

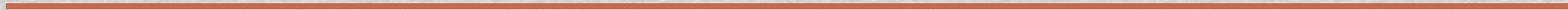
# RATIONAL USE OF MEDICATIONS

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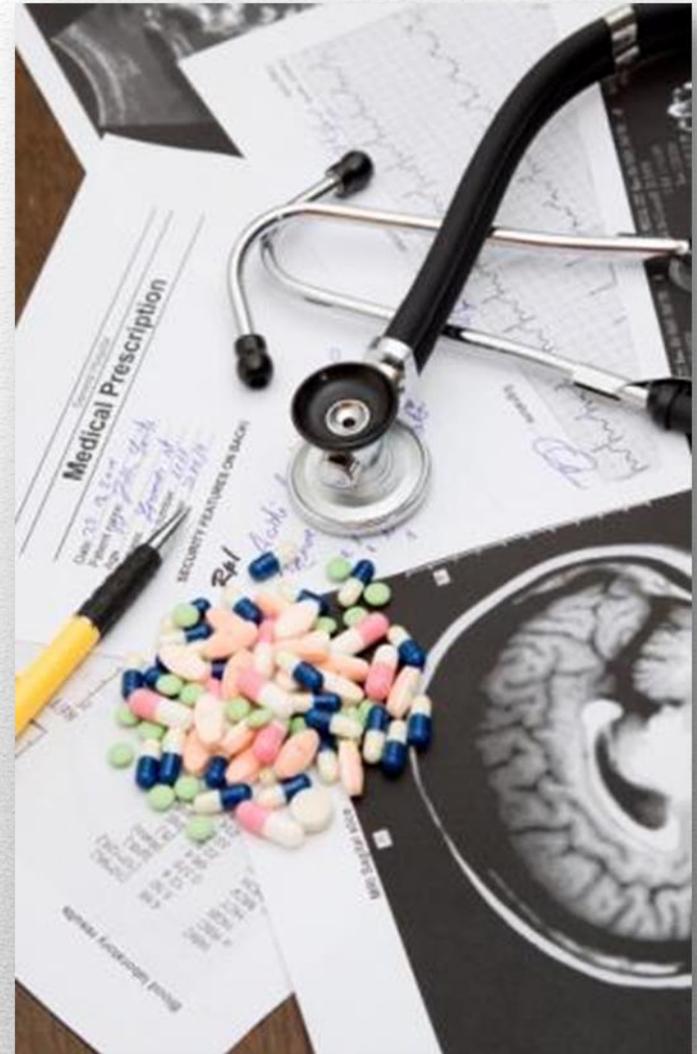
- Define rational use of medicines and identify the magnitude of the problem
- Understand the reasons underlying irrational use
- Discuss strategies and interventions to promote rational use of medicines

# Learning Objectives

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# CONTENT

- DEFINITION
- ELEMENTS
- CONSEQUENCES
- FACTORS
- STRATIGIES FOR IMPROVEMENT
- MEDICATION ERROR



# Definition



World Health Organization

Prescribing Right **Drug**, in adequate **Dose** for the sufficient **Duration** & appropriate to the **Clinical Needs** of the patient at lowest **Cost**

(WHO 1985)

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- ***Appropriate indication:*** The decision to prescribe drug(s) is entirely based on medical rationale & that drug therapy is an effective & safe treatment
- ***Appropriate drug:*** The selection of drugs is based on efficacy, safety, suitability & cost considerations.
- ***Appropriate patient:*** No contra-indications exist & the likelihood of adverse reactions is minimal & the drug is acceptable to the patient.
- ***Appropriate information:*** Patients should be provided with relevant, accurate, important & clear information regarding his / her condition & the medication(s) that are prescribed.
- ***Appropriate monitoring:*** The anticipated & unexpected effects of medications should be appropriately monitored.

# BACKGROUND

- Medically inappropriate, ineffective & economically inefficient use of medication is commonly observed in health care systems.
  - Appropriate use of drugs is essential element in achieving quality of health & medical care
-

# BACKGROUND

- More than 50% of all medicines worldwide are prescribed, dispensed, or sold inappropriately
  - 50% of patients fail to take them correctly.
  - Conversely, about 1/3 of the world's population lacks access to essential medicines
-

# BACKGROUND

- The proportion of national health budgets spent on medicines ranges between:
    - **10 - 20%** (developed countries)
    - **20 - 40%** (developing countries)
-

# CONSEQUENCES

- Reduction in the quality of drug therapy leading to increased morbidity & mortality
- Waste of resources leading to reduced availability of other vital drugs & increased costs.
- Increased risk of unwanted effects such as adverse drug reactions & the emergence of drug resistance.



# CONSEQUENCES

- Can stimulate inappropriate patient demand, & lead to reduced access & attendance rates due to medicine stock-outs and loss of patient confidence in the health system.



# Types of Irrational Drug Use

- Under-prescribing
  - Incorrect prescribing
  - Extravagant prescribing
  - Over-prescribing
  - Multiple prescribing
-

# Common Examples of Irrational Use of Drugs

- Use of too many medicines /patient (**Poly-pharmacy**)
- Inappropriate use of antibiotics, often in inadequate dosage, for non-bacterial infections.
- Over-use of injections when oral formulations would be more appropriate.
- Failure to prescribe in accordance with clinical guidelines.
- Inappropriate self-medication, often of prescription-only medicines.



# Towards Rational Use of Medicines

## Type

- Strategies can be targeted towards changing specific problems.

