



# LA HEALTH-SYSTEM PHARMACIST

## Newsletter of the Louisiana Society of Health-System Pharmacists

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[www.lshp.org](http://www.lshp.org)

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### FROM THE DESK OF THE PRESIDENT

The Midyear LSHP Meeting held at Sam's Town in Shreveport was another successful event. We had 126 attendees that participated in the various activities and continuing education programs. I would like to give a special thanks to our Programming and Practitioner Education Committee that worked very hard to bring this meeting to Shreveport. The members of that committee are Kelsey Trimble, Mandy Ranzino, and David Loftin. I would also like to thank our presenters Katie Barber, Mia Ajekwu Bassaragh, Ashley Engemann, Loretta Lemoine, Shawn Manor, Elizabeth Morgan, Chau Nguyen, Elizabeth Perry, Karlye Pesci, Jeremy Taylor, Jamie Terrell, and Hui Jamie Yun. Lastly, an extra special thanks to ASHP Advantage, Novartis Oncology, and Morris & Dickson, the LSHP executive board, and Kati Craig and Bland O'Connor for their continued support. In addition to member support, I would also like to recognize the students of the LSHP student chapter at the University of Louisiana at Monroe. Their chapter continuously participates and contributes support at both our midyear and annual meetings in Shreveport and in New Orleans. This year the chapter sold LSHP long sleeve T-Shirts and blankets that were decorated with original artwork designed by their chapter members.

Prior to the actual Midyear meeting, we also had a very successful board meeting. The Programming and Practitioner Education Committee has also been working very hard in coordinating our upcoming Annual Meeting for 2011 in New Orleans from May 26-28, 2011 at the Hilton Riverside. The Membership and Marketing Committee is also currently working on a variety of ways to increase membership in LSHP as a new year is quickly approaching. They have been diligently working on ways to retain membership and to attract new

members. Please contribute to their efforts by inviting pharmacists and technicians to become a part of LSHP. We as an organization are working on more "Going Green" initiatives. The Programming and Practitioner Education Committee was tasked with developing a paperless meeting plan for both state meetings. There will be more to come on that subject after our January Board meeting.

The ASP Midyear Clinical Meeting in Anaheim is from December 4th through the 9th. For those who can't attend, I will provide you with any pertinent information in the next newsletter.

In closing, as the holidays approach, I wish you and your families a safe and happy holiday season and wonderful New Year.

Sincerely,  
Teresa Nash, Pharm.D.  
LSHP President



***Don't Miss Another  
LSHP Meeting***

***Mark Your Calendar Now!***

LSHP Annual Meeting  
May 26-28, 2011  
New Orleans, LA

LSHP Mid Year Meeting  
October 8, 2011  
Shreveport, LA

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**LSHP Bimonthly Newsletter****LA HEALTH-SYSTEM PHARMACIST****Publisher Information**

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Please send article submissions to the newsletter editor, Dana Jamero, via email at [djamero@xula.edu](mailto:djamero@xula.edu).

## LSHP Technician Corner: Midyear Review

By: Jonathan Bost  
LSHP Technician Representative

This year's LSHP Midyear Meeting theme was "Making the Grade." If you were not able to attend, we missed seeing and meeting you! The meeting featured informative continuing education courses for technicians that would certainly help us "Make the Grade" in our practice. Among the topics covered were vaccines, anticoagulation, HIV treatment, pulmonary hypertension, and a few oncology related topics. Probably one of the most informative topics was Dr. Loretta Lemoine's discussion of her facility's struggle for compliance with USP797. Her honesty with her efforts to comply with the regulations and decisions about IV Room design, policies and procedures, cleaning products, and basic garbing supplies gave those in attendance a practical understanding of the regulations and insights into becoming compliant.

Twenty-eight technicians registered and attended the Midyear Meeting. Our goal is to see that number increase. LSHP recognizes that this meeting

is one of the more valuable for Technicians because of the CE cycle—continuing education credit from the annual meeting might be a little late for use renewing technician certificates. LSHP's Board of Directors is interested in learning how we can increase participation by all the membership, including technician members.

