medication access, transportation, and health literacy. These factors will be outlined in further detail throughout this article.

<table>
<thead>
<tr>
<th>Table 1. Methods to improve medication adherence</th>
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<tbody>
<tr>
<td><strong>Optimize dosing regimen</strong></td>
</tr>
<tr>
<td>• Switch to once daily dosing</td>
</tr>
<tr>
<td>• Adjust timing, dosage, and frequency</td>
</tr>
<tr>
<td>• Adherence aids</td>
</tr>
<tr>
<td><strong>Patient education</strong></td>
</tr>
<tr>
<td>• Provide clear instructions</td>
</tr>
<tr>
<td>• Reinforce discussion (teach-back method)</td>
</tr>
<tr>
<td><strong>Patient and healthcare professional relationship</strong></td>
</tr>
<tr>
<td>• Assess patients’ priorities and needs</td>
</tr>
<tr>
<td>• Address perceived barriers of taking medications</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Table 2. Adherence aids</th>
</tr>
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<tbody>
<tr>
<td>Medication manager apps (free and available for iOS and Android)</td>
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<tr>
<td></td>
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<tr>
<td></td>
</tr>
<tr>
<td>Cellphone reminders</td>
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<tr>
<td>Pillboxes</td>
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</table>

MEDICATION ACCESS
One of the many reasons patients may have trouble with medication adherence is due to the cost of prescription medications.\textsuperscript{9} This may have massive adverse consequences on public health and total healthcare cost.\textsuperscript{10} In this section, we will outline some of the current medication access programs that are available for patients who have problems with the affordability of prescription medications.

Pharmacy Savings Programs
Most community pharmacies offer some form of a prescription savings program or generic medication lists for patients who are unable to afford their medications.\textsuperscript{10} This is often a quick way to save on prescriptions because most pharmacies do not require membership fees or a waiting period. Table 3 lists the various types of programs that are currently available at community retail pharmacies. This list is not all-inclusive and it is important to contact the particular pharmacy to find out about any prescription savings plans. It is important to bear in mind these savings are subject to change at the discretion of the participating retail pharmacy. Furthermore, the online available lists for qualifying medications may not be current and up to date. It is important for patients to speak to a retail pharmacist for the most accurate information.

<table>
<thead>
<tr>
<th>Table 3: Pharmacy Savings Programs*</th>
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<tbody>
<tr>
<td><strong>WALMART</strong>&lt;br&gt;KROGER&lt;br&gt;WEGMANS</td>
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<tr>
<td><strong>RITE AID</strong></td>
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NJPhA Continuing Education Activity  
Audience: Pharmacists

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<tbody>
<tr>
<td></td>
<td>✓ $9.99 for 30 day supply and $15.99 for 90 day supply</td>
</tr>
<tr>
<td></td>
<td>✓ Select generic oral contraceptives for $19.99</td>
</tr>
<tr>
<td></td>
<td>✓ A 50-count of Rite Aid TRUEtest diabetic test strips for $29.99</td>
</tr>
<tr>
<td>CVS</td>
<td>✓ NLC Prescription Discount Card &amp; Easy Drug Card</td>
</tr>
<tr>
<td></td>
<td>✓ Discounts only available at participating pharmacies</td>
</tr>
<tr>
<td></td>
<td>✓ Average savings of 24% off the full retail cost of prescription medication</td>
</tr>
<tr>
<td>WALGREENS</td>
<td>✓ Membership fee required ($20 individual and $35 family per year)</td>
</tr>
<tr>
<td></td>
<td>✓ Tiered savings/90 days: Tier 1 ($10); Tier 2 ($20); Tier 3 ($20)</td>
</tr>
<tr>
<td></td>
<td>✓ Medicare, Medicaid and other federal or state healthcare programs are ineligible</td>
</tr>
<tr>
<td>STOP AND SHOP ACME†</td>
<td>✓ $3.99 for a 30-day supply and $9.99 for a 90-day supply of select generics</td>
</tr>
<tr>
<td>COSTCO</td>
<td>✓ Must be Costco member</td>
</tr>
<tr>
<td></td>
<td>✓ Estimated between 2% to 40% savings and determined at time of sale</td>
</tr>
<tr>
<td>SHOPRITÉ</td>
<td>✓ Free diabetes medications (metformin and sulfonylureas)</td>
</tr>
<tr>
<td></td>
<td>✓ “4Dollar Drugs”: $3.99 for a 30-day supply and $9.99 for a 90-day supply</td>
</tr>
<tr>
<td>SAM’S CLUB</td>
<td>✓ Must be Sam’s club member</td>
</tr>
<tr>
<td></td>
<td>✓ Free 30 day supply of donepezil, escitalopram, pioglitazone, vitamin D 50,000 units (4 capsules), finasteride</td>
</tr>
<tr>
<td></td>
<td>✓ 200 generic prescriptions for $4/30 days</td>
</tr>
<tr>
<td></td>
<td>✓ 400 generic prescriptions for $10/30 days</td>
</tr>
<tr>
<td></td>
<td>✓ 10-30% on select name-brand prescriptions</td>
</tr>
</tbody>
</table>