## Amount

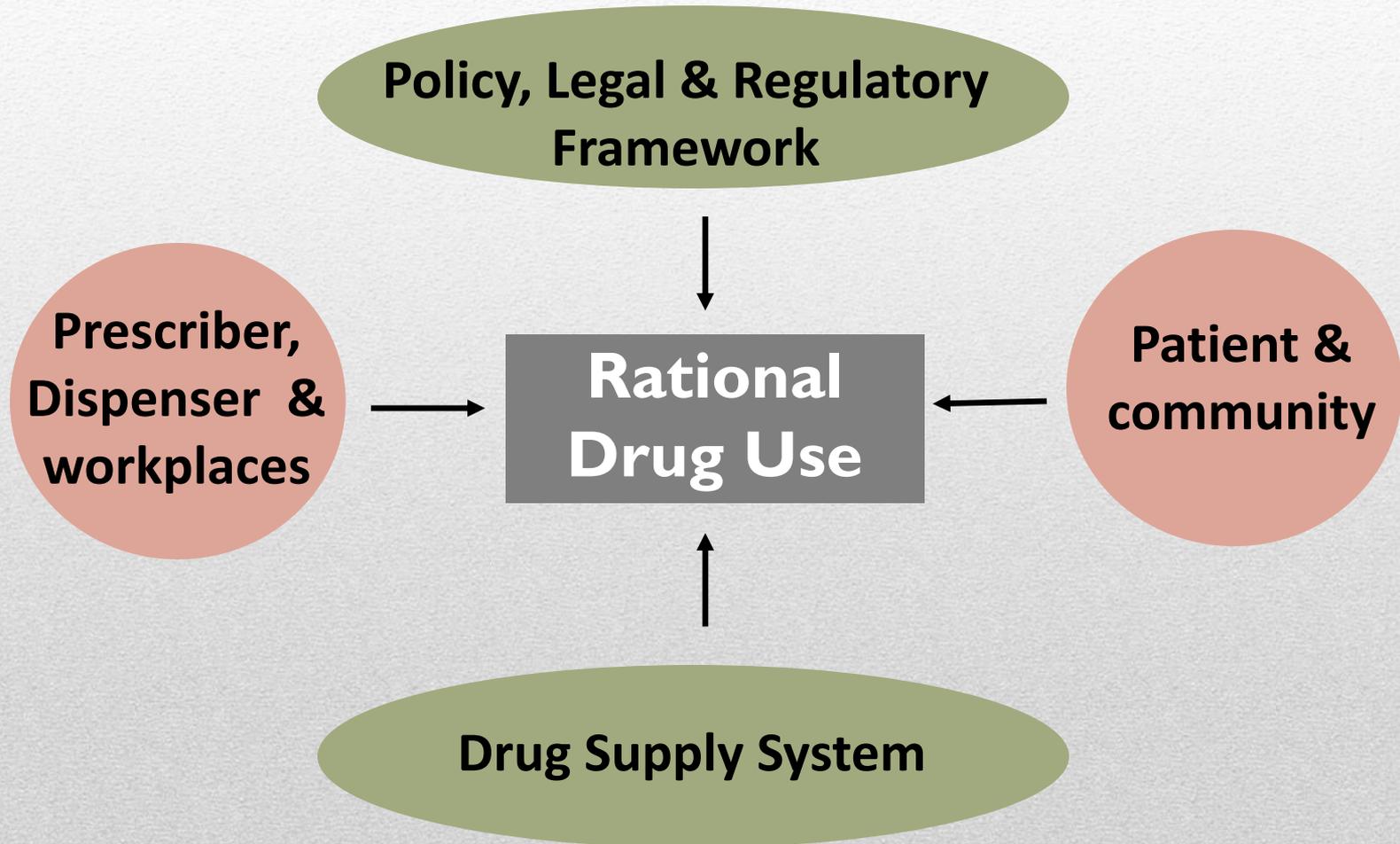
- Size of problem is known & Impact of the strategies can be monitored.

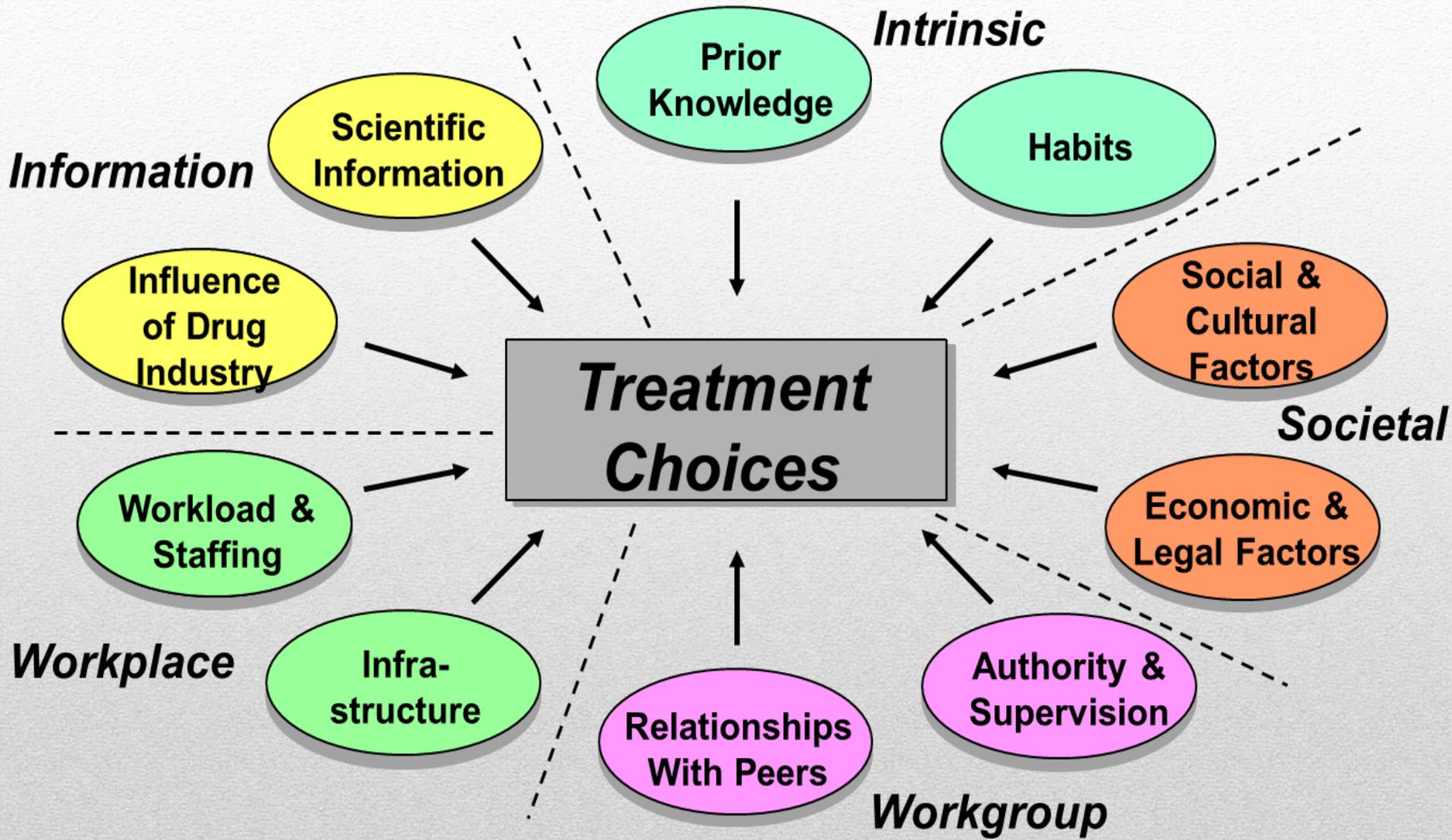
## Causes

- Appropriate, effective & feasible strategies can be chosen.



# FACTORS INFLUENCING DRUG USE





## **Patient & Community:**

- Beliefs & (mis)information available in the community including cultural values, patients demands & expectations.

