Understanding and Improving

MEDICATIO
ADHERENC

in the Community Pharmacy

OFFROAD

PHARMACY PROGRAM

Understanding and Improving

MEDICATION ADHERENCE

in the Community Pharmacy Setting

- 1 CPE
- CFPR Provider #00076
- Educational Support from Abarca Health

OBJECTIVES

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DISCLOSURE

OBJECTIVE #1

Describe the importance of medication adherence

What is adherence?

- According to the Oxford Dictionary, “adherence” is defined as the act of behaving according to a particular rule, following a particular set of beliefs, or a fixed way of doing something.[1]

- The World Health Organization (WHO) refers to medication adherence as being compliant to a medication regimen. This refers to taking a medication according to the dose and instructions prescribed by the physician.[2]

Most research has focused on medication adherence; however, adherence also encompasses numerous health-related behaviors that extend beyond taking prescribed medications.

What is adherence?

When discussing medication adherence, it is important to differentiate between adherence and compliance.

- **Compliance** suggests a process in which dutiful patients passively follow the advice of their physicians, whereas **adherence** involves the patient's active participation in the care and decision-making process for themselves considering physician orders.

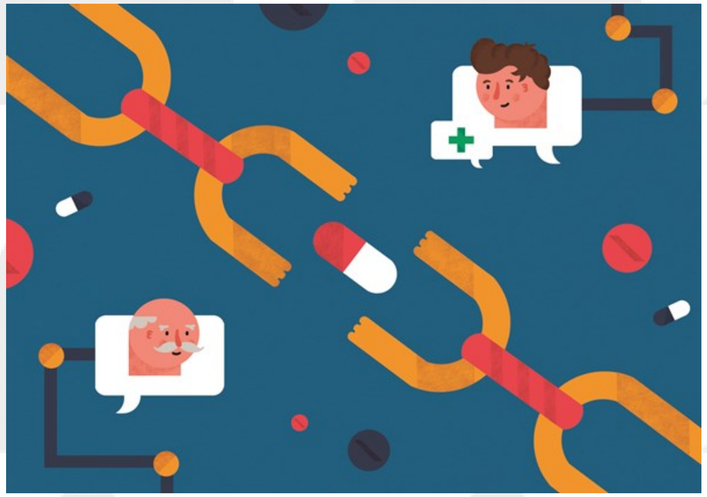
- The main difference is that adherence requires the patient's agreement to the recommendations.

Persistence also needs to be considered. This refers to the act of continually taking the prescribed medication. Adherence involves the active, voluntary, and collaborative involvement of the patient in a mutually acceptable course of behavior to produce a therapeutic result.[3] Persistence refers to the overall duration of drug therapy.

Medication Adherence

Medication Adherence is an ever-growing concern for clinicians, healthcare systems, and other stakeholders.

Non-adherence has become more prevalent throughout the years and there is significant evidence that correlates it with adverse clinical outcomes and higher healthcare costs. Nonadherence leads to low medication efficacy, the appearance of adverse effects, and overall poorer quality of life for patients.



Medication Non-Adherence

Medication non-adherence represents a risk for the health care system, healthcare professionals, and payers because of the ample evidence that non-adherence leads to adverse events and higher therapy costs.

- Approximately **20% to 30%** of patients never initially fill their medications, which leads to an increase in direct and indirect health care costs. 25% to 50% of patients then stop their medications within 1 year of their treatment initiation, which, in the worst-case scenario, leads to hospitalizations.[4]

- Medication adherence can have a more direct impact on patient outcomes than the specific treatment itself. Medication adherence can affect quality and length of life, health outcomes, and overall healthcare costs. Non-adherence can account for up to 50% of treatment failures, around 125,000 deaths, and up to 25% of hospitalizations each year in the United States.[5]

How much does non-adheren
the healthcare system?

In 2012, a review was published in *The Annals of Internal Medicine* that stated that non-adherence costs the U.S. healthcare system $100B-$300B per year.

In 2018, a pharmacist from the Massachusetts College of Pharmacy and Health Science wrote an article for *Pharmacy Times* questioning this amount.

> *The fact is that many people assume that the $300 billion is the result of non-adherence when it would be better to say that the cost is related to the entire range of inappropriate medication use in the United States. The authors contend that non-optimized medication therapy may lead to more care and possibly new medical problems needing further treatment.*[6]

Non-adherence to medicat

In patients with cardiovascular disease this is a common situation pre and post a hospital admission. This also accounts for the outpatient setting. As a result, non-adherence to cardiovascular medications has been associated with increased risk of morbidity and mortality.

For example: *Patients with coronary artery disease that were non-adherent to cardio-protective medication had a 50-80% relative increase in risk of mortality.*[7]

Sokol et al. reported that greater adherence to medication for chronic conditions such as hypertension, diabetes mellitus, hypercholesterolemia, and heart failure was associated with higher medication costs but lower non-medication medical costs, yielding a net overall reduction in healthcare costs.[8]

The WHO has established 5 re
for medication non-adherence

- **Health system:** poor quality of provider-patient relationship; poor communication and lack of access to healthcare; lack of continuity of care; waiting time; scheduling time and appointment date; referral to specific doctors

- **Medical condition:** asymptomatic chronic diseases (lack of physical cues); mental health disorders (depression)

- **Patient:** physical impairments (e.g. vision problems or impaired dexterity); cognitive impairment; psychological/behavioral impairments; younger age

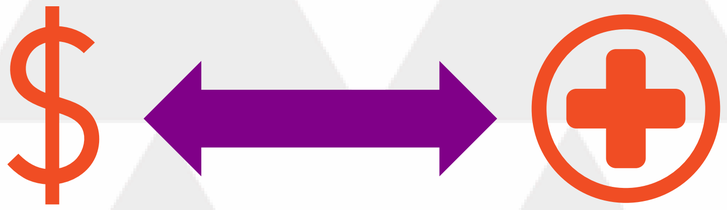
- **Therapy:** complexity of regimen; side effects

- **Socioeconomic:** low literacy; higher medication costs; poor social support; previous experience of relatives or friends with similar disease

Is there an impact/relationship between copayment and medication non-adherence?

- Some studies suggest that medication costs can have a significant impact on adherence, and future studies are needed to assess whether lowering medication costs can improve medication adherence and clinical outcomes.[10]

- Medication non-adherence could be the result of gaps in care. A gap in care can be defined as the failure to translate and utilize medical knowledge effectively by physicians and patients.[11]



OBJECTIVE #2

Describe the 3 CMS medication adherence metrics and provide examples of medications in each metric

- The Centers for Medicare & Medicaid Services (CMS) uses a five-star quality rating system to measure Medicare beneficiaries' experience with their health plans and the health care system.

- The CMS Star Rating System began in 2007 as a way for CMS and compare Medicare Advantage health plans.

    - This rating system applies to all Medicare Advantage (MA) lines of business. It also applies to Medicare Advantage plans that cover both health services and prescription drugs (MA-PD).

- The program is a key component in financing health care benefits for MA and MA-PD plan enrollees. With federal provisions dictating payment incentives for better overall performance, there is a financial reward for improving quality performance.

- Individual plan's ratings are posted on the CMS consumer website, www.medicare.gov, to assist beneficiaries in choosing among the MA and MA-PD plans offered in their area.

The measures target a broad range of clinical quality, customer satisfaction, regulatory compliance, and other beneficiary experience areas.

- The overall star rating is determined through numerous performance measures across several performance domains.

- Each measure is awarded a star rating and the individual measure's stars are then aggregated at the domain and summary level.