*All information obtained through respective pharmacy websites and may be subject to change
†Prices may be higher in CA, HI, MT, PA, TN and WI
‡Target is now operating under CVS/Caremark and does not honor previous savings program
§Requires annual fee of $11.99

**Pharmacy Coupons**

In addition to pharmacy savings programs, there are numerous drug coupons that are available. Drug coupons, from either manufacturers or non-profit organizations, can make expensive brand-name prescription medications more affordable. These coupons are not considered insurance, can vary in their average savings and are frequently changing. Some available savings coupons include National Association of Counties (NACo) Prescription Discount Program, RxSavingsPlus, and AAA Prescription Savings. Many drug coupons are available through drug online searches. Other websites, such as www.goodrx.com and www.wellrx.com, offer prescription discount cards and prescription drug price comparisons at local pharmacies.

**Patient Assistant Programs**

Patient assistance programs (PAPs), or medication assistance programs, are pharmaceutical company plans that provide brand name medications to low-income, uninsured, or underinsured patients at a reduced cost or for free. Every program may differ in specific eligibility requirements but typically patients must meet these requirements:

1. United States residency (some may require that the patient is a legal resident or U.S. citizen)
2. Prescription issued by a healthcare provider
3. Health insurance without prescription coverage provisions – patients must not have any public or private insurance (Medicare, Medicaid, Veteran’s benefits, or any state-supported prescription assistance program)
4. Limited income - each company has specific income eligibility
5. Chronic medication needs – the process of PAP may take weeks so it may be inappropriate for patients with acute conditions

While the application process can be complex, it can be broken down into five steps:11,12
1. Find PAP form – most application forms are located on the pharmaceutical company’s website.
2. Fill out PAP form – it is also important to keep a copy of the completed form before sending it out.
3. Send out PAP form – check on the company’s website to see how the manufacturer accepts form.
4. Obtain PAP drug – if approved, medications are usually sent to the provider’s office or local pharmacy for distribution. Patients may receive 30-180 day supply.
5. Drug is dispensed from the patients’ pharmacy or sent directly to patient via mail
6. Refills – new application may need to be submitted

PAPs are a great resource for medication access but present some challenges. Many programs may require patients to have a social security number, which may be a barrier to non-citizens/residents. Requirements for PAPs change frequently due to company merges, state and federal regulations, or expired patents; therefore, it is important to check the website for the most up to date form. Filling out the form may be time consuming due to its complicated instructions, detailed documentation requirements, and prolonged waiting period to receive medications (about 4-6 weeks).11 This is why PAPs should generally be used for prescribing chronic medications. Despite all of these challenges, PAPs may still have numerous benefits to the patients that qualify for the programs. Similar to the pharmacy saving programs, these PAPs are subject to change at the discretion of the manufacturer.

Table 4 identifies several databases to search for PAPs. These online lists can be used to help identify the manufacturer company of a specific drug. It is important to look on the manufacturer’s website because these online available lists may be subject to change.