## **Prescriber , Dispenser:**

- lack of drug information, limited experience & skills
- Incorrect generalization from experience , inability to read or interpret prescription

## **Workplace:**

- Lack of equipment, diagnostic facilities, insufficient staffing.

## **Drug supply system:**

**Drug quality problems**

**Unreliable suppliers**

## **Drug Regulation:**

- Non – essential drugs
- Lack of policies & regulations



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**“An aspirin a day will help prevent a heart attack if you have it for lunch instead of a cheeseburger.”**

# STEPS TO IMPROVE RATIONAL DRUG USE

## STEP I

- Identify the patient's problem
- Recognize the need for action.

## STEP II

- Diagnosis of the disease.
- Identify underlying cause & motivating factor

## STEP III

- List possible intervention or treatment.
-

# STEPS TO IMPROVE RATIONAL DRUG USE

## STEP IV

- Start treatment by writing an accurate & complete prescription

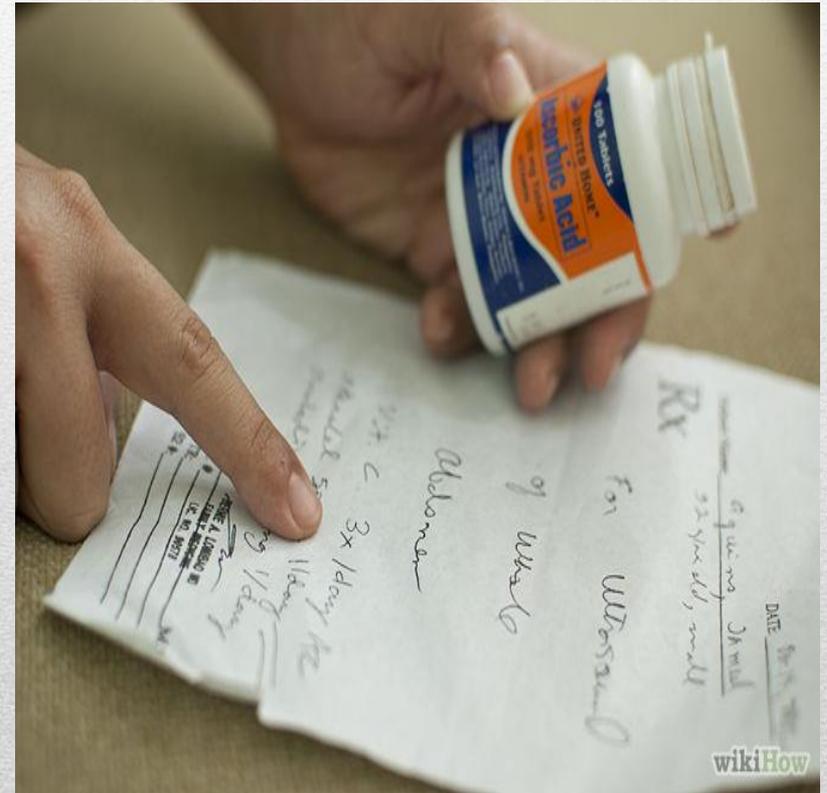
## STEP V

- Given proper information instruction & warning regarding the treatment given

## STEP VI

- Monitor the treatment & check response
-

# PRESCRIPTION WRITING



# PRESCRIPTION WRITING

## **GUIDELINES:**

- ✓ **Patient Name** and/or **Registration Number (R/N)**
  - ✓ **Date of Birth** and/or **Age**, ( especially for children)
  - ✓ **Approved medicine name** (avoid abbreviations, prefer generic name)
  - ✓ **Dosage strength** (with appropriate units)
  - ✓ **Route of administration/ dosage form** e.g. tablet
  - ✓ **Frequency of administration/ dosing interval** e.g. three times day or every 6 hours
  - ✓ **Duration of therapy / Refill**
  - ✓ **Prescriber Name**, with contact details
  - ✓ **Date of prescription**
-

# E - Prescription



Select Patient  
Manage Medications  
Manage Allergies

Prescription Report  
Additional Options  
Members Area

Return to EMR  
Help / Contact Us  
Refresh / Clear

## Practice Information

Practice: Mango      User: Mango Provider      [\[Schedule\]](#) [\[Messages\]](#)

## Patient Demographic Information

Patient: Peter Edwards [\[Prescribe\]](#) [\[Change Demographics\]](#)      DOB: 11/15/1983      Gender: Male      Height:      Weight:      BSA:  
Phone: (987) 456-1230 (home)      LOV: No last office visit [\[Visit Today\]](#)  
Pharmacy: Duane Reade (301 elizabeth street New York NY) (Mail) 24 [\[View\]](#)  
Formulary: Not entered

Your practice group has **5 renewal requests** waiting.

## Enter Details - Oral/Topical Drugs

[Continue](#)   [Change Drug](#)   [Cancel](#)

Provider:  ▼

Drug:   ▼

Sig:  ▼    ▼    ▼    ▼    ▼    ▼

Duration:  ▼

Patient Weight:  kg [Show Dose Calculator](#)

Quantity:  capsule ▼

Refills:  ▼

Primary Dx:  ▼

Secondary Dx:  ▼

Directions to Pharmacist:  ▼

Directions to Patient:

Date Started:  ▼  ▼  ▼ [\[today\]](#)

Date Last Filled:  ▼  ▼  ▼ [\[today\]](#)

Date Stopped:  ▼  ▼  ▼ [\[today\]](#)

# Parts of Prescription

Heading

Bill W. Walsh  
1229 Happy Valley  
Anytown, USA 02000

Date: \_\_\_\_\_ Patient Name: \_\_\_\_\_  
Address: \_\_\_\_\_ Age: \_\_\_\_\_ Weight: \_\_\_\_\_

Body

*R<sub>x</sub>*

*Drug* amoxicillin 500 mg tablets \_\_\_\_\_

*Disp: #* 4 (four) \_\_\_\_\_ *tablets*

*Sig:* take 4 tabs 1 hour before \_\_\_\_\_  
dental appointment \_\_\_\_\_

Closing

*Refills:* (0) 1 2 3 4 5 *pru*

*Generic substitution allowed* \_\_\_\_\_

*Dispense as written* \_\_\_\_\_

*DEA #* \_\_\_\_\_

*DDS Signature* \_\_\_\_\_



# Parts of Prescription

**Kingdom of Saudi Arabia**  
 National Guard - Health Affairs  
 King Abdulaziz Medical City



**المملكة العربية السعودية**  
 الحرس الوطني - الشؤون الصحية  
 مدينة الملك عبدالعزيز الطبية

AUTHORIZATION GIVEN FOR A NON-PROPRIETARY  
 EQUIVALENT OF A HOSPITAL FORMULARY DRUG

CLINIC STAMP

**NON-CONTROLLED  
 MEDICATION PRESCRIPTION**

**Diagnosis: DIABETES MELLITUS**

Age: \_\_\_\_\_  
 wt: \_\_\_\_\_

**Rx**

**Morning Dose:**  
 Insulin NPH \_\_\_\_\_ Units SQ  
 Insulin Regular \_\_\_\_\_ Units SQ

**Lunch Dose:**  
 Insulin Regular \_\_\_\_\_ Units SQ

**Evening Dose:**  
 Insulin NPH \_\_\_\_\_ Units SQ  
 Insulin Regular \_\_\_\_\_ Units SQ

**Bedtime Dose:**  
 Insulin \_\_\_\_\_ Units SQ

**NPH Regular Insulin Mixture**  
 \_\_\_\_\_ Ratio  
 Morning Dose \_\_\_\_\_ Units Total Dose  
 Evening Dose \_\_\_\_\_ Units Total Dose

