Reducing Medication Related Adverse Events in Rural Communities

Amy Yanicak, PharmD, MPH

Amy.Yanicak@acphs.edu

Assistant Professor at Albany College of Pharmacy and Health Sciences (Colchester, VT)

Clinical Ambulatory Care Pharmacist at Richmond Family Medicine (Richmond, VT)

Disclosures

- I have no relevant financial or nonfinancial relationships to disclose.

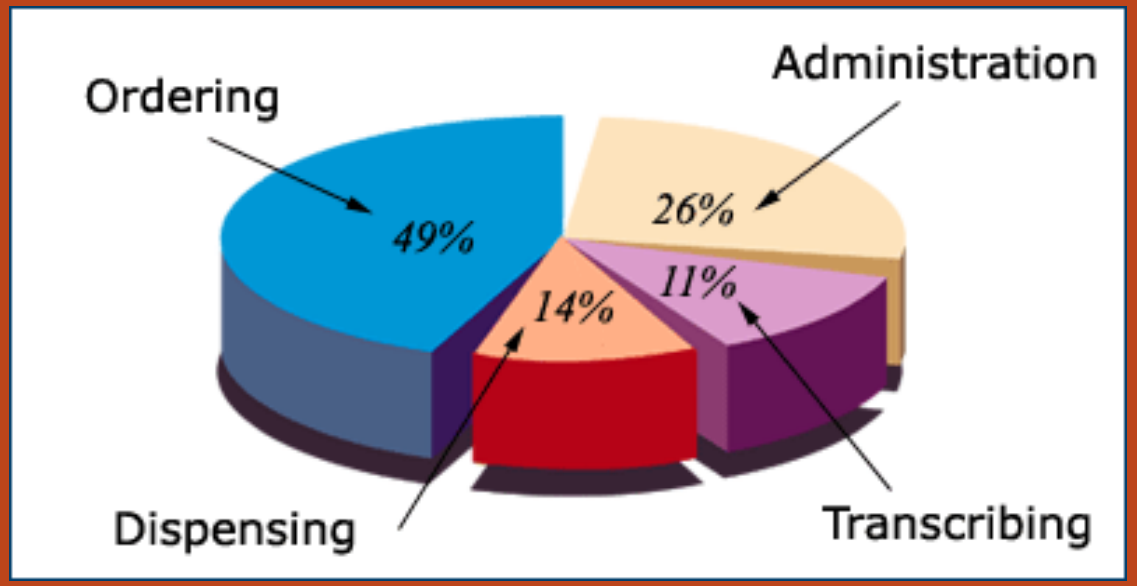
Objectives

- Delineate common prescription medication-related access, adherence, understanding and use issues in a rural setting.
- Understand the impact of regional and national measures to improve access to medication resources.
- Apply current approaches for improved medication use to care plans for patients in rural areas.

Medication Adverse Events

- ***Adverse Drug Event*** **(ADE): harm experienced by a patient as a result of exposure to a medication**
  - Not necessarily from an error or poor quality care
- Prevention at the points of: Prescribing, Transcribing, Dispensing, and Administration

Distribution of Adverse Drug Events According to the Stage of the Error in the Medication Process



Medication Errors and Adverse Drug Events. AHRQ. Jan 2019. Available at: https://psnet.ahrq.gov/primers/primer/23/medication-errors-and-adverse-drug-events
Bates DW et al. JAMA. 1995;274:29-34

ADEs in ACGME Standards

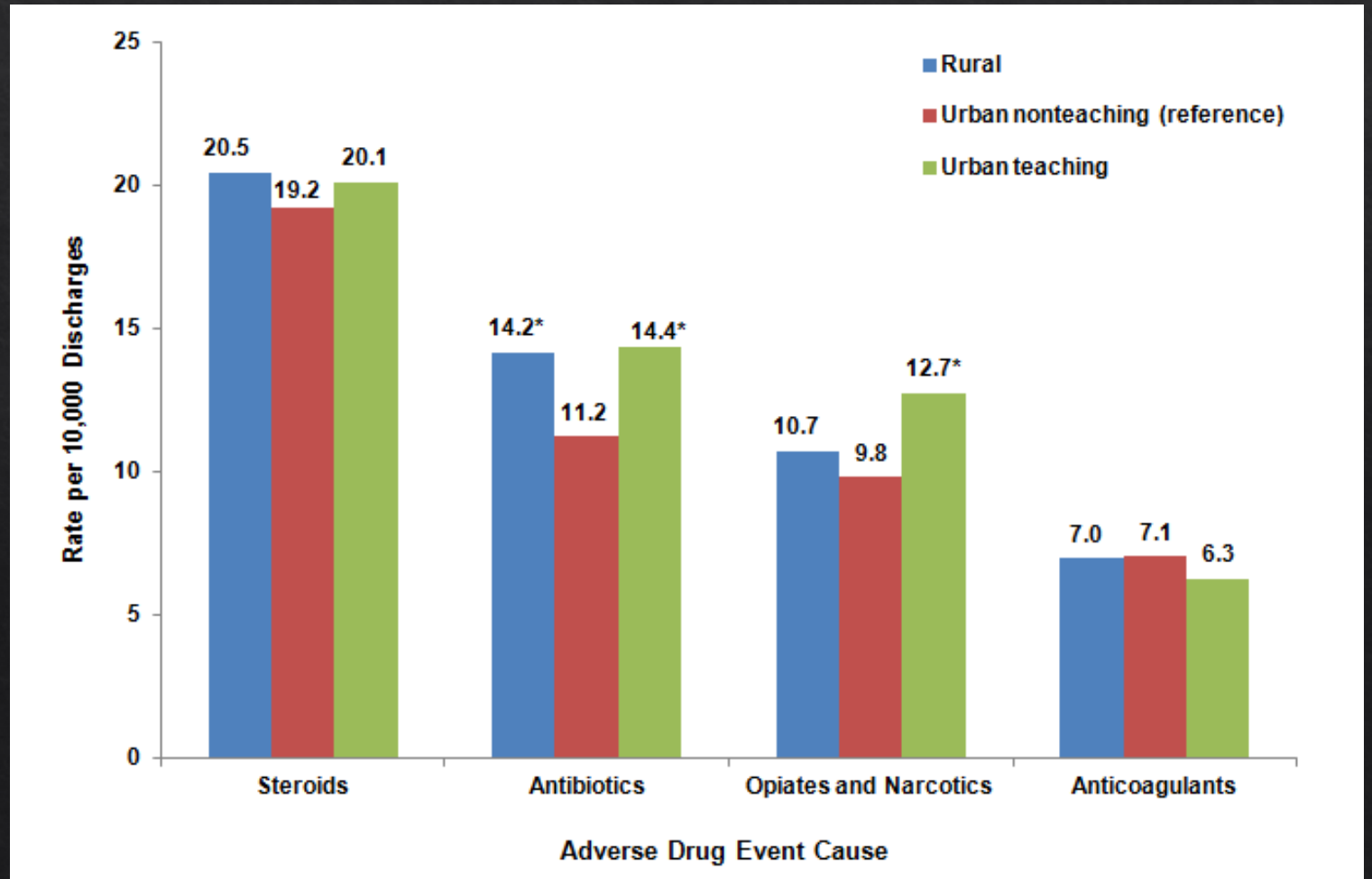
- Create a Culture of Safety
- Educate on Patient Safety
- Report events
- Complete root cause analyses
- Implement actions for improvement