<table>
<thead>
<tr>
<th>Table 4. Comprehensive database to search for patient assistance programs</th>
</tr>
</thead>
<tbody>
<tr>
<td>NeedyMeds (<a href="http://www.needymeds.org">www.needymeds.org</a>)</td>
</tr>
<tr>
<td>Partnership for Prescription Assistance (<a href="http://www.pparx.org">www.pparx.org</a>)</td>
</tr>
<tr>
<td>Patient Assistance Program Center (<a href="http://www.rxassist.org">www.rxassist.org</a>)</td>
</tr>
<tr>
<td>RxHope (<a href="http://www.rxhope.com">www.rxhope.com</a>)</td>
</tr>
</tbody>
</table>

340B Drug Pricing Program

The 340B program, created under Section 602 of the Veterans Health Care Act of 1992, requires drug manufacturers to provide discounts on expensive outpatient drugs to healthcare providers.13 The only products that are not covered under the 340B program are drugs without a National Drug Code (NDC) number, inpatient drugs and vaccines, and drugs not directly reimbursed by a payer.14 These healthcare providers, also known as Covered Entities (CEs), are then able to provide these medications to vulnerable patient populations.15 Typically hospitals or non-hospital centers that qualify for this program provide care and service to low-income individuals who do not qualify for Medicaid or Medicare.15 Some examples of non-hospital centers include Ryan White Act Part A, Part B, and Part C programs.16 A list of these covered entities can be found on the HRSA Office of Pharmacy Affairs 340B database. Once the Office of Pharmacy Affairs (OPA) approves these facilities as covered entities, they can start to receive discounts on all covered outpatient drugs.15

Not all patients can receive medications through this program. In August 2015, eligibility requirements were changed for 340B purchased drugs. Patients need to meet three criteria:17
1) Covered entity has an established relationship and maintains records of care
2) Patient receives healthcare services from healthcare professional employed/contracted with covered entity
3) Patient receives healthcare consistent with range of services from the covered entity
Patients have to meet all three criteria in order to be eligible for this program. This is one way that hospitals and non-hospital facilities can help patients obtain expensive medications.

HEALTH LITERACY

Functional health literacy is “the ability to read, understand and act on health information,” which includes prescription labels, appointment slips, health insurance paperwork, and diagnostic test instructions. According to the Program for the International Assessment of Adult Competencies (PIAAC), 67% of patients between 66 to 74 years old were at level three or below health literacy proficiency. At a level three or below, patients could not understand information that may be complex or in unfamiliar contexts. Patients also could not perform tasks that involved understanding of arguments or communicating rationalized explanations to answers.

Poor health literacy can lead to negative health outcomes. Patients with lower-level reading are three times more likely to experience adverse outcomes than those who read at higher levels. Furthermore, patients with poor health literacy may be hospitalized more frequently. In a study conducted in an urban public hospital, patients with inadequate health literacy, as defined by the short version of the Test of Functional Health Literacy in Adults, had double the number of hospitalizations when compared to patients with adequate literacy.

Healthcare practitioners can improve educating patients with poor health literacy by asking open-ended questions, using simple language, and providing written information (Table 5). Health literacy can also be improved by ensuring patients and caregivers are given easy-to-read materials. There are several tools, highlighted in Table 6, which are available to improve the readability of medical materials.

| Table 5. Strategies for Improving Patient Education

<table>
<thead>
<tr>
<th>Communication</th>
<th>Written Materials</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduce yourself clearly and greet patient by name</td>
<td>Prepare written materials at a 5th grade reading level</td>
</tr>
<tr>
<td>Create an environment open to learning</td>
<td>Tailor material to patient by including the patient’s name</td>
</tr>
<tr>
<td>Obtain consent from patient and ask if family member or caregiver would like to listen</td>
<td>Use one or two syllable words and short sentences</td>
</tr>
<tr>
<td>Ask open-ended questions</td>
<td>Use large-font print</td>
</tr>
<tr>
<td>Use simple, easy-to-understand language</td>
<td>Use uppercase letters, bold, highlight or underline to emphasize certain points</td>
</tr>
<tr>
<td>Connect new information to previously learned knowledge</td>
<td>Try to use bullets instead of paragraphs</td>
</tr>
<tr>
<td>Specify information to specific patient by using examples and giving reasoning</td>
<td>Avoid a cramped look by spacing appropriately</td>
</tr>
<tr>
<td>Repeat important information and ask the patient to repeat the same information back</td>
<td>Focus on writing only important points</td>
</tr>
<tr>
<td>If applicable, demonstrate what is being taught</td>
<td>Avoid too much unnecessary details</td>
</tr>
<tr>
<td></td>
<td>Use illustrations relevant to text</td>
</tr>
<tr>
<td></td>
<td>Use verbal education to highlight written material</td>
</tr>
<tr>
<td></td>
<td>Give importance to the patient’s motivation to succeed</td>
</tr>
</tbody>
</table>
Table 6. Resources to Improve Health Literacy