**Supply:** Ref ( )  
 Insulin for \_\_\_\_\_ weeks  
 Swabs # 100 ( )  
 Syringes # 100 ( ) Ref ( )

M.D. \_\_\_\_\_  
 (PRINTED NAME)

\_\_\_\_\_  
 (SIGNATURE)

\_\_\_\_\_ / \_\_\_\_ / \_\_\_\_  
 DATE

\_\_\_\_\_  
 BADGE NO.

PLEASE USE BALLPOINT PEN FOR LEGIBLE HANDWRITING

PHARMACY USE ONLY

ADDRESSOGRAPH

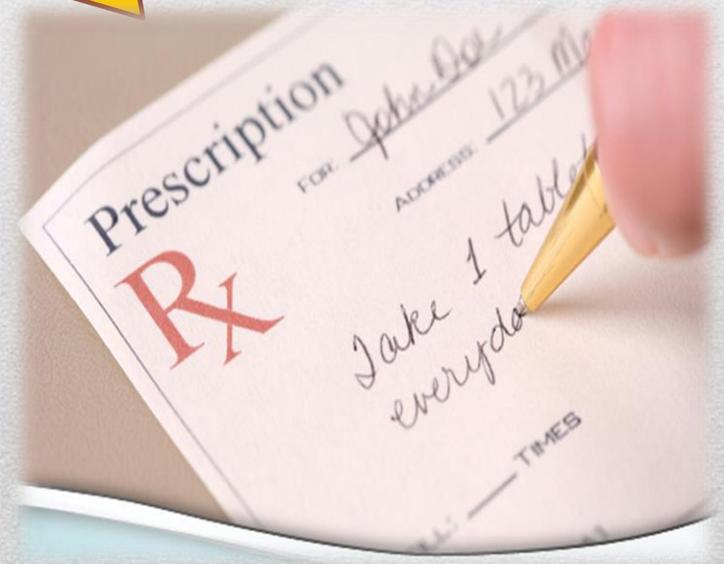
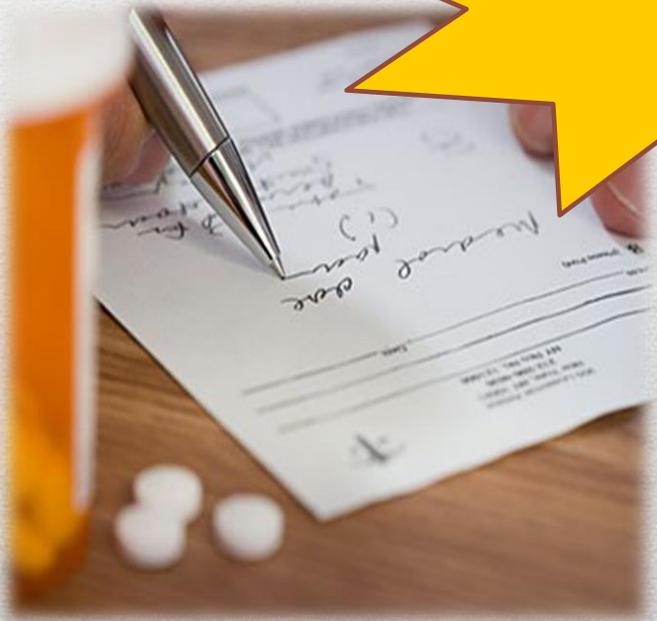
AMBUCO TEL.: 2500269

KFH - PHARMACY 17107 (30066)

# PRESCRIPTION WRITING STANDARDS

GENERAL	
The patient	All drug charts and TTAs MUST include the patient's surname and given name, their date of birth, date of admission, consultant. Where dosing is weight dependent e.g. paediatrics, low molecular weight heparins, or patient is significantly under- or overweight, the weight should be documented
Allergy box	Both positive and negative allergy histories and drug sensitivities MUST be documented. Where allergy history is positive symptoms of the allergy should be described.
Drug name	Write approved names, legibly and correctly spelt. Do NOT use abbreviations Print if necessary
Dose	NO trailing zeroes (5mg NOT 5.0mg) Quantities of 1gram or more should be written (1g, 1.5g etc.) Quantities less than 1g should be written in milligrams (500mg NOT 0.5g) Quantities less than 1mg should be written in micrograms (100micrograms NOT 0.1mg) When decimals are unavoidable the decimal point MUST be preceded by another figure (0.5mls NOT .5mls)
Dose units	The words <i>micrograms</i> , <i>nanograms</i> and <i>units</i> MUST NOT be abbreviated. The term <i>millilitre</i> is abbreviated to ml NOT cc or cm <sup>3</sup>
Frequency	The dose and frequency must be specified. For <i>As Required</i> prescriptions the minimum dose interval MUST be specified (6hours NOT qds)
Start date	Specify the date the drug was FIRST prescribed/due this admission (not the date the chart is rewritten)
Indication	For <i>As required</i> prescriptions the indication should be included
Signature	Prescriptions must be signed in ink. Bleep/contact numbers should be included so that prescribers can be contacted if necessary

**AVOID  
Abbreviations**



<b>Abbreviation</b>	<b>Potential Problem</b>	<b>Preferred Term</b>
U (unit)	Mistaken as zero, four, or cc	Write “unit”
IU (international unit)	Mistaken as IV or 10	Write “international unit”
Q.D., Q.O.D.	Mistaken for each other. Period after Q and O after Q can be mistaken for “I”	Write “daily” and “every other day”
Trailing zero and lack of leading zero	Decimal point missed	Never write a zero by itself after a decimal point, and always use a zero before a decimal point
MS, MSO4, MgSO4	Confused for one another	Write “morphine sulfate” or “magnesium sulfate”