Later this year, you should anticipate receiving an invitation to participate in a survey. We want as much participation in the survey as possible, including members and non-members of LSHP, so feel free to forward the survey to your coworkers. Not only do we want your opinion about how to better serve your professional needs, we want your input on how the role of the technician is evolving and how our society can assist in developing our role to fulfill the needs of the profession of pharmacy. *So, let us know what you think!*

## Southeast Chapter Update

By: Ariane Conrad, PharmD  
Southeast Chapter President

First, I would like to thank all of our members for their support of the chapter. I have truly enjoyed serving the chapter as president. It has been challenging at times but it has been a rewarding experience for me. Thank you for this opportunity. As I'm sure you are aware, securing funding for our meetings has been a constant challenge but we were able to have sponsor support for 3 of our meetings this year. I would like to thank Cubist Pharmaceuticals, Centocor Ortho Biotech, and Ameridose for sponsoring programs for us and supporting the chapter. The chapter was able to provide 5 ACPE accredited programs this year and we were able to save money on these programs by hosting them at Xavier University. I would like to

thank Drs. Keturah Robinson, Joseph LaRochelle, Camtu Ho, Kisha Gant, Heather Olivier, Suzanne Nguyen, Sophia Pasedis, and Andrew Freeman for speaking at our educational meetings. I would also like to thank Kati Craig (Senior Associate Coordinator for LSHP), Dr. Keturah Robinson, Dr. Ashley Taylor (Secretary/Treasurer), and Dr. Lovie Lewis (President-Elect) for all of your support this year. Elections for the new officers for 2011 will take place in November and they will be installed during our chapter meeting in January 2011. Again, thanks for the opportunity to serve the chapter as president and I hope to have the opportunity to serve the chapter and LSHP in another capacity.

## Telavancin: A New Treatment for Complicated Skin and Skin Structure Infections

By: Victoria Williams, PharmD Candidate; Shawn Manor, PharmD; Jamie Terrell, PharmD

Infections caused by drug-resistant bacteria are a therapeutic dilemma facing healthcare practitioners in the United States. At this time, the most common drug-resistant bacteria found in the hospital setting is methicillin-resistant *Staphylococcus aureus* (MRSA). The resistance rate for this bacteria is approximately 63%. MRSA can cause several types of infection, including complicated skin and skin structure infections (cSSSIs).<sup>1</sup>

Vancomycin, a glycopeptide antibiotic, is a common treatment for cSSSIs caused by MRSA. However, some strains of bacteria have begun to show intermediate and complete resistance to vancomycin.<sup>1</sup> This emerging resistance illustrates the need for new antibiotics that can successfully treat MRSA skin infections.

Telavancin is a bactericidal semisynthetic lipoglycopeptide that received FDA approval in September 2009 for the treatment of cSSSIs caused by susceptible gram-positive organisms. Telavancin is a derivative of vancomycin; therefore, the mechanism of action of telavancin is similar to that of vancomycin which involves binding to the D-Alanyl-D-Alanine site on peptidoglycan chains and disrupting cell wall synthesis. Telavancin is differentiated from vancomycin by the addition of a hydrophilic group and a hydrophobic group to the original vancomycin chemical structure. The extra lipophilic group enhances the ability of telavancin to bind to bacterial membranes which increases the potency of this new class of antibiotics. The extra lipid chains also have a detergent effect on the bacterial membrane causing destabilization and loss of membrane potential. The extra hydrophilic group on telavancin helps to promote clearance of the drug and potentially decrease nephrotoxic side effects.<sup>2</sup>

Telavancin has a wide spectrum of activity against gram positive organisms. The drug is effective for methicillin-susceptible and methicillin-resistant *Staphylococcus aureus* and *Staphylococcus epidermidis*. Vancomycin-intermediate *Staphylococcus* species are also susceptible to telavancin. However, vancomycin-resistant *Staphylococcus aureus* and VanA vancomycin-resistant *Enterococci* (VRE) are not susceptible to telavancin, and only moderate activity against VanB VRE is obtained with the antibiotic.<sup>2</sup> VanA and VanB are gene clusters that cause antibiotic resistance by replacing alanine with lactate at the terminal end of peptidoglycan chains. A recent study<sup>3</sup> reported that VanA resistance genes in enterococci are induced by telavancin, but telavancin was able to retain its antibacterial activity at a much lower concentration than vancomycin in these strains of enterococci.