<table>
<thead>
<tr>
<th>Resource</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maine Area Health Education Center (AHEC) Literacy Center</td>
<td>● Checklist available to ensure patient education pamphlets are easy-to-read</td>
</tr>
<tr>
<td>Readability Calculations</td>
<td>● Computer program to assess reading level of written material</td>
</tr>
<tr>
<td>Vocabulary Assessor</td>
<td>● Available for purchase with Readability Calculations</td>
</tr>
<tr>
<td></td>
<td>● Identifies text words that may be confusing for patients</td>
</tr>
<tr>
<td>Microsoft Word: Flesch Reading Ease score,</td>
<td>● Check readability of document</td>
</tr>
<tr>
<td>Flesch-Kincaid Grade Level score</td>
<td></td>
</tr>
</tbody>
</table>

TRANSPORTATION

Lack of transportation is a main challenge faced by patients as they transition back from the hospital to home. Patients may depend on unpredictable or limited options for transportation. Studies involving patients with chronic diseases have demonstrated that issues with transportation can have a considerable effect on adherence to medications and medical care. Patients living in the State of New Jersey have several options to access to find transportation to a clinic appointment or to the pharmacy. An online search database, www.NJfindaride.org, will match specific transportation needs to available public and accessible transportation options. Eldercare.gov allows patients to search for available transportation areas through zip code or city and then provides contact information for available services. Many Eldercare services will link to the Union County Paratransit System (phone number: 908-241-8300) for patients 60 and older. There is a $4 roundtrip fee, but waivers are available for low income riders. Table 7 lists several options available for patients in need of transportation.

Table 7. Transportation Resources

<table>
<thead>
<tr>
<th>Area Agency on Aging</th>
<th>Identify local agency through eldercare.gov</th>
</tr>
</thead>
<tbody>
<tr>
<td>NJ Ease</td>
<td>(877)-222-3737, toll-free number with available transportation options for disabled and older adults</td>
</tr>
<tr>
<td>New Jersey Council on Special Transportation</td>
<td>(973)-251-2242, information on available transportation services for people with disabilities</td>
</tr>
<tr>
<td>New Jersey Transit</td>
<td>1-800-955-2321, Access Link services for people with disabilities</td>
</tr>
</tbody>
</table>
CONCLUSION

Some factors leading to poor adherence include poor health literacy, lack of transportation, and medication expense. Pharmacists are in a unique position to develop a trusting, professional relationship with their patients. They can help identify potential barriers and create solutions by using available tools to improve medication adherence. Better patient education, adherence aids, transportation considerations, and medication costs are techniques that can further increase patient adherence and improve outcomes for patients and the overall healthcare system.

References:


The New Jersey Pharmacists Association is accredited by the Accreditation Council for Pharmacy Education as a provider of continuing pharmacy education.

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**Test and Evaluation Information:**

Please enter this URL into your browser to access the home study test - [http://njpharmacists.org/continuing-education/home-study](http://njpharmacists.org/continuing-education/home-study) and scroll to the title of the home study activity. Members sign in, and non-members register for the activity. You will receive a confirmation email with the test link for pharmacists or pharmacy technicians, if applicable. Learner feedback is important to judge the effectiveness of the CE activity. Your test score, and the rationale for the correct answers you selected will be displayed upon completion of the test, as required by ACPE. NJPhA uploads credit to CPE monitor within 60 days of successful completion of the required materials. The test may be taken two additional times to achieve a passing grade for test scoring under 70%.
The Operating Room Pharmacist

Alexandra Kovary, PharmD

The role of an Operating Room (OR) pharmacist may not be an obvious one when brainstorming career options after completing pharmacy school; yet, I can say it is one that is very rewarding. Hospital pharmacy can be viewed as a lot of behind-the-scenes work, usually in the basement, with limited opportunity for patient interaction compared to that of a retail pharmacist. Though this reputation may hold some truth, I feel the role of any pharmacist on the patient care team is one that is highly valued and relied on daily. Throughout my short time in my current role, I can see the impact we make in our support to the OR staff and the care of our patients.