What are the Star Rating's d

A health plan's rating is based on measures in five categories:

1. Staying Healthy: includes screenings, tests and immunizations
2. Managing Chronic (Long-term) Conditions
3. Member's Experience with the Health Plan
4. Member Complaints and Changes in the Health Plan's Performance
5. Health Plan's Customer Service

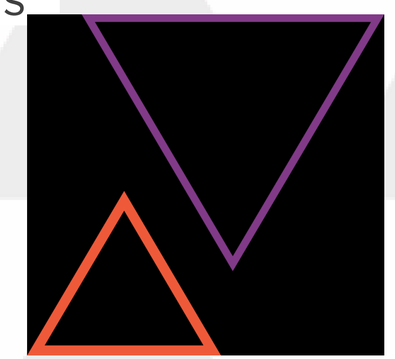
A Medicare drug plan's rating is based on measures in four categories:

1. Drug Plan Customer Service
2. Member Complaints and Changes in the Drug Plan's Performance
3. Member's Experience with the Drug Plan
4. Patient Safety and Accuracy of Drug Pricing

Measures in both of these categories are used to rate MA health plans. CMS sets the thresholds for each measure annually.

Good star ratings can position plans to receive quality bonus payments from the federal government.

- Five-star plans are permitted to market year-round to consumers.
- Patients can choose to leave their current plan for a five-star plan at any point during the year.
- Patients cannot enroll in a plan if it received less than three stars for three consecutive years (these plans may be terminated).
- Patients are more likely to choose a plan with a higher star rating.



The CMS Star Rating System has three measures related to medication adherence.

- These Adherence Measures were developed by the Pharmacy Quality Alliance (PQA).

- The PQA is a non-profit organization that develops consensus-based measures for medication safety, adherence and appropriate use.

    - Five PQA measures are included in the Medicare Part D Star Ratings, three of which are related to medication adherence.[12]

Star Ratings and Medication Adherence

Adherence Measure	Description and Eligibility	Examples of medications included in the measures
Adherence to Diabetes Medications	Percent of plan members who fill their prescription specific for the adherence measure often enough to cover 80% or more of the time they are supposed to be taking the medication. To be a candidate for the measure, a patient should have at least two paid claims of any of the medications considered in the measure at any time during the calendar year.	Oral anti-diabetic medications (insulins are not included in the measure): • Biguanides: metformin • Sulfonylureas: glipizide, glimepiride, glyburide • Thiazolidinediones: pioglitazone • DPP-IV inhibitors: sitagliptin, saxagliptin, linagliptin • SGLT-2 Inhibitors dapagliflozin, empagliflozin, canagliflozin • Meglitinides: repaglinide, nateglinide • GLP1-RA: lixisenatide, exenatide, semaglutide
Adherence to Hypertension Medications (RAS antagonists)		• ACE-I: lisinopril, enalapril, ramipril • ARB: losartan, irbesartan • Renin Inhibitors: aliskiren
Adherence to Cholesterol Medications (Statins)		Statins: atorvastatin, rosuvastatin, pravastatin, simvastatin, lovastatin, pitavastatin

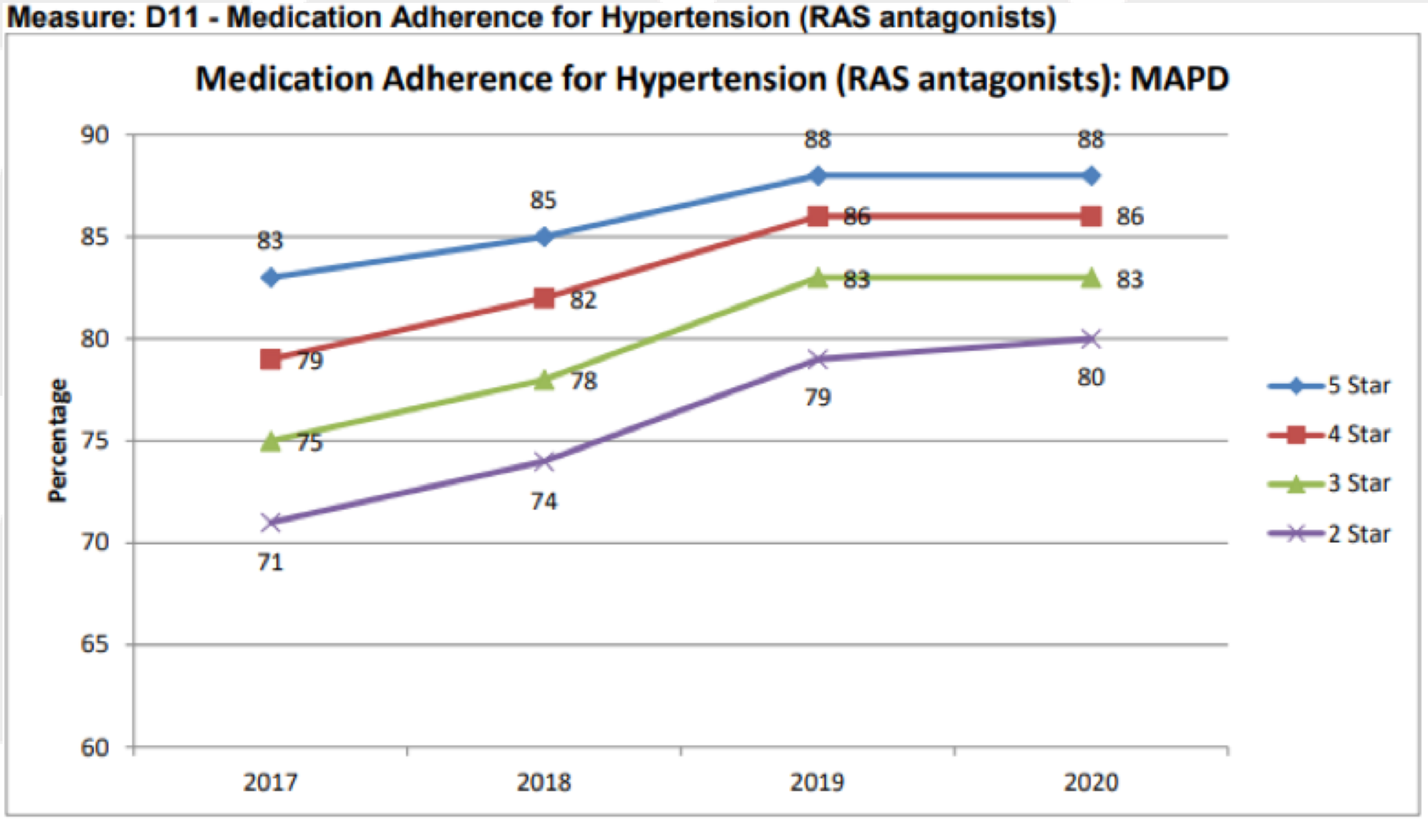
How are adherence measure

Every year during fall, CMS publishes guidance on how to calculate each measure, and the cutpoints for each one: (https://www.cms.gov/Medicare/Prescription-Drug-Coverage/PrescriptionDrugCovGenIn/PerformanceData)