Similar to vancomycin, telavancin has poor oral bioavailability and is administered as an intravenous infusion over 60 minutes. Telavancin is available in single-dose vials of 250 mg or 750 mg and must be reconstituted with dextrose

5% injection, sterile water for injection, or sodium chloride 0.9% injection.<sup>4</sup>

Telavancin has a half-life of 7-9 hours and has the added advantage of being dosed once daily. The recommended dosage for treatment of cSSSIs is a range of 7.5-10 mg/kg daily. Unlike vancomycin, telavancin exhibits a high percentage of protein binding, but the association is very weak and the activity of telavancin is not affected by the amount of serum protein binding. Telavancin penetrates well into the fluid of skin blisters, pulmonary epithelial lining fluid, and alveolar macrophages. However, only 1% of the drug can pass through uninflamed meninges, and a slightly higher amount may pass through inflamed meninges. Like vancomycin, telavancin is primarily eliminated through the kidneys. Renal dysfunction increases the half-life of the antibiotic and requires dosage adjustments when creatinine clearance is  $\leq 50$  mL/min. Hepatic dysfunction does not affect the pharmacokinetics of telavancin and the drug does not interact with cytochrome P450 enzymes. In addition, the bactericidal activity of telavancin is concentration-dependent and has a prolonged post-antibiotic effect (PAE). The PAE of telavancin may last 4-6 hours for some gram-positive bacteria.<sup>2</sup>

The most common adverse effects found with the use of telavancin include taste disturbances and headaches. These effects are reversible after discontinuation of treatment. Prolongation of the corrected QT (QTc) interval did occur in phase I trials assessing telavancin, but no cardiovascular events resulted from the prolongation.<sup>1</sup> Also, telavancin is pregnancy category C and has a black box warning stating that the drug should not be used in pregnant women.<sup>4</sup>

Another advantage of telavancin over Vancomycin is that monitoring of peak and trough drug levels is not necessary. Assessing serum creatinine and other indicators of renal function are the only monitoring recommendations.<sup>4</sup>

The clinical efficacy of telavancin against cSSSIs has been proven in two phase III trials, ATLAS-1 and ATLAS-2. The conclusion of the trials indicated that telavancin was just as effective as vancomycin for the treatment of cSSSIs with a combined clinical cure rate of 88.6% for telavancin and 86.2% for vancomycin. Researchers also assessed the cost-effectiveness of telavancin versus vancomycin using information from the ATLAS-1 trial. The researchers used a range of \$50-200 to simulate telavancin acquisition costs, and the cost for vancomycin was \$13.44 per dose. Results indicated that the infection-related length of stay and hospitalization costs of telavancin were similar to that of vancomycin even with telavancin having a higher per-

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unit cost. The similarity in overall costs for the two drugs is due to vancomycin having additional expenses associated with its use, such as drug level assays and pharmacist consultations.<sup>5</sup>

Telavancin has several positive features that may lead to increased use of the drug for cSSSIs particularly once-daily dosing, lack of drug level monitoring, and non-inferiority to vancomycin. These aspects of telavancin are beneficial for healthcare professionals treating the patient and may also decrease human error associated with treatment. Therefore, telavancin should be considered a reasonable alternative treatment for cSSSIs when patients exhibit unresponsiveness, resistance, or intolerance to vancomycin.<sup>2</sup>

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## Liraglutide (Victoza®): A new therapy option for Type 2 Diabetes

By: Ariane Conrad, PharmD

Liraglutide is the second glucagon-like peptide-1 (GLP-1) receptor agonist to receive FDA approval as adjunctive therapy in adults with type 2 diabetes mellitus to improve glycemic control. Similar to exenatide (Byetta®), this agent is a long acting analog of human GLP-1, an incretin hormone, which improves glycemic control by several different mechanisms. When injected into systemic circulation, it will cause insulin release in the presence of elevated glucose concentrations. Liraglutide can also cause a glucose dependent decrease in glucagon secretion along with a delay in gastric emptying.

Liraglutide is administered as a subcutaneous injection in the upper arm, thigh, or abdomen. It is available as a prefilled pen which should decrease patient administration difficulty. The recommended dosing schedule is 0.6 mg once daily for 1 week, then increase to 1.2 mg once daily. The dose may be increased to 1.8 mg once daily if the patient's goals are not achieved with the 1.2 mg dose. This dose may be administered without regard to meals or time of day. The most common side effects are nausea, diarrhea, headache, and vomiting. The development of anti-liraglutide antibodies may occur, but it doesn't appear that this antibody formation is associated with reduced efficacy. Liraglutide carries a black box warning because it has been found to cause thyroid cell tumors in rodent studies. Therefore, it is not recommended for use in patients with a personal or family history of medullary thyroid carcinoma or in patients with multiple endocrine neoplasia syndrome type 2.

Liraglutide has been studied in several clinical trials. The Liraglutide Effect and Action in Diabetes (LEAD) series of studies were conducted to compare liraglutide to some commonly prescribed therapies for the treatment of type 2 diabetes.