ACGME Common Program Requirements. 2017

ADEs in Rural Hospitals

- Top 4 ADEs show no difference between hospital settings

Rates of common adverse drug events originating during the hospital stay by hospital teaching status, 2011



Agency for Healthcare Research and Quality (AHRQ), Center for Delivery, Organization, and Markets, Healthcare Cost and Utilization Project (HCUP), State Inpatient Databases (SID) for 32 States, 2011

Preventing ADEs in Rural Hospitals

- Training of hospital staff is imperative
- Internal Assessment
  - Example: IHI Trigger Tool for Measuring Adverse Drug Events
- Creation of committees for medication safety
- Medication reconciliations at all transitions of care
- Developing protocols and processes
  - Example: TALL-man lettering, monitoring parameters for medications, pharmacist review

Casey M et al. Resources to Reduce Adverse Drug Events in Rural Hospitals. University of Minnesota Rural Health Research Center Policy Brief. 2017 May 24.

What ADEs will be encountered in rural practices outside of the acute care setting?

What ADEs will be encountered in rural practices outside of the acute care setting?

What if we change the definition of ADEs?

Expanding Medication Adverse Events

- *Medication-Related Adverse Events*: Patient harm as a result of exposure OR inexposure to a medication, including barriers/delays to obtaining medication, unintended side effects, improper disposal, incorrect administration, and lack of adequate health literacy

- Examples:
  - Absence of nearby pharmacies
  - Medication counseling without a method for measuring patient understanding
  - Hoarding of medicines

- Prevention from a Public Health Perspective
  - Drug Take Back Days
  - Medication reconciliation
  - Telehealth medication counseling

- Are there medication problems of concern for **rural** patients (using expanded definition)?

Medications issues in rural areas

- **More medications than urban patients** (5.5 vs 3.7 meds per month in elderly patients)
- **Hoarding unused medications**
- **Pharmacies closing** (Travel avg. 20 miles)
- **High medication costs**
  - $495 per month
  - No significant difference from metro areas
- **Low adherence**
  - 50% have low adherence to medications
  - Equal to urban areas

Goeres LM et al. J Rural Health. 2016; 32(3): 269–279.
McMillan S et al. BMC Public Health. 20181; 8:1026.
Todd K et al. RUPRI Center for Rural Health Policy Analysis Policy Brief No. 2012-5. 2013.
Arbuckle C. J Rural Health. 2018; 34(4): 339-346.