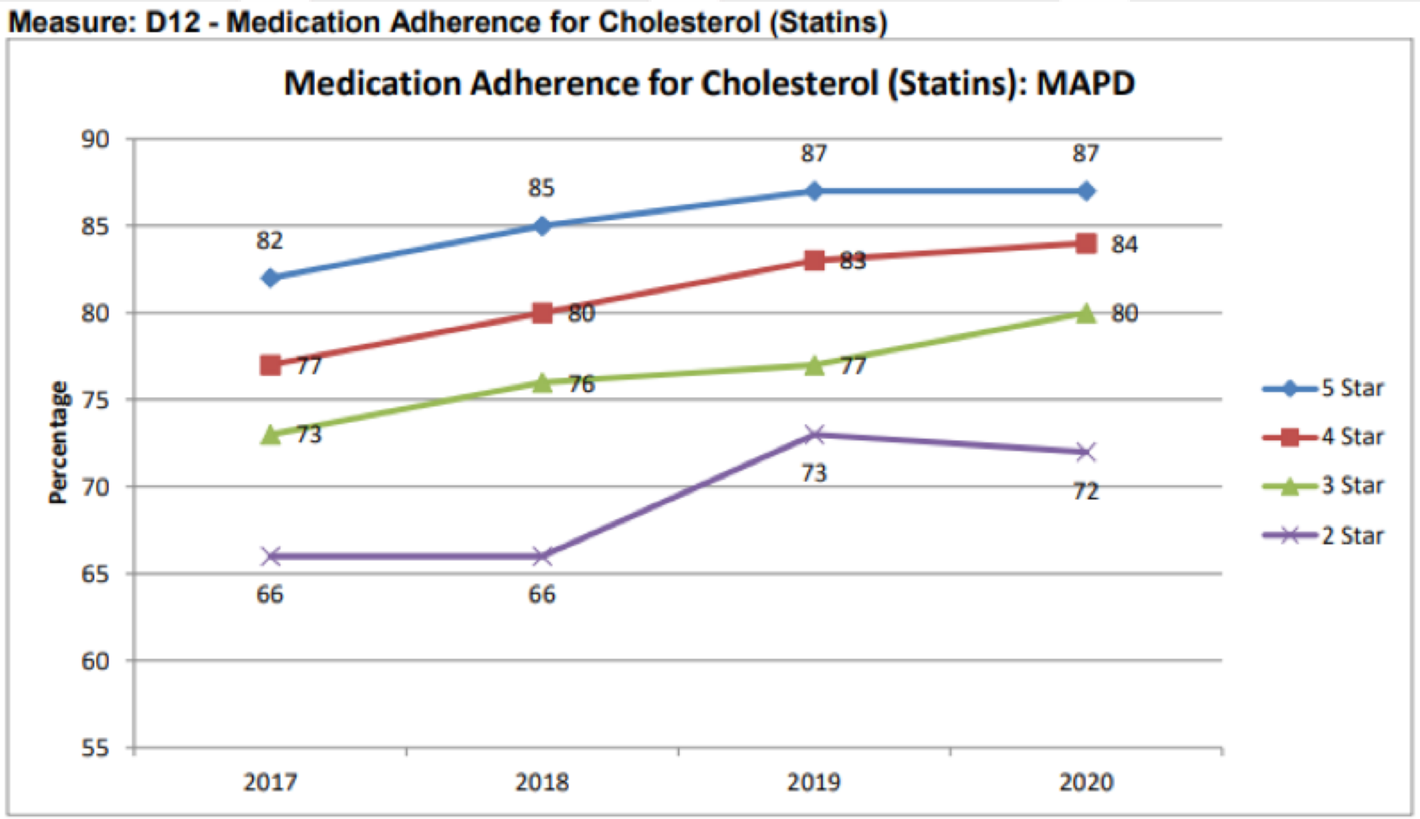
- As a general rule in terms of adherence, the higher the score the better.
- No medication can be effective if the patient is not taking it appropriately.
- For the past 4 years, the CMS's cut points have remained stable, with smaller annual increases in thresholds.

CMS Star Ratings Cut Points:

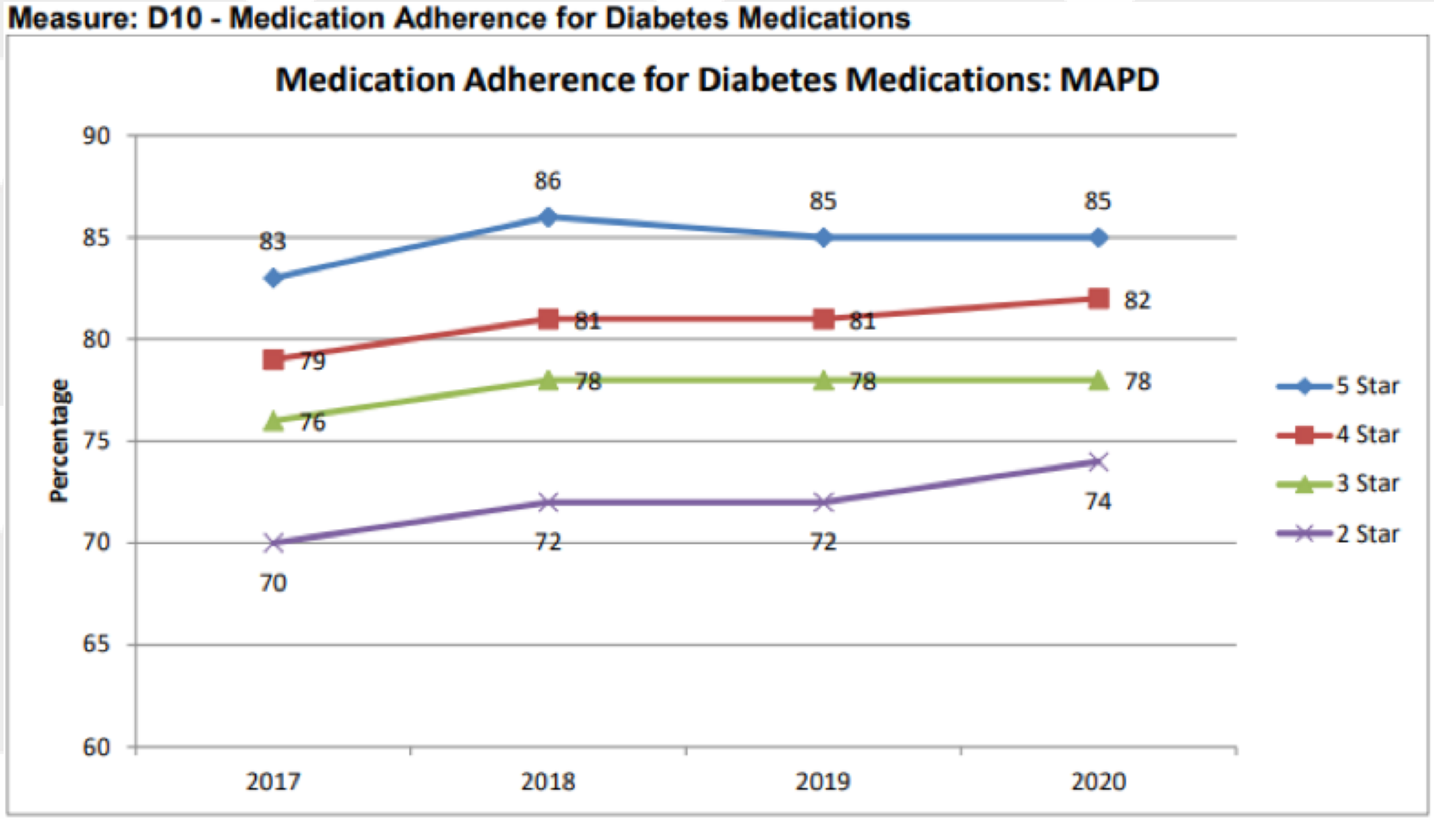
Adherence to Hypertension Medications (RAS antagonists)



CMS Star Ratings Cut Points:
Adherence to Cholesterol Medications (Statins)



CMS Star Ratings Cut Points:
Adherence to Diabetes Medications



ADHERENCE TO CHOLESTEROL MEDICATIONS

Medication Adherence for Cholesterol

Description: Percent of plan members with a prescription for a cholesterol medication (Statins) who fill their prescription often enough to cover 80% or more of the time they are supposed to be taking the medication.