In our facility, the OR pharmacist is at the forefront of serving 18 operating rooms inclusive of cardiac surgery, neuro-interventional surgery, and both elective scheduled surgeries and emergency add-on cases for both adults and pediatrics. Each day is different; this is an around-the-clock OR and anything can happen on any given day. It is important to stay organized and anticipate needs for the day, before the “morning rush” to open the OR rooms begins. The OR satellite pharmacy is staffed by a pharmacist for the busiest 12 hours. A typical schedule starts with the first cases beginning as early as 7:10 am. A brief list of overall daily responsibilities include the following:

- Prepare IV infusions for use by anesthesia
- Prepare IV admixtures and irrigations used by surgeons
- Re-stock anesthesia drug box with frequently-used medications
- Assist with pediatric dosing and preparation, when asked
- Reconcile narcotic administration and return
- Re-stock pharmacy satellite to reach appropriate par levels
- Answer clinical questions ranging from home medications, allergies, and drug interactions

The niche of frequently-used medications in the OR focuses on a different knowledge base than the overall summary taught in pharmacy school. Pharmacists must be familiar with paralytics, IV anesthetics, local anesthetics, muscle relaxants, reversal agents, and anti-emetics. Pre-operative antibiotics are prepared by the pharmacy to prevent surgical infection. Post-operative antibiotic orders are continued by the surgeon for post-operative care. The Post Anesthesia Care Unit, PACU, is responsible for administering pain medication, and stabilizing the patient before transferring to the inpatient floor for care or back to Same Day Surgery for stabilization before discharging of the patient. PACU orders are written by the anesthesiologist, and verified by the OR pharmacist inclusive of narcotics, patient-controlled analgesia (PCA), patient-controlled epidural analgesia (PCEA), and post-natal care (PNC) order sets. It is the responsibility of the pharmacist to review appropriate dosing for all medications ordered in PACU and prepare any intravenous (IV) drips necessary for PACU care.

Overall, I know the role of the OR pharmacist is respected and appreciated by the staff in the units; as pharmacists are a valuable resource. The urgency of completing a case and importance of the attention to detail involved in the patient care can be impacted by the pharmacy before, during, and after surgery. It is not where I saw myself upon graduation, yet it has been a very rewarding place to be since then.

About the author:
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The Valley Hospital
223 N. Van Dien Avenue
Ridgewood, NJ 07450
201-447-8126
akovary@vallyhealth.com
Don’t Leave Money On The Table when you transition the ownership of your pharmacy.

- If you are talking with a buyer (particularly a chain buyer), have an offer on the table, haven’t signed anything yet, TALK TO US LAST!!
- If you are contemplating a sale but haven’t begun to consider the issues involved, TALK TO US FIRST!!
- Either way, all conversations are TOTALLY CONFIDENTIAL AND TOTALLY WITHOUT OBLIGATION. THEY COST YOU NOTHING!

Don’t be fooled by web sites or advertisements that purport to tell you EXACTLY HOW MUCH you are leaving on the table. There are no absolutes when selling a business and EVERYTHING is negotiable.

Visit our website to view a list of references that you can contact.
### FRIDAY, OCTOBER 13th

<table>
<thead>
<tr>
<th>Event</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Registration Open</td>
<td>7:00 AM - 4:00 PM</td>
</tr>
<tr>
<td>Certificate Programs – Part 1</td>
<td>8:00 AM - 12:00 PM</td>
</tr>
<tr>
<td>Lunch for certificate program attendees</td>
<td>12:00 PM - 1:00 PM</td>
</tr>
<tr>
<td>Corresponding Responsibility for Lawful Prescribing &amp; Dispensing</td>
<td>1:00 PM - 2:30 PM</td>
</tr>
<tr>
<td>CMS Mega Rule: Implications for Consultant Pharmacists</td>
<td>2:30 PM - 4:00 PM</td>
</tr>
<tr>
<td>NJPhA Annual Meeting &amp; Committee Presentations</td>
<td>4:00 PM - 5:30 PM</td>
</tr>
<tr>
<td>Welcome Reception</td>
<td>5:30 PM - 7:00 PM</td>
</tr>
</tbody>
</table>