**LEAD-1:** This trial compared liraglutide 0.6, 1.2, or 1.8 mg/day and rosiglitazone 4 mg/day or placebo in patients also taking glimepiride 2-4 mg/day for 26 weeks in patients with poorly controlled blood glucose. Liraglutide, at all doses, produced statistically significant reductions in HgA1c levels as compared to placebo. Liraglutide 1.2 and 1.8 mg/day produced statistically significant reductions in HgA1c levels and fasting glucose levels when compared to the rosiglitazone. Liraglutide 0.6 mg/day did not provide significant reductions when compared to rosiglitazone. Also, greater improvements in  $\beta$ -cell function were observed with liraglutide 1.2 and 1.8 mg/day as compared with rosiglitazone and placebo.

**LEAD-2:** This was a 26 week trial that evaluated the efficacy and tolerability of liraglutide plus metformin. Liraglutide 0.6, 1.2, or 1.8 mg/day, glimepiride 4 mg/day, or placebo was added to metformin 1 g BID. All of the doses of liraglutide produced statistically significant reductions in HgA1c levels compared with placebo. The reduction in HgA1c produced by liraglutide was comparable to that produced by glimepiride.

**LEAD-3:** This trial compared liraglutide with glimepiride. Patients were randomized to receive liraglutide 1.2 or 1.8 mg/day, or glimepiride 8 mg/day for 52 weeks. The patients in this trial had type 2 diabetes treated with lifestyle modifications alone or with up to half of the maximum dose of oral antihyperglycemic therapy. At both doses, liraglutide reduced HgA1c levels significantly more than glimepiride ( $p \leq 0.0014$ ). The American Diabetes Association's goal HgA1c level of  $<7\%$  was achieved by 50.9% of patients receiving liraglutide 1.8 mg/day versus 27.8% of patients receiving glimepiride. Also, significant improvements in  $\beta$ -cell function were noted with liraglutide versus placebo.

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## A Joint Commission Experience

By Scott D. Dantonio, RPh

Regional Director of Pharmacy, River Parishes Hospital/Teche Regional Medical Center

Earlier this year, I experienced my first two Joint Commission Surveys as a pharmacy director. The surveyors were at Teche Regional Medical Center on Monday and Tuesday. Much to our surprise, they arrived at River Parishes Hospital on Thursday and Friday of the same week. Here are some of the highlights.

At Teche:

1. The surveyor looked at a chemotherapy order which stated infuse per protocol. She wanted to see the protocol.
2. She asked for the narcotic ordering process, who orders, who approves, and who puts them away?
3. What is the anesthesia narcotic documentation process? Does the pharmacy review, where are they kept, how do you monitor for abuse?
4. Pediatric Medication process. The surveyor recommended a printout (clinical pharmacology has one) for pediatric emergency medications to be placed on the charts. PACU was asked where their emergency drugs were.

OB- Make sure the floor is not compounding any Pitocin bags. Pitocin vials should only be stored on the unit for emergency use only.

At River Parishes:

1. Performance Improvement review. The surveyor wanted to know how we track medication errors. We also were asked to simplify PI, don't look for goals that you know will be 100%. Try to tie them into the Joint Commission standards.

After hour compounding. Have the nursing supervisors been given a competency on sterile compounding? What is your process for antibiotics in the nursery after hours?

Both facilities had two day surveys so it went by quickly. The surveyors were very nice. They were full of compliments for good processes and suggestions for improvements. Both facilities are not open twenty four hours and require on-call pharmacists. Please contact me with any questions you may have (Scott.dantonio@lpnt.net).

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**LEAD-4:** This was a 26 week trial comparing liraglutide 1.2 or 1.8 mg/day or placebo in combination with metformin 1 gm BID and rosiglitazone 4 mg BID. Liraglutide produced statistically significant reductions in HgA1c and postprandial glucose levels as compared with placebo. Improvements in  $\beta$ -cell function occurred with liraglutide versus placebo were also noted.

**LEAD-5:** This trial evaluated treatment with liraglutide 1.8 mg/day, open label insulin glargine, or placebo as additional therapy to glimepiride 2-4 mg/day and metformin 1 gm BID for 26 weeks. Liraglutide, as compared to placebo and insulin glargine, produced significantly greater reductions in HgA1c. Also, 53.1% of liraglutide treated patients reached an HgA1c goal of <7% as compared to 45.8% of insulin glargine treated patients and 15.5% of placebo treated patients.

**LEAD-6:** This final trial compared the efficacy and tolerability of liraglutide to exenatide. Patients taking metformin and/or a sulfonylurea received liraglutide 1.8 mg/day or exenatide 10 mcg BID. Liraglutide produced

statistically significant improvements in HgA1c levels, fasting glucose levels, and  $\beta$ -cell function as compared to

exenatide. Also, more of the patients receiving liraglutide achieved an HgA1c of <7%. Both therapies resulted in similar reductions in patient weight.