Star Ratings Cut points for 2020

MA-PD	< 75%	≥ 75% to < 80%	≥ 80% to < 84%	≥ 84% to < 87%	≥ 87%
PDP	< 79%	≥ 79% to < 83%	≥ 83% to < 86%	≥ 86% to < 88%	≥ 88%

Commercially Available Statins

				Avoid	Maximum Dose	
ATORVASTATIN Lipitor™Caduet™	10-20mg	Moderate	30%–49%	Strong CYP3A4 Inhibitor: - Itraconazole - Ketoconazole - Posaconazole - Voriconazole - Clarithromycin HIV-Protease Inh. - Nefazodone - Cyclosporine - Gemfibrozil - Grapefruit juice (Simvastatin and Lovastatin)	SIMVASTATIN **Máx. 10 mg** Verapamil Diltiazem Dronedarone **Máx. 20 mg** Amiodarone Amlodipine Ranolazine **Máx. 40 mg** Ticagrelor **LOVASTATIN** **Máx. 20 mg** Diltiazem Verapamil Amlodipine **Máx. 40 mg** Amiodarone Ticagrelor	**Contraindications:** • Active Liver Disease • Unexplained LFT elevations • Hypersensibility or allergy to any of the ingredients • Pregnant women or nursing mothers **Statins that should be taken at night:** • Simvastatin • Lovastatin >>>All other statins can be taken anytime during the day, but it's important to be consistent.
	40-80mg	High	≥50%			

Commercially Available Statins

				Avoid	Maximum Dose	
ROSUVASTATIN Crestor™	5-10mg	Moderate	30%–49%	**Strong CYP3A4 Inhibitor:** - Itraconazole - Ketoconazole - Posaconazole - Voriconazole - Clarithromycin HIV-Protease Inh. - Nefazodone - Cyclosporine - Gemfibrozil - Grapefruit juice (Simvastatin and Lovastatin)	**SIMVASTATIN** **Máx. 10 mg** Verapamil Diltiazem Dronedarone **Máx. 20 mg** Amiodarone Amlodipine Ranolazine **Máx. 40 mg** Ticagrelor **LOVASTATIN** **Máx. 20 mg** Diltiazem Verapamil Amlodipine **Máx. 40 mg** Amiodarone Ticagrelor	Contraindications: • Active Liver Disease • Unexplained LFT elevations • Hypersensibility or allergy to any of the ingredients • Pregnant women or nursing mothers **Statins that should be taken at night:** • Simvastatin • Lovastatin >>>All other statins can be taken anytime during the day, but it's important to be consistent.
	20-40mg	High	≥50%			
PRAVASTATIN Pravachol™	40-80mg	Moderate	30%–49%			
	10-20mg	Low	< 30%			
LOVASTATIN Mevacor™	40mg	Moderate	30%–49%			
	20mg	Low	< 30%			
SIMVASTATIN Zocor™ Vytorin™	20-40mg	Moderate	30%–49%			
	10mg	Low	< 30%			

Clinical Background

- **Cardiovascular disease (CVD) is the leading cause of death worldwide.**
  - *CVD accounts for about 1 in 3 overall deaths per year in the U.S.*

- Statins are cholesterol lowering agents that have proven to decrease morbidity and mortality related to Cardiovascular Disease.

- Statins' efficacy have been proven in both primary prevention (patients who have never experienced an event) and secondary prevention (after a CV event or established ASCVD).

Medication Adherence and Statins

Possible causes of non-adherence

- High cholesterol is a symptomless condition, and adherence to therapy is a challenge. Most people don't see a benefit in taking the medication, as they don't feel immediate relief of any symptom.
- According to studies, about half of patients discontinue statin therapy within the first year, and adherence decreases with time.

Poor adherence to statins can increase CVD-related emergency department visits, hospitalizations, and healthcare costs.

- A 10% reduction in statin-medication possession ratio, or MPR, is associated with a 5% increased risk for CVD-related hospitalizations.
- After an Acute MI, patients with decreased statin adherence had the worst mortality outcomes. However, patients with increased statin adherence had a similar risk of mortality compared with continuously adherent patients, suggesting that even after an Acute MI, it is not too late to improve statin adherence.[13]

Some specific causes of non-adherence to statin therapy reported in the literature include:

- Concerns about or experiences with adverse events (AEs) such as muscle-related effects, cognitive or memory problems, and new-onset diabetes are major causes of statin discontinuation [15].

- In a focus group of 18 participants, non-adherence was primarily due to concerns about or experiences with adverse events (AEs). Some of the concerns about statin AEs were due to information acquired from the internet.

- Uncertainty about the benefits or importance of statins

- The inconvenience of taking a medication and getting laboratory tests done

- Concerns regarding drug interactions
  - For example, patients wanting to drink grapefruit juice, which they were instructed to avoid.

Statin intolerance

Definition

- The National Lipid Association (NLA) defines **statin intolerance** as the inability to tolerate at least two statins, one at the lowest starting daily dose and another at any daily dose, either due to objectionable symptoms (real or perceived) or abnormal laboratory analysis, temporally related to statin treatment, reversible upon statin discontinuation, reproducible by re-challenge (restarting medication), and excluding other known factors.[17]

- Symptomatic criteria are intolerable muscle symptoms (pain, weakness or cramps with or without CK changes) or severe myopathy, and they must appear in the first 12 weeks after initiating treatment or dose increase. Symptoms must improve or disappear within four weeks of statin discontinuation.

Statin intolerance

- Most cases of the discontinuation of statins are due to muscle complaints. Side effects of statin use other than statin-associated muscle symptoms (SAMS), which could affect a patient's quality of life, are headache, dyspepsia, nausea, alopecia, and erectile dysfunction.

- Statin intolerance is not mere occurrence of symptoms or laboratory abnormalities; they must occur after initiating therapy, improve with statin discontinuation, and reappear when statin is reintroduced. In addition, disorders with similar manifestations, and the so-called “nocebo effect” should be excluded.

Literature Review on Statin Intolerance

- Data from Clinical Trials have shown that some AEs attributed to statins are not caused by them and that statin treatment is generally as well tolerated as placebos.

- In a systematic review of 26 clinical trials, 12.7% of subjects treated with statins and 12.4% with placebos referred to muscle complaints.

Strategies to improve adherence to statin therapy

- Evaluate the reasons for non-adherence.

- When a patient on statin develops muscle symptoms, assess whether the symptoms are attributable to statin or not by measuring CK levels, evaluate risk factors for intolerance or other causes of the symptoms, and determine the effect of temporary withdrawal of statins followed by re-challenge.

- Emphasize on the demonstrated cardiovascular benefits of statins and explain that myopathy is a very rare AE.
    - Statins are effective for secondary prevention. After a patient experiences an AMI, counseling about the need for statin therapy that is tailored to the patient's experience may increase the likelihood of positive adherence changes and better clinical outcomes.

ADHERENCE TO DIABETES MEDICATIONS

Medication Adherence for Diabetes Medications

Definition: Percent of plan members with a prescription for diabetes medication who fill their prescription often enough to cover 80% or more of the time they are supposed to be taking the medication.

