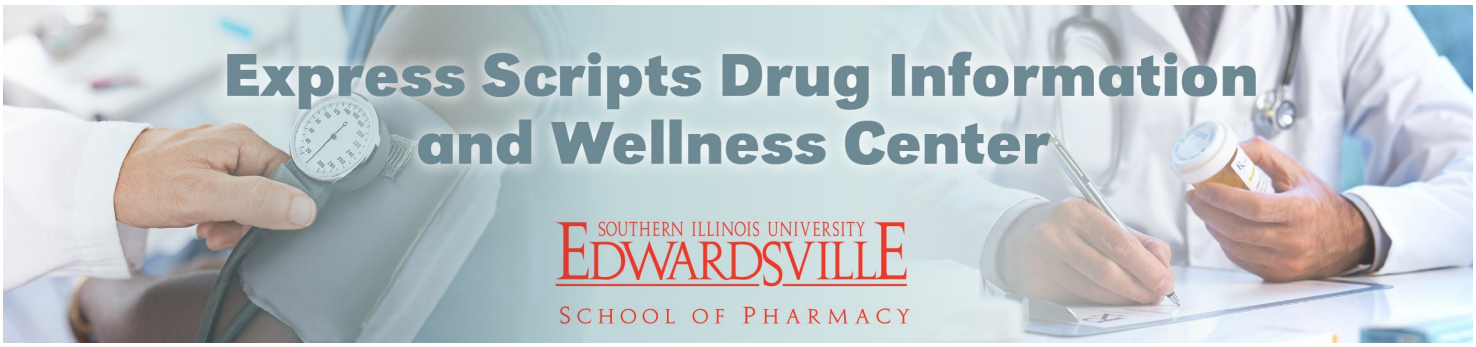

November 2017

Inside this issue:

Thank you to Erika Kuenstler, Pratik Patel, and Carissa Sorenson for their contributions to this newsletter.

Pharmacy in the News:

Prescribing gabapentin with opioids could increase risk of fatal overdose, study finds

- A case control study in Ontario, Canada compared opioid-related deaths in opioid users (n = 1,256) to opioid users who did not die (n = 4,619)
- New gabapentin prescriptions (within the last 120 days) were found in 12.3% of the deaths, and 6.8% in the control group
  - ◊ Patients were at a 49% higher risk of an opioid related death when prescribed gabapentin
- Hypothesized that gabapentin increases the amount of opioid absorbed by the body
- Both gabapentin and opioids can suppress breathing
- Limitations of this study included the fact that it only captured patients eligible for public drug coverage in Ontario, which was most often low-income neighborhoods, and it did not assess adherence or drugs received outside of the government reimbursement system

http://www.pharmaceutical-journal.com/news-and-analysis/news/prescribing-gabapentin-with-opioids-could-increase-risk-of-fatal-overdose-study-finds/20203676.article

FDA approves GSK shingles vaccine (Shingrix)

- FDA approved the use of Shingrix, a non-live recombinant subunit vaccine administered in two intramuscular doses for adults aged 50 years or older
- In a Phase III clinical trial with more than 38,000 individuals Shingrix demonstrated 90% efficacy after a 4 year follow-up
- Most common adverse events include: pain, redness, and swelling at the injection site, muscle pain, fatigue, headache, shivering, fever, and upset stomach

http://www.pharmacist.com/article/fda-approves-gsk-shingles-vaccine

Taking Opioids Out of Anesthesia Decreases Post-Surgery Nausea

- In the study design, 1009 patients having neck and head surgery received general anesthesia without opioids. Instead they received various combinations of magnesium, ketamine, lidocaine, and/or ketorolac
- After surgery, 11% of patients experienced nausea vs. 50 to 80% that typically experience nausea post-operatively
- An additional 64% of patients did not require any pain medications after surgery
- The surgeons that adopted this regimen, say they now prescribe 5 tablets of hydrocodone vs. 50 tablets previously

http://nationalpainreport.com/taking-opioids-out-of-anesthesia-decreases-post-surgery-nausea-8834750.html

Newly Approved Drugs

First Gene Therapy in the US
Kymriah (tisagenlecleucel) Novartis; 8/17

Indication: B-cell precursor ALL that is refractory or in second or later relapse in patients up to age 25

MOA: T-cells are modified to include a gene that contains a chimeric antigen receptor that causes them to target and kill leukemia cells with a CD19 antigen on the surface

Dosing: Customized using the patient's own T cells

Fiasp (Insulin aspart) Novo Nordisk; 9/17

Indication: To improve glycemic control in adults with diabetes mellitus

MOA: Rapid-Acting Insulin; Insulin aspart binds to insulin receptors to lower blood glucose by facilitating cellular uptake into the skeletal muscle and adipose tissue and by inhibiting output of glucose by the liver.