Liraglutide seems to be a viable option for both monotherapy and adjunct therapy for the treatment of uncontrolled type 2 diabetes. Like exenatide, liraglutide is associated with an increased risk of pancreatitis. It is recommended to monitor patients for the development of symptoms suggesting pancreatitis and therapy should be discontinued if pancreatitis is confirmed. Also, severe hypoglycemia may occur, especially when liraglutide is used in combination with a sulfonylurea. Despite some of the risks, this agent shows real promise for those patients who have difficult to control type 2 diabetes.

**References available upon request**

## Fixed Dose Combination Therapy in Treating Hypertension

Heather Olivier, Pharm.D.

A vast majority of patients diagnosed with hypertension will need three or more medications to adequately maintain goal blood pressures. These patients that take three or more antihypertensive agents and are still above goal blood pressure are considered to be resistant as opposed to uncontrolled as defined by the American Heart Association. Uncontrolled hypertension describes patients whose blood pressure is not at goal due to other factors including non-adherence, poor lifestyle habits, or inappropriate treatment regimen. According to an analysis done by the National Health and Nutrition Examination Survey (NHANES), the prevalence of resistant hypertension is unknown, but it is not uncommon. In the NHANES analysis only 53% of the participants were at goal blood pressure of less than or equal to 140/90.

Whether due to resistant hypertension or uncontrolled hypertension, studies show that patients taking combination therapy for high blood pressure have added benefit when agents from separate classes are used, especially when a thiazide diuretic is involved. In clinical trials, it has been shown that initiation of two drugs at the diagnosis of hypertension has shown clinical benefit. Depending on other compelling indications, the second agent of choice in addition to a thiazide diuretic may be an ACE-inhibitor, angiotensin receptor blocker, calcium channel blocker, or beta blocker.

Over the past few years there has been a rise in the number of antihypertensive combination agents available. The most recent combination contains a renin inhibitor and a calcium channel blocker. Other commonly used combination products include ACE-inhibitor/thiazide diuretic, angiotensin receptor

blocker/thiazide diuretic, and angiotensin receptor blocker/calcium channel blocker. In addition, three-drug combination products have been approved by the Food and Drug Administration (FDA). The three-drug agents contain an angiotensin receptor blocker, calcium channel blocker, and thiazide diuretic. See Table 1 for some examples of combination products.

Combination products help alleviate the pill burden most hypertensive patients face. Patients only have one pill to take as opposed to two or three, which in some patients makes a difference with compliance. Combination products also present advantages to prescribers. These agents simplify the dose titration process and work to synergistically lower blood pressures. However, pharmacists and physicians should also keep in mind with every pro there is a con. While these products provide an ease for dose titration and eliminate a few pills the patient may be required to take, they may present a very important complication for patients: cost. While there are a few generic options available, specifically an ACE-inhibitor/thiazide diuretic combination and an ACE-inhibitor/calcium channel blocker combination, most of the newer products are brand name only, especially the three-drug combinations. The pros and cons of combination products should be discussed with the patient to determine the best hypertensive treatment option. Some patients may prefer to take multiple pills in order to save money, while others may prefer to pay more out of pocket to decrease their pill burden.

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*References available upon request*

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Table 1. Available fixed dose combination therapy for hypertension (not a conclusive list).

<b>BRAND</b>	<b>GENERIC</b>	<b>DRUG CLASS*</b>
<b>Lotrel</b>	Amlodipine/benazepril	CCB/ACE-I
<b>Zestoretic</b>	Lisinopril/ hydrochlorothiazide	ACE-I/diuretic
<b>Hyzaar</b>	Losartan/ hydrochlorothi- azide	ARB/diuretic
<b>Tenoretic</b>	Atenolol/chlorthalidone	BB/diuretic
<b>Dyazide</b>	Triamterene/ hydro- chlorothiazide	Diuretic/diuretic
<b>Tekamlo</b>	Aliskiren/amlodipine	Renin inhibitor/CCB
<b>Exforge</b>	Amlodipine/valsartan	CCB/ARB
<b>Tribenzor</b>	Amlodipine/olmesartan/ hydrochlorothiazide	CCB/ARB/diuretic

\*Abbreviations: CCB, calcium channel blocker; ACE-I, angiotensin converting enzyme inhibitor; ARB, aldosterone receptor blocker; BB, beta blocker