Addressing the issues

MORE MEDICATIONS

HOARDING

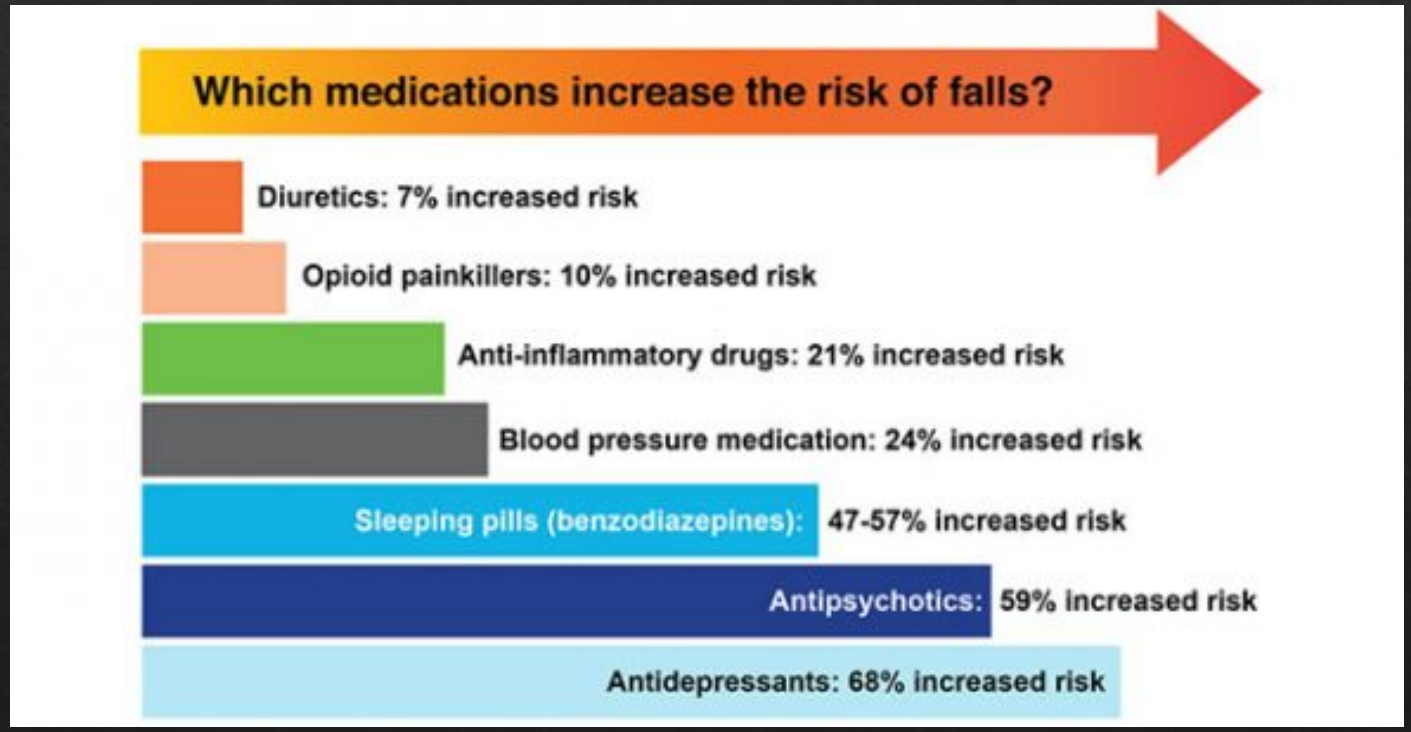
CLOSING OF PHARMACIES

COSTS

ADHERENCE

MORE MEDICATIONS

- Polypharmacy = greater risk for ADEs
  - Example: Fall risk in elderly
- How to mitigate risks
  - Routine monitoring
  - Deprescribing
  - Medication reviews
  - Patient education



(https://medshadow.org/medication-falls/)

Shade MY et al. J Gerontol Nurs. 2017;43(9): 21-30
Dagli and Sharma. J Int Oral Health. 2014 Nov-Dec; 6(6): i–ii.

Medication Monitoring

- Monitoring errors make up a **major** portion of medical errors
  - Dynamic patients, medication interactions, long term effects
- Why we don't routinely monitor
  - No perceived urgency
  - Usually fine
  - Bias of practice experience
  - Delegation
- Common classes of medications where monitoring is missed
  - Antidiabetics
  - Antihypertensives
  - Lipid lowering/cholesterol
  - Antipsychotics
  - Antiarrhythmics
  - Many more……

State Operations Manual. Centers of Medicare and Medicaid Services. Available at: https://www.cms.gov/Regulations-andGuidance/Guidance/Transmittals/downloads/R22SOMA.pdf Accessed Sept 2015. 2. Laboratory Monitoring Interval (in Months) Recommended for Chronic Medications, Table 2: Consult Pharm. 2008 May; 23(5): 387–395.

Common meds, not commonly checked

Medication/class	Monitoring Test	Frequency	Rationale
Aldosterone Antagonists (ex. Spironolactone)	Potassium Renal function	3 and 7 days after initiation, then quarterly	Hyperkalemia and worsening renal function risk
ACEi or ARB (ex. Lisinopril, Losartan)	Potassium Renal function	1-2 weeks after initiation, then 1-2 times yearly	Kidney perfusion highly dependent on angiotensin for some patients
Statins (ex. Simvastatin)	Lipids	6-8 weeks after initiation or dose change	Assessing efficacy and dose adjustment
Amiodarone	TSH LFTs	Every 6 months	Thyroid dysfunction common, hepatotoxicity
Direct Oral Anticoagulants (ex. Rivaroxaban)	CBC, LFTs Renal function	Yearly Every 6 months	Bleeding risks, metabolized by liver, renal dose adjustments

Pharmacist's Letter/Prescribers Letter #260704. 2010. Volume 26.

How to effectively monitor meds

- **Panel management**
  - Assigned staff to review medications and set up monitoring appointment or lab draw
- **Alerts**
  - Reminders to prescribers about monitoring
- **Patient visit checklist**
  - Comprehensive monitoring at convenient times for patient

Deprescribing

- Why it's important
  - Eliminates mediations that may be ineffective or cause harm currently or in the future
  - Combats clinical inertia
    - Ex: Deprescribing aspirin

- **D-PRESCRIBE: A Trial to De-prescribe Inappropriate Medications in the Community Dwelling Elderly**
  - Design: Cluster-randomized trial at community pharmacies in Quebec
    - 489 patients at 69 pharmacies for 6 months
    - Pharmacist led intervention to deprescribe potentially inappropriate meds (PIMs) in the elderly
    - Included patient and prescriber involvement
  - Results: Significant difference in patients stopping PIMs in intervention group (43%) compared with the control group (12%)
  - Conclusion: Health care teams can work together to reduce use of potentially harmful medications

Martin P et al. *JAMA*. 2018;320(18):1889-1898.

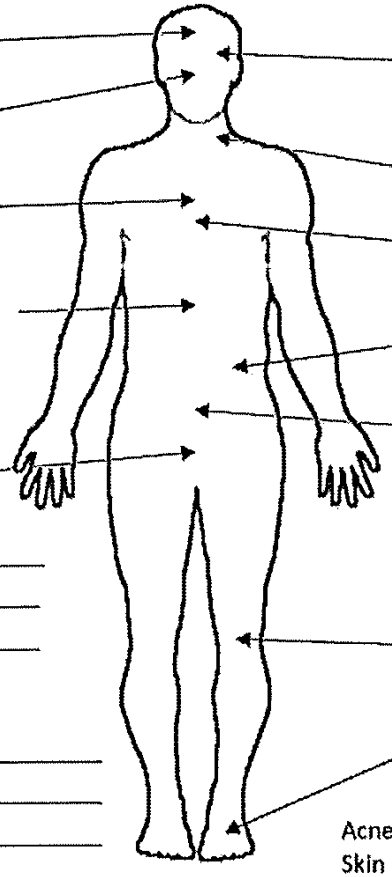
Medication Reconciliation

- According to the Joint Commission:
  - Medication reconciliation is **the process of comparing a patient's medication orders to all of the medications that the patient has been taking**
  - Looks for omissions, duplications, dosing errors, or drug interactions
  - **Recommended to be done at EVERY transition of care when new meds are ordered or changed**
- Why does it matter?
  - More than 40% of medication errors are believed to result from inadequate reconciliation in handoffs
- Improving the med rec process
  - Develop a workflow process, ex: nurse call or part of office visit intake forms
  - MedManage: a tool for primary care rural clinics
    - Increased reporting of over the counter products

Rozich JD, Howard RJ, Justeson JM, et al. Jt Comm J Qual Saf. 2004;30(1):5–14.;
The Joint Commission. Medication reconciliation. sentinel event alert. 2006. http://www.jointcommission.org/SentinelEvents/SentinelEventAlert/sea_35.htm;
Jarrett T et al. J Am Assoc Nurse Pract. 2019; 00(00): 1-6

MED MANAGE

Please list any medicine you have taken in the last two (2) weeks for these conditions.