- This measure is defined as the percent of Medicare Part D beneficiaries 18 years and older who adhere to their prescribed drug therapy across classes of diabetes medications: biguanides, sulfonylureas, thiazolidinediones, and DiPeptidyl Peptidase (DPP)-IV Inhibitors, incretin mimetics, meglitinides, and sodium glucose cotransporter 2 (SGLT2) inhibitors.

Star Ratings Cut points for 2020

MA-PD	< 74%	≥ 74% to < 78%	≥ 78% to < 82%	≥ 82% to < 85%	≥ 85%
PDP	< 79%	≥ 79% to < 83%	≥ 83% to < 85%	≥ 85% to < 88%	≥ 88%

Examples of commercially available diabetes medications included in the measure

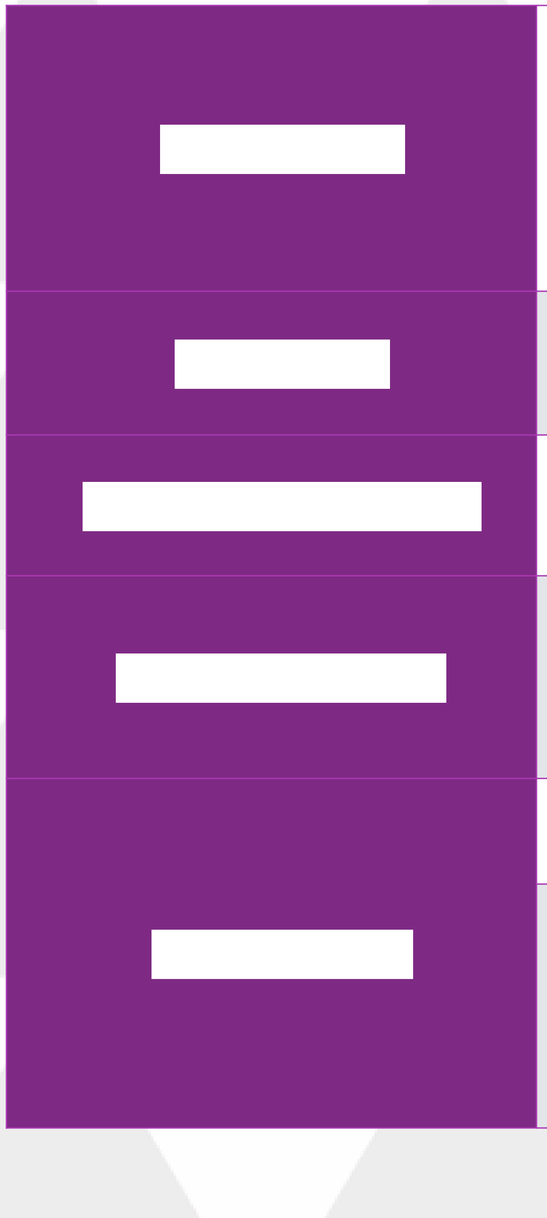
Adlyxin® (Lixisenatide) (SubQ), Bydureon® (Exenatide) (SubQ), Byetta® (Exenatide) (SubQ), Ozempic® (Semaglutide) (SubQ), Rybelsus® (Semaglutide) (PO), Saxenda® (Liraglutide) (SubQ), Tanzeum® (Albiglutide) (SubQ), Trulicity® (Dulaglutide) (SubQ), Victoza® (Liraglutide) (SubQ)	Farxiga® (Dapagliflozin) (PO) Invokana® (Canagliflozin) (PO) Jardiance® (Empagliflozin) (PO) Steglatro® (Ertugliflozin) (PO)
Metformin	Actos (Pioglitazone) (PO)
Onglyza® (Saxagliptin) (PO) Januvia® (Sitagliptin) (PO) Nesina® (alogliptin) (PO) Tradjenta® (Lingliptin) (PO)	Glyburide (PO) Glipizide (PO) Glimepiride (PO)
Prandin® (Repaglinide) Starlix® (Nateglinide)	

Clinical Bac

- Diabetes Mellitus is a group of metabolic disorders in which the body's ability to produce and/or use insulin is affected, resulting in elevated levels of glucose in the blood.

- There are different types of diabetes, but regardless of the pathophysiology, chronic elevated blood glucose levels are associated with microvascular and macrovascular complications that increase morbidity and mortality in people with this condition.

Diabetes Statistics in the United States



34.2 millions 10.5% of the population	Diagnosed 26.8 million	Not Diagnosed 7.3 million	
Approximately 1.5 million people are diagnosed with diabetes each year			
Puerto Ricans 12.4%	Cubans 6.5%	Mexican American 14.4%	South Americans 8.3%
14.3 million or 26.8% of the population with Diabetes are 65 years or older			
88 million Americans > 18 Years old were diagnosed with pre-diabetes			
Deaths Diabetes is the 7th leading cause of death in the United States		**Cost** ~ $327 billion annually	

Adherence to Diabetes Medications

- Patient non-adherence poses a significant barrier to effective management of diabetes and can place a significant burden on the patient and the healthcare system, resulting in increases in costs, morbidity, and mortality. Therefore, effective treatment and long-term management of diabetes requires a patient-centered collaborative model of care with an understanding of the factors associated with non-adherence.

- A 2013 study found that when hospitalizations caused by non-adherence were recorded at four different American hospitals, diabetes was the second leading cause. Only mental illness accounted for more.

- For patients with diabetes, non-adherence can increase risk for all-cause hospitalization (odds ratio [OR]: 1.58; *P* <.001) and can increase risk for all-cause mortality (OR: 1.81; *P* <.001).[19] Studies have also shown that lack of medication adherence can result in approximately 3 times higher hospitalization rates and almost double the associated healthcare costs[18].

Adherence to Diabetes Medications

- Clinical studies show that improved adherence is associated with improved glycemic control and decreased healthcare resource usage.
- Higher adherence has been shown to be associated with overall decreased costs, specifically lower acute care costs that lead to total cost reductions.
- Each 1% increase in adherence among 1,000 diabetes patients 65 years and older was associated with $65,464 all-cause cost savings over 3 years.

Barriers to Adherence [19]

- Forgetfulness
- Lack of perceived benefit
- For people with diabetes using insulin, fear of injection can be an additional barrier.
- Low income
- Low education levels
  - Different studies show that education and income are major socioeconomic determinants to adherence to anti-diabetic medications. Low income and educational levels have been associated with higher rates of non-adherence. Consequently, a poor economic base and illiteracy can result in substandard adherence outcomes to diabetes medications due to poor accessibility to healthcare services and self-care of diabetes. Educated patients were more adherent to therapy. Being less educated makes learning more difficult; as diabetes drug therapy gets more complex, patients are required to have more complex cognitive skills to be able to understand the prescribed drug therapy and to adhere to treatment for good glucose control.

Barriers to Adher

- Health literacy and medication beliefs
  - Along with the patient's knowledge of the disease and its treatment also play an important role in whether the patient will adhere to the treatment regimen[20]. Positive attitudes tend to be associated with better adherence outcomes.

- Complexity of patient's therapy

- Comorbidities and behavioral factors, such as cognitive function, mental illness, stress, and substance abuse, are important patient factors that determine adherence.

- Cost of treatment, particularly for patients with a low socioeconomic status, may be a limiting factor to medication adherence.
  - Studies have shown that the cost of diabetes treatment may result in newly diagnosed patients not seeking medical care after a diagnosis, or inconsistent or inappropriate use of medication.

Recommendations to improve adherence[21]

- Early identification of diabetes and management of medication-related tolerability issues are important to achieve positive outcomes.