Dosing: Based on the metabolic need but should be injected subcutaneously at the start of a meal or within 20 minutes of starting a meal

---

Trelegy Ellipta (fluticasone furoate/umeclidinium/vilanterol) GlaxoSmithKline and Innoviva; 9/17

Indication: Long-term, once-daily maintenance treatment of patients with COPD

MOA: Combination corticosteroid, long-acting muscarinic antagonist, and long-acting beta agonist

Dosing: One inhalation once daily

Actemra (tocilizumab) Genentech; 9/17

Indication: Cytokine release syndrome, Chimeric antigen receptor T-cell induced, Giant cell arteritis, Polyarticular juvenile rheumatoid arthritis, Rheumatoid arthritis, Systemic onset juvenile chronic arthritis

MOA: Interleukin-6 receptor inhibitor

Dosing: Cytokine release syndrome: <30kg = 12mg/kg IV infusion over 60 min, ≥30kg = 8 mg/kg IV infusion over 60 min alone or with corticosteroids with up to 3 additional doses at least 8 hours apart and MAX 800 mg/IV infusion; Giant cell arteritis: 162 mg subQ once weekly; Rheumatoid arthritis: 4 mg/kg IV infusion over 1 hour, increase to 8 mg/kg every 4 weeks, >800 mg/IV infusion not recommended. Weight <100 kg = 152 subQ every week.

Yescarta (axicabtagene ciloleucel) Kite Pharmaceutical; 10/17

Indication: Large, relapsed or refractory B-cell lymphoma, after 2 or more lines of therapy

MOA: CD19-directed genetically modified autologous T cell immunotherapy that kills CD19-expressing cancer cells

Dosing: Pretreatment: 500 mg/m^2 IV and fludarabine 30 mg/m^2 IV on fifth, fourth and third before Yescarta. Give acetaminophen 650 mg and diphenhydramine 12.5 mg IV or orally one hour prior. Target dose 2 x 10^6 chimeric antigen receptor-positive viable T cells/kg IV; Max 2 x 10^8 CAR-positive viable cells

---

Vabomere (meropenem and vaborbactam) Rempex Pharmaceuticals; 8/17

Indication: Treatment of patients 18 years and older with complicated urinary tract infections

MOA: Carbapenem antibacterial that inhibits cell wall synthesis combined with a beta-lactamase inhibitor

Dosing: 4g IV every 8 hours (infuse over 3 hours); dose adjustments recommended for eGFR < 50 ml/min/1.73m^2

New drug indication
Gocovri (amantadine) Adamas Pharmaceuticals; 8/17

Indication: Parkinsonism, Dyskinesia in patients with Parkinson's disease receiving levodopa-based therapy

MOA: Uncompetitive NMDA receptor antagonist, it may have direct and indirect effects on dopamine neurons

Dosing: 137 mg orally once daily at bedtime, after one week increase to 274 mg once daily at bedtime

---

Benznidazole Chemo Group; 8/17

Indication: Chagas disease

MOA: 2-nitroimidazole derivative that inhibits effect on protein synthesis and RNA synthesis in Trypanosoma cruzi cells

Dosing: <15 kg: 50 mg twice daily for 60 days; 15-<20kg 62.5 mg twice daily for 60 days; 20-<30 kg 75 mg twice daily for 60 days; 30-<40 kg 100 mg twice daily for 60 days; 40-<60kg 150 mg twice daily for 60 days; ≥60 kg 200 mg twice daily for 60 days

Good Rx vs. Blink Health

Good Rx and Blink Health are two independent discount programs that provide savings on prescription medications for uninsured patients, and prescriptions not covered by regular insurance. Both programs are free to access online and via mobile app.

Price Comparisons (30 day supplies)

	Good Rx Price (Pharmacy)	Blink Health Price (Kroger, Walmart, K-Mart)
Levothyroxine 50 mcg QD	$4.00 (Walmart) $11.50 (CVS)	$16.52
Metformin 500 mg BID	$4.00 (Walmart) $8.00 (CVS)	$0.00
Atorvastatin 40 mg QD	$23.91 (Walmart) $21.00 (CVS)	$12.17

Good Rx

- Accepted at Walmart, Walgreens, CVS, Sam's Club, Costco, Kroger, and K-Mart
- Individual BIN/PCN/Group numbers for each drug
- Pay at pharmacy
- Includes discount lists from Walmart and other pharmacies
- Lists prices for drugs at each pharmacy separately
- Pays for pet medications
- Prices not always reflective of what it says on coupon

Blink Health

- Accepted at Walmart, Kroger, K-Mart
- Recently lost partnership with CVS
- One BIN/PCN/Group number per patient
- Pay on app; $0 co-pay at pharmacy
- Same prices for drugs at all pharmacies in network
- Current promotions:
  - ◊Free metformin (IR), glipizide (IR), and pioglitazone for 1 year

Useful Free Apps—Reminder

Centers for Disease Control Vaccine Schedules

Medscape MedPulse

LactMed

Orange Book Express

American Red Cross First Aid

FDA Drug Shortages

Express Scripts
Drug Information & Wellness Center
Southern Illinois University Edwardsville
Monday—Friday
8 am—4:30 pm
(618) 650—5142

Drug Information Question of the Month

Question: What effects can NSAIDs have on blood pressure?