Headache? _____

Allergy/Congestion? _____

Chest pain? _____

Diarrhea/Constipation? _____

Cramps/Menopausal/
Birth Control? _____

Eyedrops/
Eardrops _____

Sore throat/
Gum or tooth pain? _____

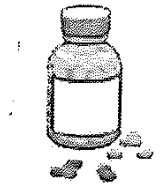
Heartburn/Indigestion/
Nausea? _____

Back Pain? _____

Difficulty urinating/
Erectile dysfunction? _____

Muscle or Joint pain/
Arthritis/Gout? _____

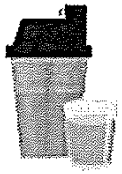
Foot pain? _____



Depression/ _____
Anxiety/ _____
Sleep _____

Herbals/Vitamins _____
Natural Remedies/ _____
Weight Loss Meds _____

Acne/Dandruff/ _____
Skin conditions/ _____
Patches _____



Shakes/Pills/ _____
Supplements/ _____
Energy drinks _____

Lotions/Creams/ _____
Ointments _____

Figure 2. MedManage patient worksheet.

Medication reconciliation for learners

- Teaching medical residents and students to do medication reconciliation (med rec) may reduce ADEs
  - In a systematic review, curriculum integration and interactive sessions **resulted more often** in increased confidence and knowledge for med recs

Proposed medication reconciliation teaching:

- Incorporation in lectures for 2nd year medical students
- During a rotation or clinical time (shadowing)
- Include a pharmacist
- Evaluate competency and confidence

Ramjaun A et al. BMC Med Educ. 2015;15(33):1-24
Lindquist LA et al. 2008;23(7):998–1001

Medication Education

- Medication Education for Patients =
  - How to take a medication
  - What it is for
  - What to expect
- Why is it important?
  - Closed loop communication
  - Patient engagement
  - Opportunity for questions
  - **Educating patients on meds reduces errors!**

http://lippincottsolutions.lww.com

Sherman J. Community and Clinical Pharmacy Resources: Chapter 3. 2013.
Heath S. How Patient Engagement, Education Can Improve Medication Safety. Patient Engagement HIT. 2016.

HOARDING

A "Home Pharmacy"

- Many patients keep extra medications at home
  - Increased with distance from medical facilities?
- Risks
  - Use of expired medications
  - Use for wrong indication
  - Medication sharing
  - Overdose
- Strategies to reduce medication hoarding
  - Home visits
  - Drug take back efforts
    - Envelopes for patients to mail back medications
    - Handouts for drug take back locations

US FDA. Disposal of Unused Medications: What you should know. 2019. https://www.fda.gov/drugs/safe-disposal-medicines/disposal-unused-medicines-what-you-should-know

Taking back medications

- Mail in services may be most feasible in rural areas
  - Available at public facilities: pharmacies, hospitals, libraries
  - Free mail in service
  - Safe disposal from Stericycle, Inc

Vermont Dept of Health. 2018. http://www.healthvermont.gov/media/newsroom/medication-mail-back-envelopes-august-2-2018