- Creating an environment that is patient centered, ensuring open communication and providing patient education.

- Educating patients about their medical condition and treatment are key to changing attitudes toward adherence.
  - Patient education, including comprehensive medication reviews as part of MTM, can empower patients and improve treatment adherence.
  - The goal of a patient education program should be to alter patient behavior in a manner that promotes healthy lifestyle choices, disease self-management, and prevention of diabetes complications. Part of the program should be identification of self-management problems, and subsequent development of strategies to solve those problems.

- Simplify therapy, recommending once a day treatment vs. a daily multiple dosing regimen.
  - Consider products containing one or more medications to avoid having the patient take multiple pills.

- It is important to discuss with patients that saving some money today by non-adherence to treatment may mean spending much more money in the future.
  - Proactively discussing the cost of treatment and offering lower-cost options may be one way that prescribers and pharmacists can improve treatment adherence. Prescriber and patient awareness of each patient's formulary coverage for medications is critical to optimize the cost of a patient's medication regimen.

ADHERENCE TO HYPERTENSION MEDICATIONS

(RAS ANTAGONISTS)

Medication Adherence for Hypertension Medications (RAS antagonists)

Definition: Percent of members 18 years and older with a prescription for a blood pressure medication who fill their prescription 80% or more of the time they are supposed to be taking the medication.

Blood pressure medication means an angiotensin converting enzyme inhibitor (ACEI), angiotensin receptor blocker (ARB), or direct renin inhibitor medications.

Star Ratings Cut points for 2020

MA-PD	< 80%	≥ 80% to < 83%	≥ 83% to < 86%	≥ 86% to < 88%	≥ 88%
PDP	< 83%	≥ 83% to < 85%	≥ 85% to < 88%	≥ 88% to < 90%	≥ 90%

Examples of Commercially Available RAS Antagonists

• azilsartan (Edarbi®) • candesartan (Atacand®) • eprosartan. • irbesartan (Avapro®) • losartan (Cozaar®) • olmesartan (Benicar®) • telmisartan (Micardis®) • valsartan (Diovan®)	• benazepril (Lotensin®,Lotensin® Hct), • captopril (Capoten®), • enalapril (Vasotec®), • fosinopril (Monopril®), • lisinopril (Prinivil®, Zestril®), • moexipril (Univasc®) • perindopril (Aceon®), • quinapril (Accupril®), • ramipril (Altace®), and • trandolapril (Mavik®).	• aliskiren (Tekturna®)

Clinical Background

- According to *Oxford University Press*, hypertension is the most powerful, independent, preventable risk factor for death and disability from cardiovascular diseases. It is also a leading risk factor for all-cause mortality and the largest contributor to global disability-adjusted life years (DALYs).
- An estimated 1.13 billion people worldwide have hypertension.
- The risk of developing hypertension can be reduced by effective medication therapy management and significant lifestyle modifications. Adherence to antihypertensive medications is the cornerstone for achieving hypertension control.

Adherence and Hypertension

- The influence of non-adherence to antihypertensive medications is the most important cause of uncontrolled blood pressure (BP)[22].
    - Because of non-adherence, most (nearly 3-quarters) of hypertensive patients do not achieve optimal BP control.
- Untreated hypertension can lead to adverse outcomes such as: heart and artery damage, stroke, vision loss, kidney damage, dementia and eventually death.
- Recent assessments of hypertension have revealed that it is the cause of around 2 million hemorrhagic stroke cases, 1.5 million ischemic stroke cases, and 4.9 million ischemic heart disease cases[23].
- Poor adherence to hypertension treatment is the most important cause of complications.

Reasons for Non-Adherence

- Poor understanding of hypertension and the perception of the condition.
  - If patients are not aware of the chronic nature of the disease, or believe it is a trivial condition, they are less likely to adhere to and persist with prescribed therapy.
- Demographic characteristics (e.g., certain age groups are generally more adherent to therapy), socioeconomic status, and patient participation in therapy monitoring and disease management.
- Regimen tolerability and side effects
- Complexity of therapy specially when patients have other medical conditions

Strategies to Improve Adherence[24]

Patient education and communication

- Educate and maintain contact with the patient and the patient's family. Information about medications is useful when written in simple language and attractively presented.

- Clinicians who provide more information to patients generally achieve better patient satisfaction, recall, and adherence. Clinicians who interview patients with questions that encourage the patient to reflect on the consequences of their behavior appear to achieve better patient satisfaction, recall, and adherence than those who use more direct or close-ended questions.

Strategies to Improve Adherence

Shared decision making

- Patients who are actively engaged in selecting their treatments (i.e., shared decision making) are more likely to adhere to treatment than patients for whom the clinician is the sole decision-maker.

Encourage home blood pressure self-monitoring

- Some reports have shown that home blood pressure self-monitoring can improve adherence, especially among patients with uncontrolled hypertension.

Use technology acceptable to the patient

- Various patient-reminder systems exist to improve adherence, ranging in sophistication from pill organizers to daily pill dispensers and text messaging.

Strategies to Improve Adherence

Keep treatment inexpensive and simple

- An effort should be made to limit both the financial burden and complexity of antihypertensive therapy.

Use the smallest effective dose

- Minimum effective doses should be prescribed in an attempt to avoid side effects of antihypertensive medication.

Use single-pill combinations whenever possible

- Keeping therapy simple includes the use of single-pill combinations that contain more than one antihypertensive medication. An increasing number of once-a-day formulations are available so that fewer tablets are needed.

Strategies to Improve Adherence

Medication synchronization

- Many patients with hypertension have multiple chronic conditions and receive a substantial number of prescription medications. Improvement to adherence can be achieved by reducing the required number of visits to the pharmacy to fill their polypharmacy regimens by consolidating and coordinating refills.

OBJECTIVE #3

Discuss the various methods available for measuring medication adherence

Methods used to measure adherence

- Correctly identifying and estimating treatment adherence has become a research focus in many chronic conditions, and the importance of increasing the effectiveness of adherence interventions is considered to “have a far greater impact on the health of the population than any improvement in specific medical treatments.”

  Different tools and measurements have been developed and validated in order to effectively and accurately assess adherence and persistence in a wide range of diseases.

- Each method’s advantages and disadvantages should be thoroughly taken into consideration when designing and choosing a suitable method.

- In addition, it is important to understand which methods are used by accredited organizations such as CMS, especially if the adherence performance has an impact in your pharmacy due to any performance program.

Methods used to measure adherence

Can be divided into two broad categories[25]:

Objective methods

Such as clinical outcomes measurements, dose counts, pharmacy records, and electronic monitoring of medication administration. These methods have the apparent potential to measure treatment adherence best.

Subjective methods

Involve the patient's assessment of their medication taking behavior or healthcare provider (usually with the help of a questionnaire). These methods are inclined to a certain degree of bias.

These two categories can be further divided into two types[26]:

Direct methods

Refer to the direct observation of therapy or measurement of the drug (or metabolite) or a biological marker level in blood or urine that prove that the medication has been taken by the patient.

Indirect methods

Involve patient questionnaires, patient self-reports, pill counts, prescription refills rates, assessment of patient's clinical response, electronic medication monitors, measurement of physiologic markers, or patient diaries. These are the most popular methods used for research purposes.