<b>Abbreviation</b>	<b>Potential Problems</b>	<b>Preferred Term</b>
<b>µg (microgram)</b>	<b>Mistaken for mg (milligram)</b>	<b>Write “mcg”</b>
<b>H.S. (at bedtime or half – strength)</b>	<b>Mistaken for either meaning: Also mistaken for every hour</b>	<b>Write out “half – strength” or “at bedtime”</b>
<b>T.I.W (three times a week)</b>	<b>Mistaken for three times a day or twice weekly</b>	<b>Write “three times weekly” or “3 times weekly”</b>
<b>S.C. or S.Q. (subcutaneous)</b>	<b>Mistaken for SL for sublingual or “5 every”</b>	<b>Write “Sub-Q” or “subQ” or “subcutaneously”</b>
<b>D/C</b>	<b>Interpreted as discontinue whatever medication follows (typically discharge meds)</b>	<b>Write “discharge”</b>
<b>c.c.</b>	<b>Mistaken for U (units) when poorly written</b>	<b>Write “ml” for milliliters</b>



**“That’s what it says: ‘one tablespoonful,  
300 times a day’.”**

# Exercise 1

Comment on the prescription :

**AZT 250 mg PO twice daily**

DRUG (print approved name)	Dose		Additional info and/or dose/kg
AZT	250		09.00
Signature	(mg) microgram ml units		13.00
	Date	Route	Pharmacy
Print name & designation	10/2	PO	17.00
	Bleep 1234		21.00

# Exercise II

Comment on the prescription :

**Digoxin .125 PO Once daily**

DRUG (print approved name)	Dose		Additional info and/or dose/kg
DIGOXIN	.125		09.00
Signature	mg microgram ml units		13.00
	Date	Route	Pharmacy
Print name & designation	10/2	PO	17.00
	Bleep 1234		21.00

# Exercise III

Comment on the prescription :

**LASIX T PO once daily**

DRUG (print approved name)	Dose	Additional info and/or dose/kg	
LASIX	T		09.00
Signature	mg microgram ml units		13.00
	Date	Route	Pharmacy
Print name & designation	10/2	PO	17.00
	Bleep 1234		21.00

# Exercise IV

Comment on the prescription :

Warfarin 4 mg PO

DRUG (print approved name)	Dose	Additional info and/or dose/kg	
WARFARIN	4	09.00	
Signature	mg microgram ml units	13.00	
	Date	Route	Pharmacy
Print name & designation	10/2	PO	17.00
	Bleep 1234		21.00

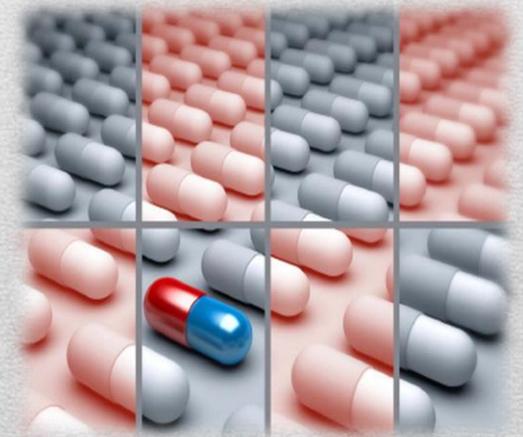
# Exercise V

- A 2 year old child presented with fever & Right ear discomfort for 2 days
- You diagnosed him with acute otitis Media & decided to start him on Amoxicillin (40mg/kg/day) for 1 week
- His weight 15 kg
- **Write the prescription**



# Medication Error

Any preventable event that may cause or lead to inappropriate medication use or patient harm while the medication is in the control of the health care professional, patient, or consumer.



## Prescribing errors can occur as a result of :

- Inadequate knowledge of the patient and their clinical status
- Inadequate drug knowledge
- Calculation errors
- Illegible handwriting
- Drug name confusion
- Poor history taking
- **WORKLOAD !!**



# Types of Medication Errors

## Prescribing



**Prescribing**  
39% of Errors  
48% Prevented

## Transcribing



**Transcribing**  
12% of Errors  
33% Prevented

## Dispensing



**Dispensing**  
11% of Errors  
34% Prevented

## Administration

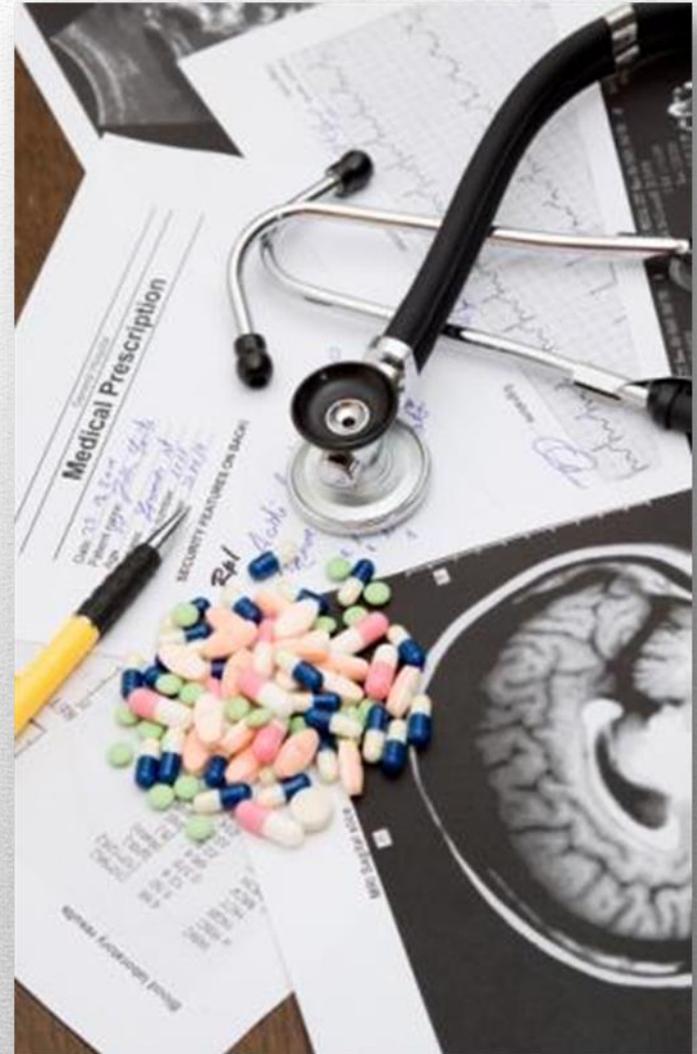


**Administration**  
38% of Errors  
only 2% Prevented

Leape et al, JAMA 1995

# CONCLUSION

- *Irrational use of drugs not only waste resources that could otherwise be spent on other essential services, but also leads to drug induced disease.*
- *The drug control authority, the teaching institutes, drug industries, HC providers & the patient himself are helpful for rational drug use.*



FREE PRESCRIPTION

Name: Ever Ry-Body Age: N.E.