CLOSING OF PHARMACIES

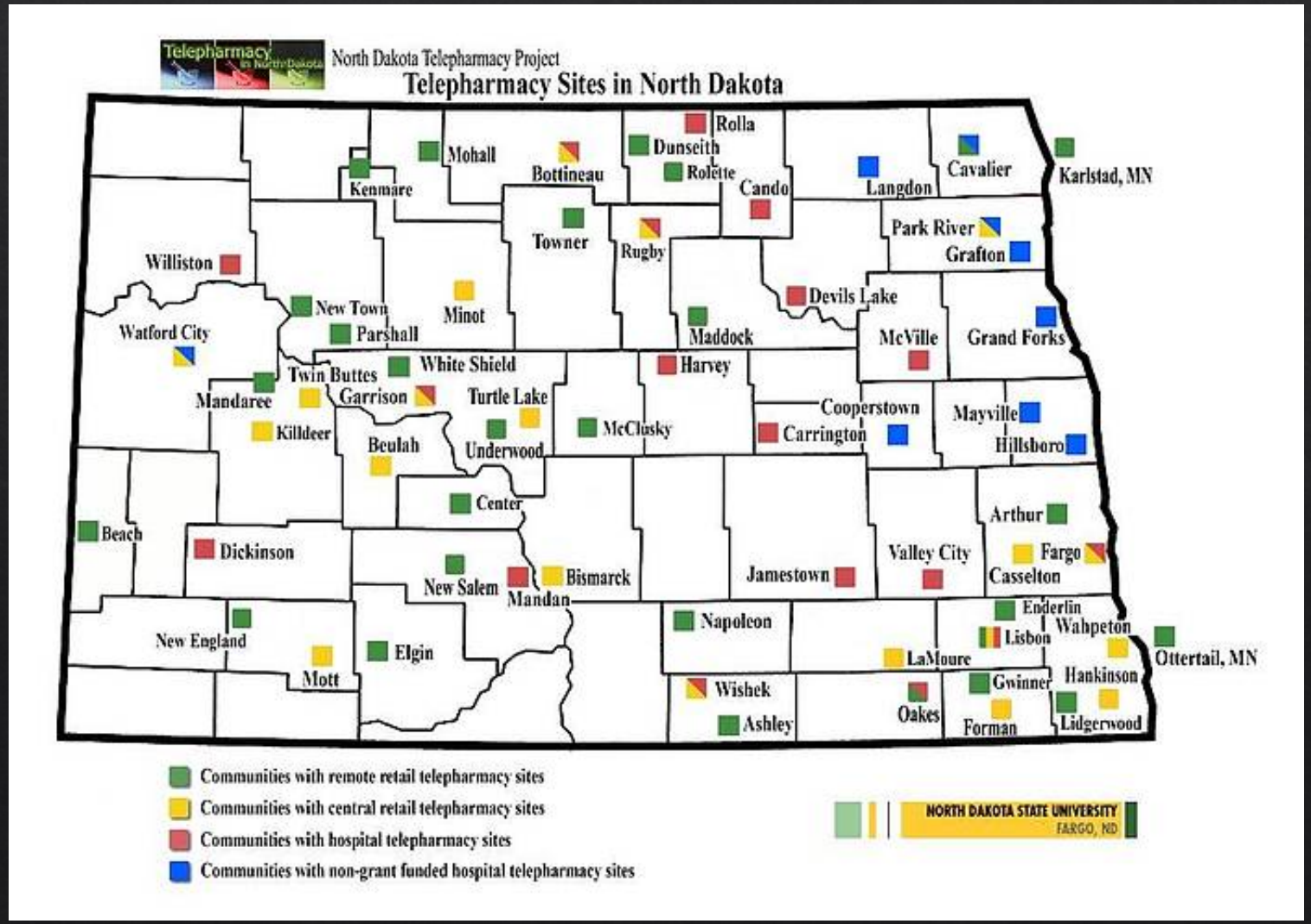
April 8, 2019

Pharmacies closing

- Since 2003, 16 % of independent rural pharmacies – or roughly 1,230 stores – have closed
  - 630 rural communities lost their only pharmacy
- Impact = Longer travel time - 20 miles (or ~ 27 minutes) for patients in areas where a pharmacy closed
- Solution Strategies
  - Mail order
  - Medications for acute illnesses in primary care
  - Telepharmacy

Esposito L. US News and World Report. 2018 Oct 17.
Mueller KJ. Update: Independently Owned Pharmacy Closures in Rural America, 2003-2018. Rural Health Research Gateway. 2018 July 26.

Telepharmacy



- North Dakota was the first state to pass rules allowing retail pharmacies to operate in certain remote areas without requiring a pharmacist to be present
  - Authorized in 23 states as of 2016
- North Dakota Telepharmacy Project
  - A licensed pharmacist at a central pharmacy site supervises a pharmacy technician at a remote telepharmacy site using video conferencing technology
  - Restored pharmacy services to 80,000 rural citizens

Telepharmacy. North Dakota State University. Available at: https://www.ndsu.edu/telepharmacy/
Tzanetakos G. et al. Am J Med Res. 2018;7–23

COSTS

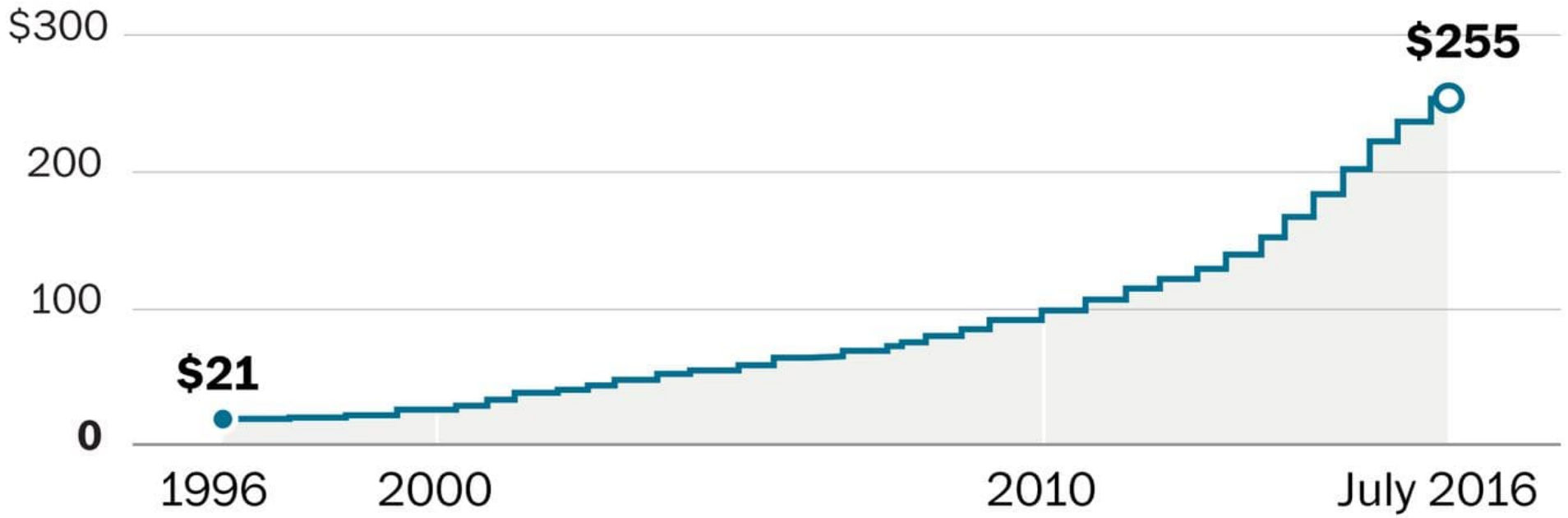
PERSONAL HEALTH

The Cost of Not Taking Your Medicine

Paul Rogers

The list price of Humalog insulin keeps going up

Since 1996, there have been more than two dozen price increases on a vial of Humalog insulin. Adjusted for inflation, the current price is 700% higher than it was 20 years ago.