A search was conducted using Micromedex, Facts & Comparisons, Adverse Drug Reactions (text), as well as Pharmacist's Letter for information related for your request.

After reviewing Micromedex Drug Consult, it was confirmed that NSAIDs may cause blood pressure to rise in some patients. NSAIDs inhibit the enzyme cyclooxygenase which is responsible in converting arachidonic acid to prostaglandins. This in turn reduces prostaglandin levels, leading to vasoconstriction within the kidney, reducing sodium excretion, and ultimately volume retention.[1] Pharmacist's Letter discussed the use of NSAIDs in patients with hypertension. NSAID induced hypertension is more common in patients with chronic kidney disease. Use of a NSAID for ≥ 1 week can increase blood pressure by 5 mmHg.[2]

Micromedex Drug Consult found that NSAIDs in addition to antihypertensive regimens including ACE inhibitors, diuretics, beta-blockers, and alpha blockers may negate the blood pressure lowering effect. It also referenced a case control study showing that the use of NSAIDs in higher doses increased the chance of needing to start antihypertensive.[1]

More studies are needed to fully evaluate the risk of NSAID's effect on hypertension. However, the NSAIDs that are most likely to increase blood pressure when taken with antihypertensive include piroxicam, indomethacin, ibuprofen, and naproxen. Celecoxib is a moderate risk NSAID. The least likely to impact blood pressure include aspirin, sulindac, and diclofenac.[1,3] Table 1 is a summarized chart of potential elevations in blood pressure due to NSAID use.[3]

TABLE 1. Comparison of Elevations in Blood Pressure

Drug	BP Elevation (mmHg)
Piroxicam	6.2
Ibuprofen	6.5
Naproxen	6.1
Aspirin (>150mg/day)	0.6
Diclofenac	1.6
Indomethacin	4.8
Nabumetone	3.8
Sulindac	2.2
Celecoxib	3.0

Continued on next page...

Express Scripts
Drug Information & Wellness Center
Southern Illinois University Edwardsville
Monday—Friday
8 am—4:30 pm
(618) 650—5142

Drug Information Question of the Month

Question: What effects can NSAIDs have on blood pressure?

If additional therapy is needed to counteract the effect from the NSAID, calcium channel blockers may be more effective than first line anti-hypertensive when treating NSAID induced hypertension.[3,4] Diuretics can be used as well, but monitor for acute kidney injury when the patient is taking NSAID + ACE/ARB + diuretic.[4]

Small short term studies show that acetaminophen may also increase blood pressure, but to a lesser extent than NSAIDs. Data tying acetaminophen to blood pressure elevation or increasing cardiovascular risk is not as strong as NSAIDs.[5]

In summary, NSAIDs can elevate blood pressure. Overuse of ibuprofen may not be the root cause of the elevated blood pressure, but it may be contributing to it. If you are unable to discontinue the NSAID attempt to decrease dose, change to acetaminophen or topical treatment, or switch to a NSAID that is least likely to increase blood pressure (sulindac or diclofenac).[1,2] Blood pressure should be frequently assessed during initiation of therapy with NSAIDs and antihypertensive until it is confirmed the patients' blood pressure is within goal.[1,3]

References

1. Drug Consult - Micromedex® 2.0, (electronic version). Truven Health Analytics, Greenwood Village, Colorado, USA. Available at: http://www.micromedexsolutions.com.libproxy.siue.edu/ (cited: 10/13/2017).
2. Clinical Resource, Meds That Can Increase Blood Pressure. Pharmacist's Letter/Prescriber's Letter. September 2017.
3. Lovell AR, Ernst ME. Drug-Induced Hypertension: Focus on Mechanisms and Management. Curr Hypertens Rep. 2017 May;19(5):39.
4. Morgan T, Anderson A. The effect of nonsteroidal anti-inflammatory drugs on blood pressure in patients treated with different antihypertensive drugs. J Clin Hypertens (Greenwich). 2003 Jan-Feb;5 (1):53-7
5. White WB, Campbell P. Blood pressure destabilization on nonsteroidal antiinflammatory agents: acetaminophen exposed? Circulation. 2010 Nov 2;122(18):1779-81