Address: 2b Well Street

Date: 1st 4 2day

**Rx**

- 1) Don't get angry
- 2) Don't worry
- 3) Be Grateful
- 4) Work hard
- 5) Be Kind to others

怒るな  
心配すな  
感謝して  
業を上げめ  
人に親切に

Apply Morning & Evening (& as deemed necessary throughout the day)

Label

No Substitution

Signature: Mikao Usui

REPEAT  1  2  4  5 PRN NR

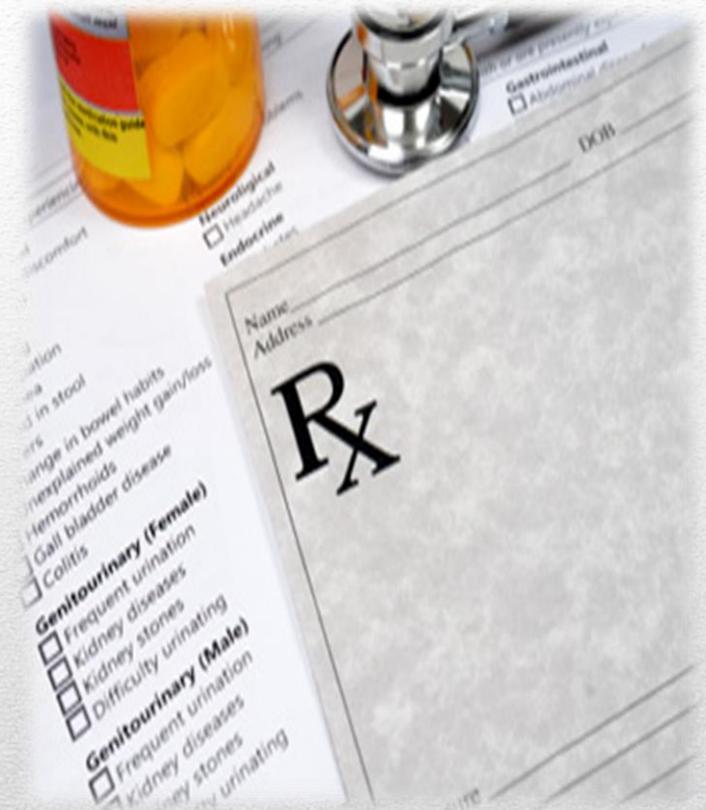
1 00 912 RX



# ADHERANCE TO MEDICATIONS



- **DEFINITION / TERMINOLOGY**
- **IMPORTANCE**
- **TYPES**
- **DIMENSIONS**
- **STRATIGIES FOR IMPROVEMENT**
- **CONCLUSION**



**CONTENT**

---

## Adherence:

- Synonym for compliance
- The extent to which a patient's behavior (in terms of taking medication, following a diet, modifying habits, or attending clinics) coincides with medical or health advice.

## Compliance:

- The patient is **PASSIVELY** following the doctor's orders & that treatment plan is not based on a therapeutic alliance / contract established between patient & physician.

**DEFINITIONS**

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## Concordance:

- The extent to which patients & their providers agree on **Whether, When, How** a medication should be taken.

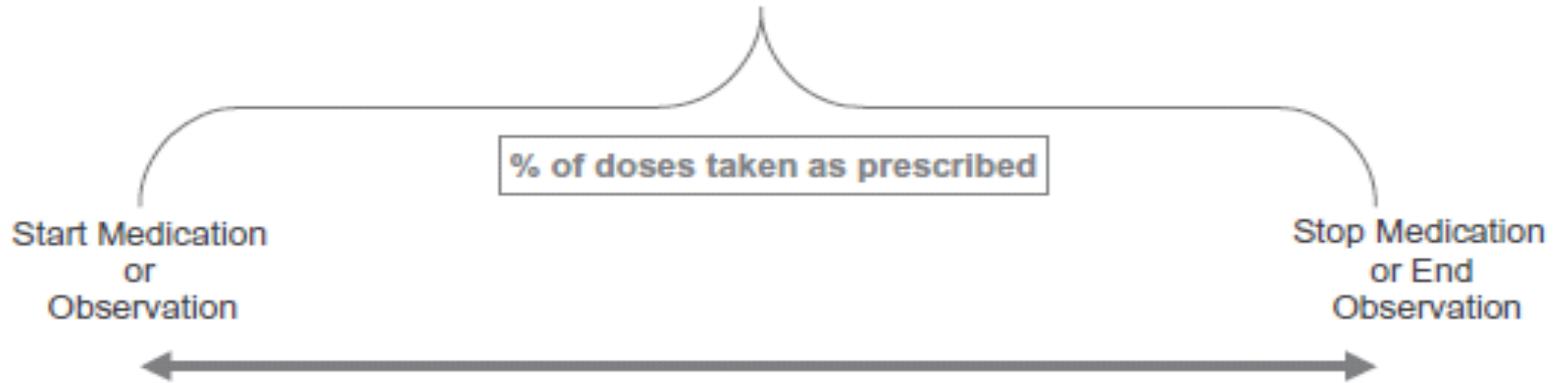
## Persistence

- The duration of time from initiation to discontinuation of therapy.

**DEFINITIONS**

---

## COMPLIANCE



Start Medication  
or  
Observation

**Days taking medication**  
(without exceeding permissible gap)

Stop Medication  
or End  
Observation

## PERSISTENCE

# DEFINITIONS

## **Non-Adherence:**

- Wide range of behaviors , both intentional & unintentional, that leads to either underuse or overuse of prescription medications.

**DEFINITIONS**

---

- Adherence is the key mediator between medical practice & patient outcomes.
- Rates of adherence have not changed much in last 3 decades, despite WHO & IOM improvement goals.
- WHO , describes patient non-adherence with prescribed medication as worldwide problem of striking magnitude.