Note: List price is in unadjusted dollars and does not reflect rebates or discounts

Source: Truven Health Analytics

THE WASHINGTON POST

Costs

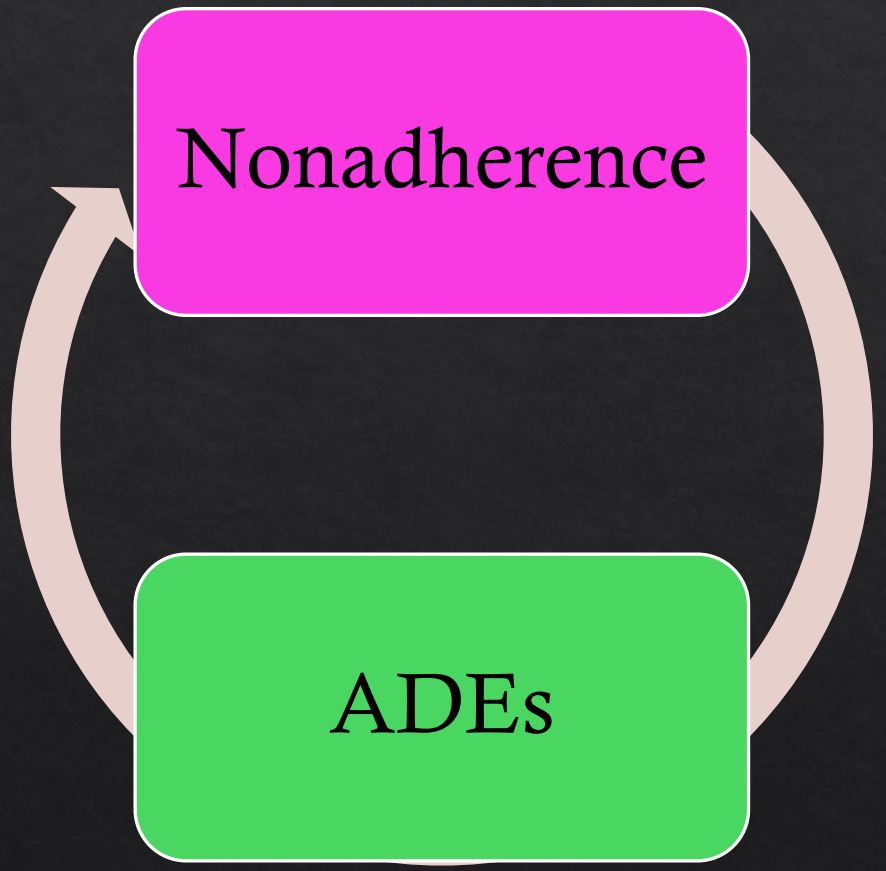
- Less adherence when costs are > $50 for a medication/month
- Free medications can increase adherence and reduce ADEs

- What can be done?
  - Discussing costs as a barrier to care
    - "Will you take this if it costs this much?"
  - Assistance programs and coupons
    - Care managers to assist with paperwork
  - Activism

The most expensive medication is the one the patient doesn't take.

Rogers P. The Cost of Not Taking Your Medicine. NY Times. 2017 April 4.

ADHERENCE



Adherence Stats

- **A LOT OF PEOPLE DON'T TAKE MEDS AS PRESRIBED**
  - 20 - 30 % of medication prescriptions are never filled
  - 50 % of medications for chronic disease are not taken as prescribed

- Costs
  - Hospitalizations from side effects of improper use
  - $100 billion to $289 billion a year in costs to American healthcare system

Viswanathan M et al. Ann Intern Med. 2012 Dec 4; 157(11):785-795

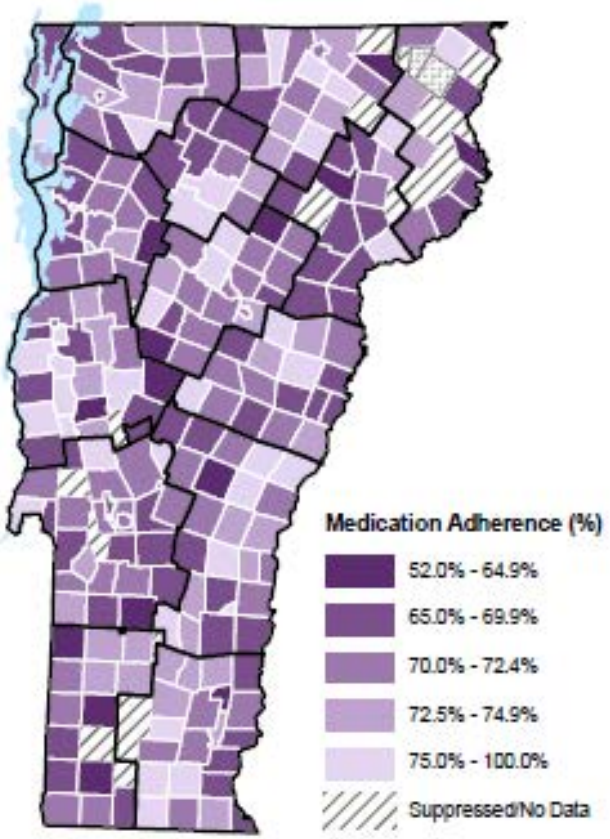
Adherence and Medication Access in VT

- Adherence is tied to Access (to PCP and Pharmacist)
  - Data from GIS mapping on blood pressure medication adherence and pharmacy access in Vermont indicate that that access and adherence are related
  - Report conclusions: "Many Vermont towns with limited access to community pharmacies also have lower rates of blood pressure medication adherence."