Objective methods to measure adherence:

Measurement of the drug (or metabolite) or a biological marker in the blood or urine.[27]

Accurate	Costly	Concentration of the drug /metabolite
Objective, proving the ingestion of the drug	Invasive, inter-individual differences	

- Drug metabolism, individual variation in the pharmacokinetics of the drug, drug-drug interactions and drug-food interactions may interfere with the accuracy of the method, making it inapplicable for some drugs that have long halving times and can be detected long after the patient has stopped the treatment.
- Appropriate for the measurement of adherence to one drug therapy regimen only, offers no supplementary data on the additional causes of non-adherence and does not report on any patterns of non-adherence.
- Potential bias should also be considered with some patients begin taking their medication before upcoming examinations.
- The parameter measured, the presence of the drug (or metabolite), simply generates a yes/no result. Therefore, this method does not offer additional information regarding patterns or levels of adherence or factors that could influence it[28].

Objective methods to measure adherence:

Direct observation of patient's medication-taking behavior.

Objective, proving the ingestion of the drug	Complicated to perform if multiple medications are taken	Observing the patient taking the medication

- Using direct observation as an example, patients can hide their medicines under tongue and discard them afterwards, making routine inspection impractical. Therefore, these measures are mostly used for patients under single-dose therapy, hospitalized patients, or those receiving administered intermittent intravenous medications[29].

White coat adherence is a phenomenon described as “improved patient adherence to treatment around clinic visits.”

- A study reported an average of 88% and 86% adherence rates before and after clinic visits, respectively, but adherence rates declined to 67% a month after the visit30.
- This suggests that false adherence may occur close to the appointment date and should be considered while carrying out these measures.
- Ideally, healthcare professionals should not inform patients of the visit's date to minimize this barrier, yet this challenges the right of patients to control their own treatment.

Subjective methods to measure adherence:

Pill counts

Simple Most commonly used in clinical trials	No evidence of ingested medication	Medication Possession Ratio (MPR) and Proportion of Days Covered (PDC)

- Calculates the number of doses that have been taken between appointments and compares it with the total number of doses that the patient has received.
  - An adherence ratio is then calculated.
- This is a straightforward and low-cost method that can be easily applied for different types of formulations (tablets, inhalers).
- It can assess an average adherence rate but does not give specific information about daily adherence or patterns of adherence.
- It is based on the assumption that removing the correct number of tablets from the dosing unit is equivalent with taking the medicine as recommended; however, this method does not prove actual ingestion of the drug.

Subjective methods to measure adherer

Electronic Monitoring Devices[32]

Objective, Additional information on degree of adherence	The patient is aware of the evaluation	Overall percentages of doses taken
One of the most accurate methods	No actual evidence that medication is being ingested	Dosing Regimen

- Devices incorporated in the patient's prescribed medication container that monitors the dosing history.
- The opening of the container is assumed to coincide with the ingestion of the medication. It has been proven to be highly accurate in several studies and is used as a reference standard for validating other adherence methods.
- It gives precise and detailed information about the number of doses taken and other deviations from the dosing regimen. Incorrect use of the device and opening of the container without taking the medication could lead to false results.
- The use of these devices in large populations is limited by the relatively high price of the device, as well as some practical issues like potential complications that may arise with refilling the prescription in the local pharmacy or some medication formulations.

Subjective methods to measure adherer

Self-reported

Less expensive	Tend to overestimate adherence	A value that is interpreted in regard to a pre-established cut-off point
Easy to administer	Subjective, influenced by recall or reporting bias	

- *Self-reported methods* are among the most cheap and simple procedures for measuring adherence and can easily be adapted in different patient populations.
- In comparison to *direct methods*, they are generally perceived as tending to overestimate adherence since the patients can be influenced by recall or reporting bias.
- Includes validated questionnaires to evaluate adherence to a specific medication regimen.
  - These questionnaires can also give additional information about attitudes, behaviors and intentions.
- The most frequently used questionnaires include:
  - Medication Adherence Report Scale (MARS)
  - The Compliance Questionnaire Rheumatology (CQR19)
  - Belief about Medicines Questionnaire (BMQ)

Subjective methods to measure adherence:

Using electronic databases (pharmacy and insurance claim databases, registries)

Easy to use	• Can overestimate adherence	Medication Possession Ratio (MPR) Proportion of Days Covered (PDC)
Inexpensive	• Does not provide information regarding barriers or factors associated with non-adherence	
Non-invasive, patients not aware that they are being monitored	• Evidence of the drug being dispensed but not digested	
Especially specific to identify non-adherent patients		

- Is based on the assumption that prescription refilling patterns coincide with medication-taking behavior. This requires the existence of a centralized, electronic system with consistency among prescribers and dispensers, and can be a convenient and inexpensive method to measure adherence.
- Prescription refill data has the capacity to provide rough adherence estimations since it offers information on medication possession and not proof on actual intake of medicine, and in some cases could give overestimations.
- It gives the opportunity to assess non-adherence in a large population over an extensive period of time, including multi-drug non-adherence.

Medication Possession Ratio (MPR)

Defined as "the proportion (or percentage) of days' supply obtained during a specified time period or over a period of refill intervals."

- MPR is the sum of the days' supply for all fills of a given drug in a particular time period, divided by the number of days in the time period.

$$MPR = \left(\frac{\text{Sum of days' supply for all fills in period}}{\text{Number of days in period}} \right) \times 100\%$$

- Patients who routinely refill their medications early will have an inflated MPR, as the numerator in this equation will be larger than the denominator. Also, the exact formulas used to calculate MPR vary from source to source.

Proportion of Days Covered (PDC)

PDC is the number of days when the drug was available divided by the number of days in the study period.

- Similar to MPR, this method uses administrative data from pharmacy claims to calculate the number of days that a beneficiary is covered by at least one prescription for a medication, divided by the number of days in the treatment period.

- The formula is similar to MPR, but instead of simply adding the days' supplied in a given period, the PDC considers the days that are “covered.”

$$PDC = \left(\frac{\text{Number of days in period “covered”}}{\text{Number of days in period}} \right) \times 100\%$$

Proportion of Days Covered (PDC)

- In the MPR calculation, a patient who refills a medication 7 days prior to running out of it will have overlapping days supplied, which would increase MPR, but PDC makes an adjustment.
- PDC doesn’t simply average the PDC for individual drugs; instead, it considers the days within a particular period when a patient is covered for all medications in a regimen. In other words, for a 3-drug regimen, a day is only considered "covered" when all 3 medications are available to the patient.
- Although both PDC and MPR are used to assess medication adherence, PDC is the preferred method for assessing adherence by the Pharmacy Quality Alliance (PQA) for use in Medicare Star Ratings.
  - PQA determined that the PDC approach results in a more conservative estimate, especially in cases of frequently switched medications.

Subjective methods to measure adheren
PDC and MPR scores

- These metrics define adherence as >0.8 or 80% of days covered.
  - It is important to note that medications such as those for HIV/AIDS and birth control may require closer to 100% adherence for effectiveness.
- Most adherence is measured via claims data and adherence can be wrongly represented using these calculations.
  - Examples of this incorrect estimation include instances where the medication is automatically filled, or the directions have changed, and a new prescription has not been issued.
  - These methods do not take into account administration techniques or timing of dosing.

OBJECTIVE #4

Discuss the various methods available for measuring medication adherence

Interventions to Improve Medication Adherence[33]

- Unimodal interventions - have been demonstrated to be less successful.
  - Reduce the number of daily doses of medication, motivational strategies, packaged medication into special containers (e.g. Pill boxes or blister packs)
- Multimodal interventions - telemonitoring with interactive voice response technology, weekly nurse feedback, pharmacist-led intervention

Interventions to Improve Medication Adherence

- Patient education plays a vital role in medication adherence.
  - Patients that are educated on their medications and their medical condition can communicate with their physicians and understand better the safety profile or details of their therapy. Education improves the patient's understanding and convinces them about the seriousness of the disease. Knowledge of a medication's purpose appears to be linked to perceived importance, while this importance appears to be significantly associated with medication compliance.[34]
- Despite education, patients need to be informed, motivated, and skilled in the use of cognitive and behavioral self-regulation strategies.