**Potential Dinner for Healthcare Providers**

### SATURDAY, OCTOBER 14th

<table>
<thead>
<tr>
<th>Event</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Registration Open</td>
<td>7:30 AM - 4:00 PM</td>
</tr>
<tr>
<td>Breakfast in Exhibit Hall</td>
<td>7:30 AM - 9:00 AM</td>
</tr>
<tr>
<td>Certificate Programs – Part 2</td>
<td>8:00 AM - 12:00 PM</td>
</tr>
<tr>
<td>Turning the Tide: The Expanded Access to Naloxone</td>
<td>9:00 AM - 10:30 AM</td>
</tr>
<tr>
<td>Advocacy for Pharmacy Opening</td>
<td>10:30 AM - 11:00 AM</td>
</tr>
<tr>
<td>Present Your Case: Leg. Hearing Process</td>
<td>11:00 AM - 12:30 PM</td>
</tr>
<tr>
<td>LUNCH in Exhibit Hall</td>
<td>12:30 PM - 2:30 PM</td>
</tr>
<tr>
<td>Poster Session: Advancing Pharmacy through Research</td>
<td>1:30 PM - 2:30 PM</td>
</tr>
<tr>
<td>Communication Skills for Optimal Patient Outcomes</td>
<td>2:30 PM - 4:00 PM</td>
</tr>
<tr>
<td>Committee Chat</td>
<td>4:00 PM - 4:30 PM</td>
</tr>
<tr>
<td>Student Self Care Competition</td>
<td>4:30 PM - 6:00 PM</td>
</tr>
<tr>
<td>PAC Auction &amp; Head Shots</td>
<td>6:00 PM - 7:00 PM</td>
</tr>
<tr>
<td>+TONICRx Happy Hour</td>
<td>6:00 PM - 7:30 PM</td>
</tr>
</tbody>
</table>

**Student Programming**

10:00 AM - 6:00 PM
- Orientation/mentors
- Legislative Hearing
- Communication Skills Training
- Student Challenge

**Potential Dinner for Healthcare Providers**

### SUNDAY, OCTOBER 15th

<table>
<thead>
<tr>
<th>Event</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Registration Open</td>
<td>7:30 AM - 1:00 PM</td>
</tr>
<tr>
<td>Breakfast in Exhibit Hall</td>
<td>7:30 AM - 9:00 AM</td>
</tr>
<tr>
<td>Mice &amp; Men: Drugs Approval Process</td>
<td>9:30 AM - 10:30 AM</td>
</tr>
<tr>
<td>Drug Abuse Crisis</td>
<td>10:30 AM - 11:30 AM</td>
</tr>
<tr>
<td>Check-Out Break</td>
<td>11:30 AM - 11:45 AM</td>
</tr>
<tr>
<td>Installation &amp; Awards Luncheon</td>
<td>12:00 PM - 1:30 PM</td>
</tr>
<tr>
<td>Opioid Treatment and Addiction Prevention Act</td>
<td>1:30 PM - 3:00 PM</td>
</tr>
</tbody>
</table>

As of July 2017; schedule subject to change
HUB services include dedicated staff and resources, data analytics, and clinical call center.

Modern web portal for checking patient prescription statuses and bi-directional data transfer.

Real Time verification of insurance benefits and co-pay.

Expanded payer network participation.

Increased Limited Distribution Drug accessibility.

Non-Specialty drug services at no extra charge.

340-B capabilities.

No competitive affiliation.

NEED HELP WITH SPECIALTY PHARMACY?

INTRODUCING

A SPECIALTY PHARMACY PROGRAM SUPPORT HUB DESIGNED FOR INDEPENDENT PHARMACIES

RDC is the nation’s 7th largest wholesale drug distributor owned by pharmacists and dedicated to Independent Pharmacy.

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