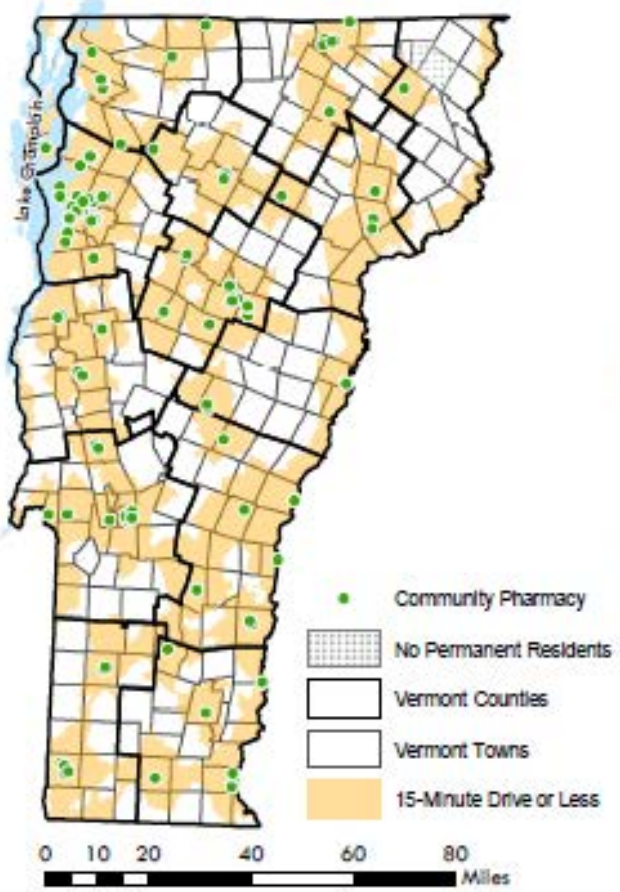
Vermont Department of Health. May 2019. Sourced from: Green Mountain Care Board (GMCB) Vermont Health Care Uniform Reporting and Evaluation System (VHCURES), 2017; Blueprint for Health, 2017

Map 1: Drive Times to Community Pharmacies and Blood Pressure Medication Adherence* among Adults Aged 18 and Older, by Vermont Town, 2014-2016

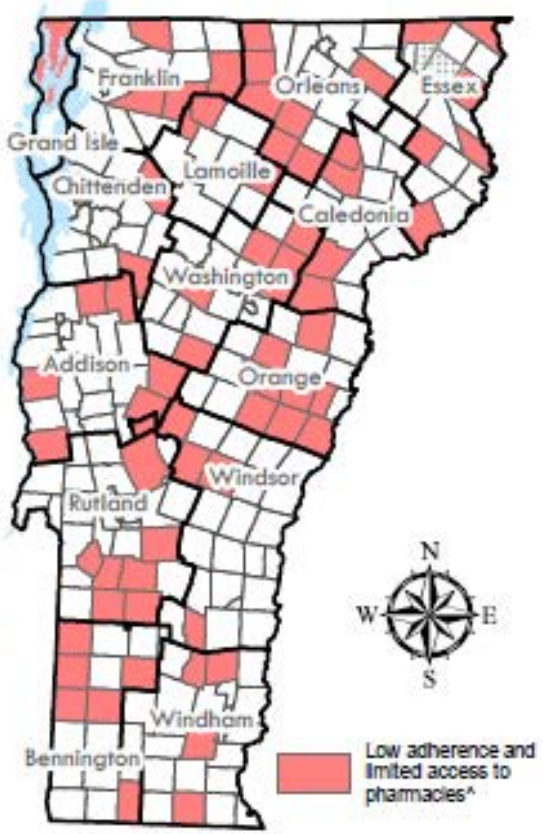
Blood Pressure Medication Adherence*, by Town



Drive Time to Pharmacies In/Near Vermont



Towns With Low Adherence and Limited Pharmacy Access^



* A person was considered adherent to their blood pressure medication if they had a "proportion of days covered" (PDC) value of 80% or higher (i.e. medication available for 80% of days or more from the time of the first medication fill through the end of the calendar year).

^ Low adherence are towns with less 75.5% of persons at least 80% adherent*. Limited pharmacy access are towns whose town center is greater than a 15-minutes drive to a community pharmacy.

Data Source: Green Mountain Care Board (GMCB) Vermont Health Care Uniform Reporting and Evaluation System, 2014-2016.
All analyses, conclusions, and recommendations provided here are solely those of the Vermont Department of Health and not necessarily those of the GMCB.

VERMONT
DEPARTMENT OF HEALTH
AHS.VDHGIS@Vermont.gov
November 2018

Determining Non Adherence

- Direct Measures
  - Medication Possession Ratio
  - Pill Counts

- Indirect Measures – Screening tools
  - Morisky Medication Adherence Scale (MMAS 4 and MMAS 8)

Morisky's instrument (MMAS-4)

Questionnaires

1. Do you ever forget to take your medication?
2. Are you careless at times about taking your medication?
3. When you feel better, do you sometimes stop taking your medication?
4. Sometimes, if you feel worse when take your medicine do you stop taking it?

Number of patients who said "no" to all four questions were considered adherent to medications

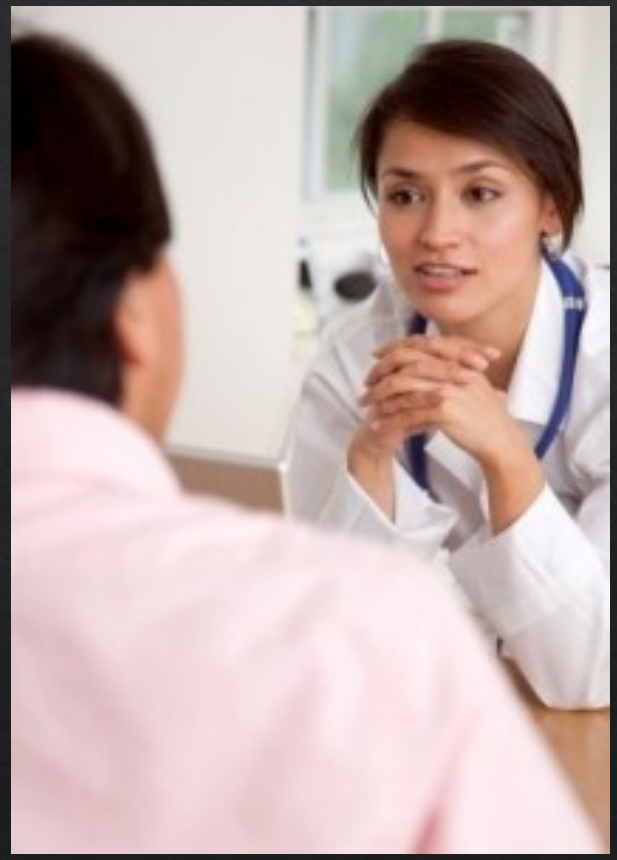
Yin Lam W and Fresco P. Biomed Res Int. 2015. ID 217027. p 1-12.