**BACKGROUND**

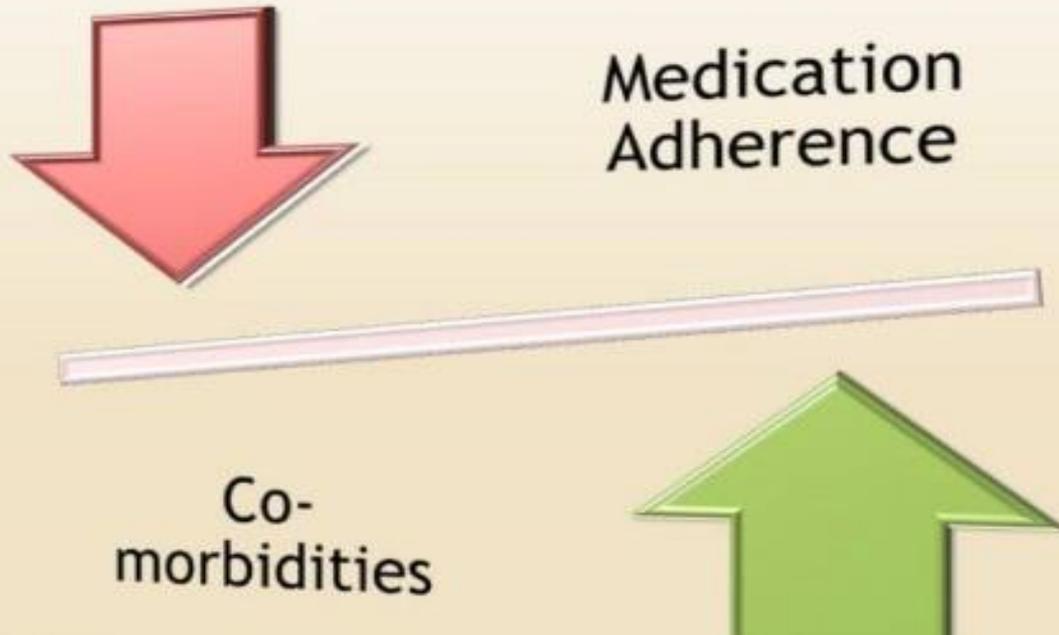
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- Non-adherence to medications is estimated to cause **125,000 deaths** annually.
- Overall, about **20% to 50%** of patients are non-adherent to medical therapy.
- People with chronic conditions only take about half of their prescribed medicine.

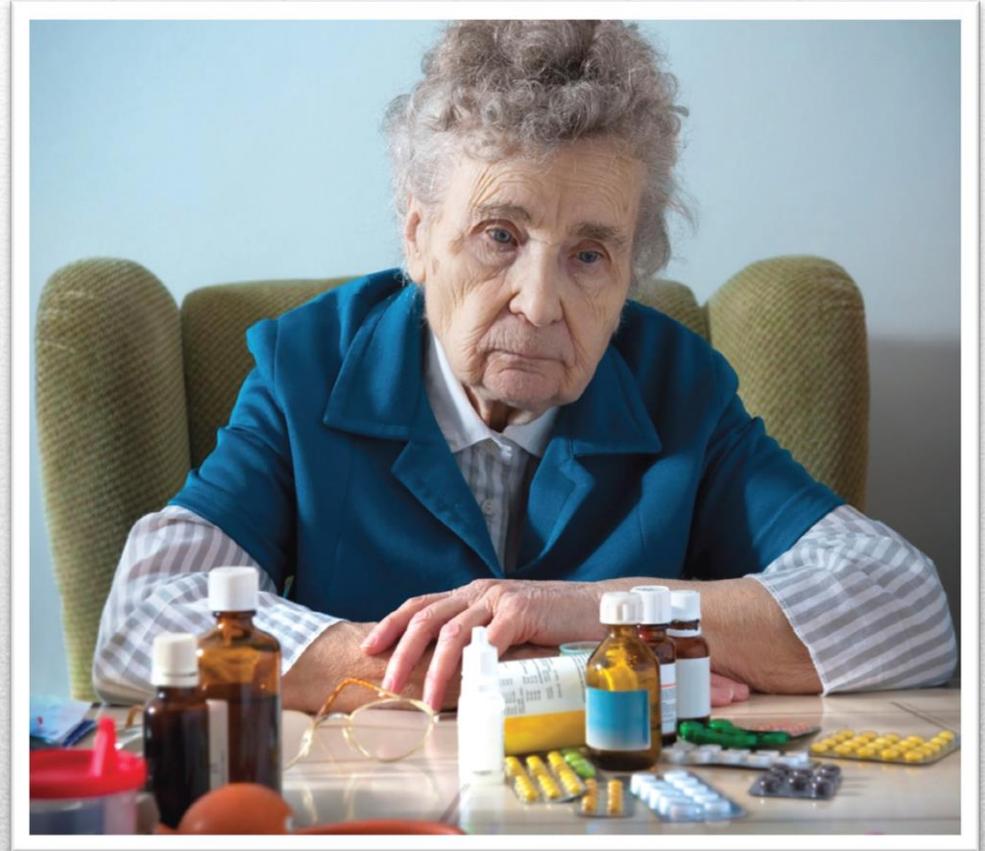
**BACKGROUND**

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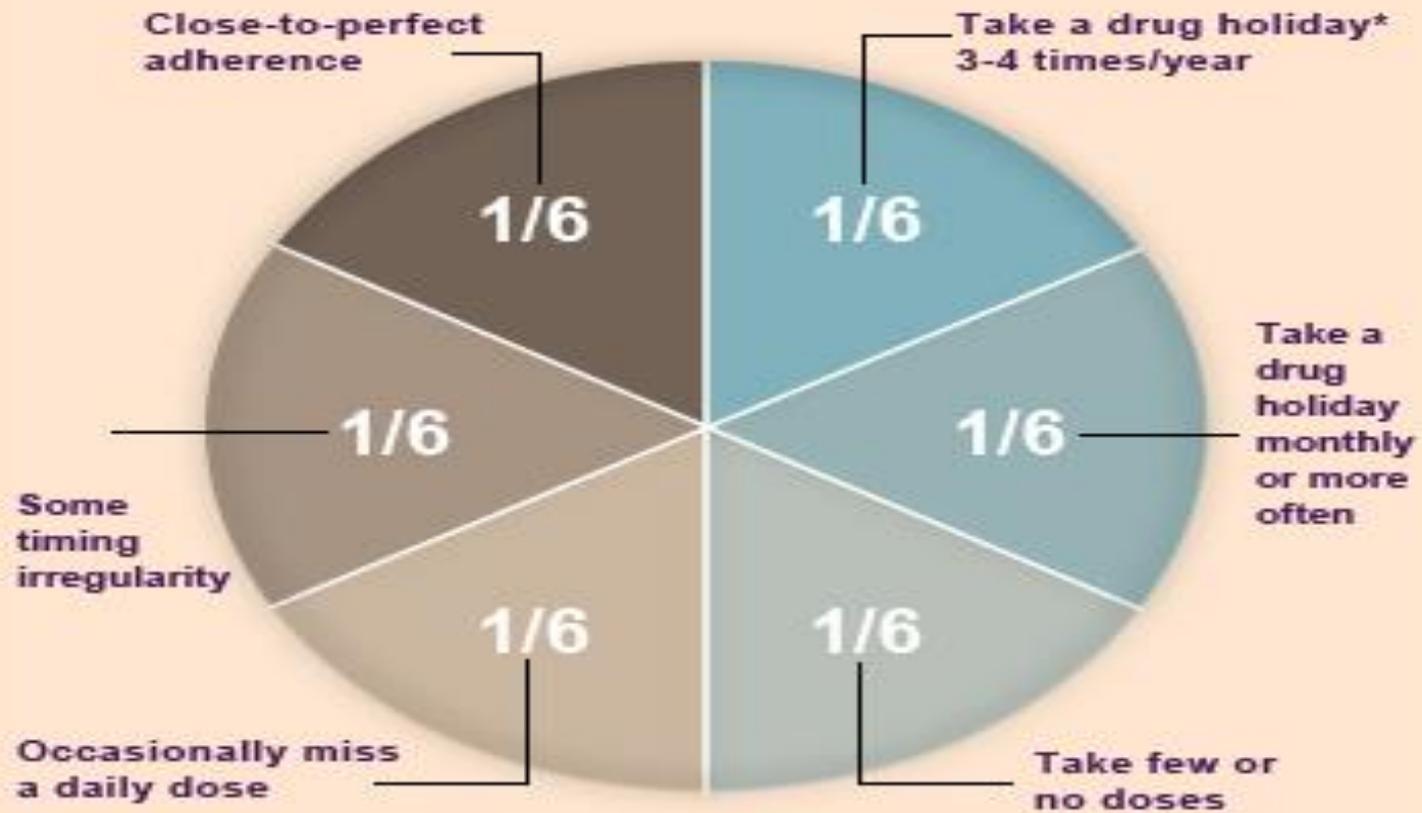
**Global Medication Adherence is 50%**