- A multidisciplinary approach is needed.
  - Collaboration among the healthcare team seems to be beneficial.

  - During a World Health Organization (WHO) meeting, the panel discussed the relationship between the patient and the health care provider (be it physician, nurse or other health practitioner) must be a partnership that draws on the abilities of each. The literature has identified the quality of the treatment relationship as being an important determinant of adherence. Effective treatment relationships are characterized by an atmosphere in which alternative therapeutic means are explored, the regimen is negotiated, adherence is discussed, and follow-up is planned.[35]

Interventions to Improve Medication Adherence

- Strategies to improve medication adherence should involve taking into account the patient's specific needs (patient takes too many medications and forgets, patient has cognitive barriers, patients with busy lifestyles).
- Pharmacists should build and foster a trust with their patient and he or she will open up and disclose any apprehension or difficulties when it comes to their medications or medical conditions.
- Each practice site has its uniqueness that can be exploited to create and improve medication adherence. Pharmacists should take these opportunities and work with their pharmacy staff to improve adherence and therapeutic outcomes. Pharmacists must embrace and act on these opportunities.
- Switching maintenance medications to 90-day prescriptions and enrolling patients in automatic refill programs also appear to be favorable interventions. There is general concern that automatic refill programs can lead to medication oversupply if not properly managed.
- Mobile text messaging is a key example of an electronic strategy worthy of further exploration.[36]

Interventions to Improve Medication Adherence

- Maintaining a blame-free environment and providing patients with praise for goal achievement are essential for a trusting and effective relationship between patient and practitioner
  - Patients may have challenges communicating adherence barriers to their healthcare team or have difficulty understanding the health consequences of non-adherence. Asking key questions through motivational interviewing is therefore imperative to revealing adherence challenges, and empathetic listening will assist in arriving at patient-centered solutions to overcome these challenges. Patient education and ongoing communication are critical for patient understanding and medication persistence, especially with mindful consideration that challenges can evolve over time.[37]

OBJECTIVE #5

Identify the role of community pharmacists in medication adherence improvement

The role of community pharmaci

- Pharmacists are experts in drug therapy and are the primary healthcare professionals who optimize the use of medications for the overall benefit of the patient.
- Pharmacists can identify risk factors for non-adherence in their populations, can help develop a treatment plan, educate patients orally and in writing, and motivate patients to improve their health.
- Pharmacists in a community setting play a vital role towards medication adherence. Their proximity and strong relationship with their patients make them fit for this pivotal role in patient care. Not only can they help improve adherence through medication dispensing but also through medication counseling such as MTM, among others.

The role of community pharmaci

- Community pharmacists are well-positioned to interact with prescribers because of access to prescription histories and the ability to monitor and intervene based on adherence findings.
- Recommendation acceptance rates in the community setting range from 42% to 60%[38].
  - One of the key factors affecting these acceptance rates is pharmacist accessibility to the clinical team. In clinical settings where recommendation acceptance rates are around 70% to 90%, pharmacists may interact more with team members, which can optimize acceptance of interventions. In the community pharmacy setting, many interventions are completed via telephone or fax, and access to patient health records is usually limited.
- Pharmacists are becoming increasingly involved in pay-for-performance initiatives, and payers are now offering opportunities specific to medication adherence.
  - Through these programs, pharmacists can utilize a variety of strategies to improve medication-adherence metric performance, obtain remuneration for services, and be credited for clinical outcomes resulting from improved medication adherence. In addition, improving medication adherence can increase revenue for pharmacies due to the increased numbers of prescriptions being filled on schedule.

The role of community pharmaci

- When pursuing medication adherence initiatives, pharmacists should maximize technology to detect non-adherence, facilitate communication and therapy changes, and document interventions. Pharmacists should also track data (adherence rates, clinical outcomes, revenue, cost savings, patient and team perceptions, etc.)

- Sharing these outcomes with patients can serve as positive reinforcement and help them understand the link to feeling healthier. Reporting outcomes can also justify services and motivate team members by illustrating the impact medication adherence can have on patient care. Potential cost savings or revenue generated by these adherence outcomes, as exemplified in the 340B program, can further promote buy-in from patients, team members, and the organization.

The role of community pharmaci

- Pharmacist-led interventions in adherence have proven to reduce overall healthcare related costs; however, pharmacy technicians can play an important role in this as well[39]. Pharmacy technicians can help reduce the burden on community pharmacists that manage adherence interventions within their practice.
  - For example, pharmacy technicians can be responsible for gathering medication history, organizing patient medication lists, making appointment calls, collecting demographic history, conducting follow up calls, etc. Pharmacy technicians are an asset to the community pharmacist.

POST-TEST QUESTIONS

1. ## True or False

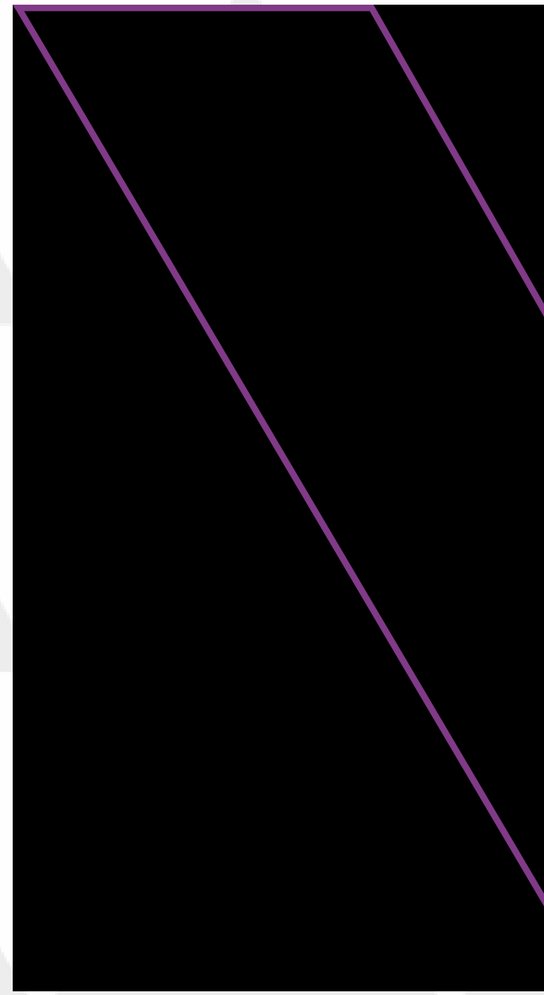
Medication non-adherence can affect quality of life, health condition outcomes, and overall healthcare costs.

2. ## True or False

Proportion of Days Covered (PDC) is the sum of the days' supply for all fills of a given drug in a particular time period, divided by the number of days in the time period.

3. ## Which of the following represents a method for improving medication adherence?

a) Educating the patient regarding their medication regiment and health conditions
b) Switching maintenance medications to 90-day prescriptions
c) Collaborating with the physician to simplify drug regimen
d) Refills reminder calls, texts or emails
e) All of the above



4. Which of the following are medications that are part of the adherence metric for Hypertension Medications (RAS antagonists)?

a) Valsartan
b) Nifedipine
c) Lisinopril
d) A and C
e) All of the above

5. True or False

Community Pharmacists are not in a position to interact with prescribers and make recommendations based on adherence findings.

Thank you!