Combating Non Adherence

- Simplifying drug regimens
- Pre-packaged meds
- 90-day supplies
- Lower costs
- Education on the medication and how to take it
- Adherence tools: boxes, apps
- Following up with patients on whether they are using their drugs and whether they are experiencing any problems

Lamb E. Strategies and Tools for Promoting Medication Adherence. Pharmacy Times. 2006 Dec 1.

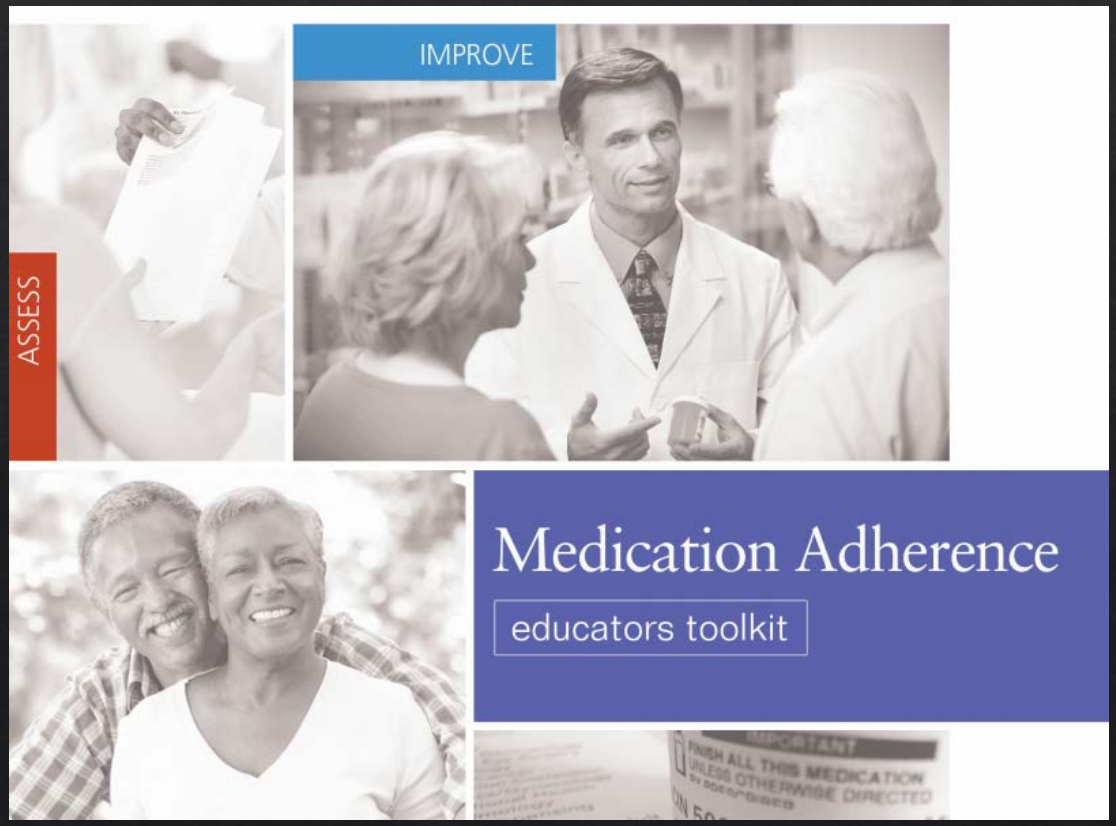
Have you talked to your patient about adherence today?



Educator Tools

AACP-NCPA Medication Adherence Educators Toolkit

https://www.aacp.org/sites/default/files/aacp_ncpa_medication_adherence_educators_toolkit_0.pdf



Addressing the issues

MORE MEDICATIONS

HOARDING

CLOSING OF PHARMACIES

COSTS

ADHERENCE

In what ways can medical students and residents help reduce ADEs for patients in rural areas?

In what ways can medical students and residents help reduce ADEs for patients in rural areas?

- Recognize differences in medication related needs
- Medication reconciliation during a home visit
- Teach back method with a patient
- Telepharmacy, mail order medication options or pharmacy connection
- Choosing lower cost medications

Teaching medical students and residents about "med rec"

- Medication reconciliation (med rec) is an important step in identifying potential adverse drug events
- Formal education on med rec can vary by institution and preceptor
- **A pharmacist** is situated to provide a comprehensive review of the med rec process to identify:
  - Errors
  - Therapeutic alternatives
  - Patient knowledge gaps
  - Lab values needed
  - Lower drug costs

Project: Medical student and resident perceptions of ambulatory pharmacy in an adult medicine evening clinic

- **Objectives:**
  - Determine changes in medical students' and residents' perceptions of pharmacists after year-long interactions in an adult medicine clinic at University of Washington
  - Identify areas of opportunity to educate medical students and residents about pharmacy topics and pharmacists' responsibilities

- **Intervention:** Teaching (called clinical conference) performed monthly at a resident and student led clinic from 2017-2018
  - 30 minutes sessions on med rec and other medication topic by a pharmacist
  - Pharmacist available at clinic weekly to review med student medication orders and treatment plans

- **Outcomes:** Residents and students found med rec an important topic and improved their knowledge about the pharmacist's role
  - More shared responsibility between pharmacists and student provider for med rec
  - Incorporated change - pharmacist and student co-visits to observe and teach med rec process

Key Points

- Medication adverse events are different for rural communities, especially in an outpatient setting

- Key issues that need to be addressed by learners and site providers are:
  - More medications
  - Hoarding
  - Closing of Pharmacies
  - Cost
  - Adherence

- Steps can be taken to:
  - Redefine ADEs for rural patients
  - Identify ADEs
  - Incorporate ADE management techniques into medical school and residency curriculums

Reducing Medication Related Adverse Events in Rural Communities

Amy Yanicak, PharmD, MPH

Assistant Professor at Albany College of Pharmacy and Health Sciences (Colchester, VT)

Clinical Ambulatory Care Pharmacist at Richmond Family Medicine (Richmond, VT)