- **40% of all admissions are due to medication problems.**
- **About half of older people do not take their medicines as instructed**

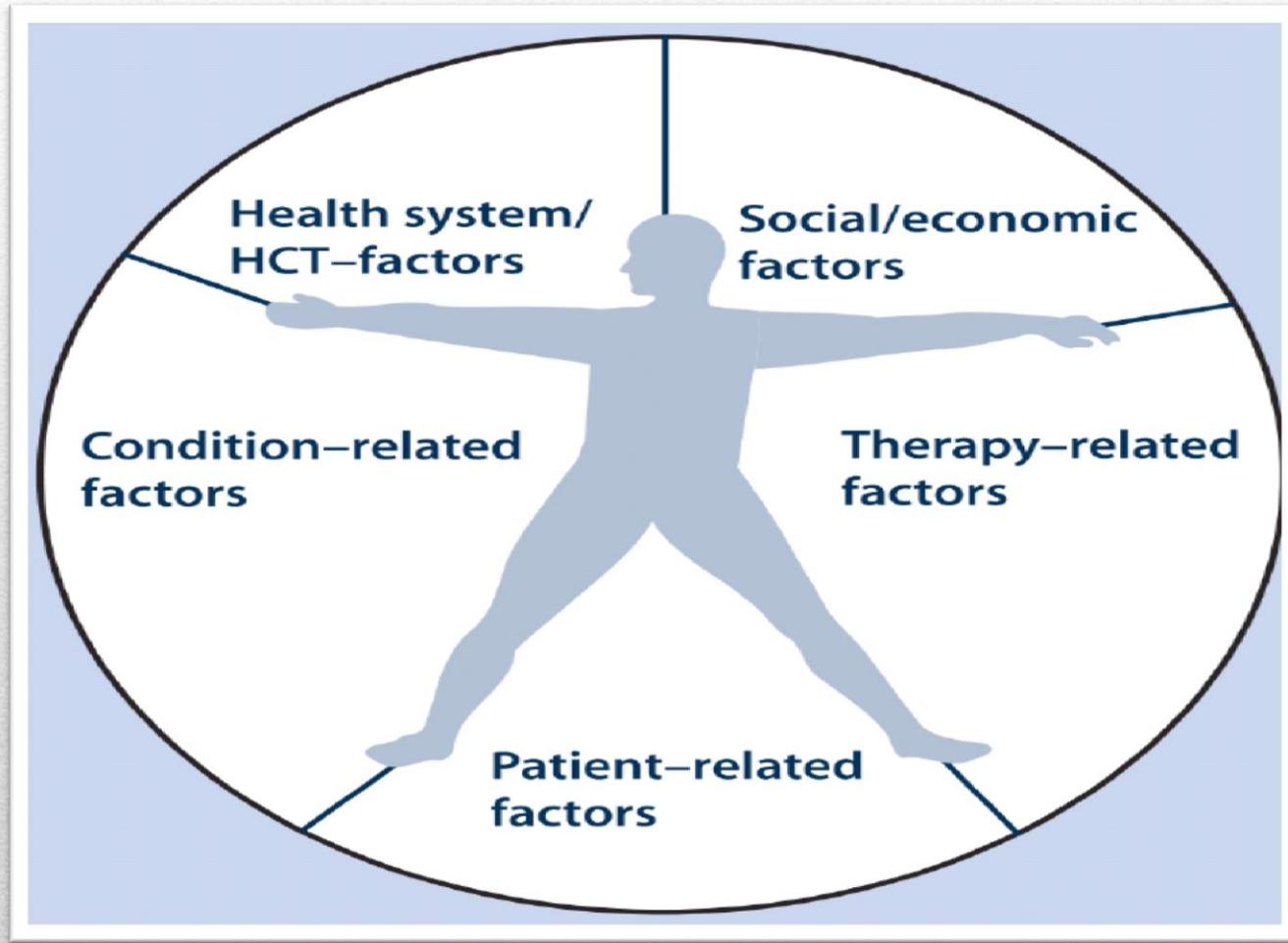


## Patients exhibit a wide variation in medication-taking behavior<sup>6,7</sup>



\* Missing several days of dosing over the treatment period.

# DIMENSION OF PATIENT ADHERANCE



# Health Care System

- Provider – Patient relationship
- Provider communication skills
- Poor access or missed appointments
- Weak capacity for patient education & Follow up .
- Disparity between health beliefs
- High cost
- Long waiting time



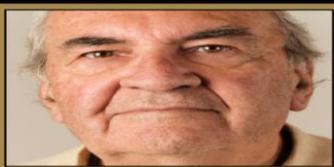
# Patient

## Physical Factors :

- Cognitive impairment
- Visual / hearing problems
- Impaired mobility
- Swallowing problems

## Psychological / Behavioral:

- Knowledge & understanding ( Dx & Rx )
- Motivation
- Perceived benefits of Rx
- Fear / Frustration
- Psychosocial stress / Anxiety
- Alcohol or substance abuse



***I feel better, so I do not need medication.***

# Therapy

- Complexity / Frequent changes
- Duration
- Actual or perceived side effects
- Treatments requires technique
- Treatments interferes with lifestyle
- Lack of immediate benefits



## Social / Economic

- Lack of family / social support
  - Low health literacy
  - Culture / health beliefs
  - Unstable living condition
  - Lack of health care insurance
-

# Condition / disease

- Chronic vs. Acute
- Asymptomatic
- Severity
- Psychiatric illness
- Mental / cognitive impairment



**Table 2. Major Predictors of Poor Adherence to Medication, According to Studies of Predictors.**

<b>Predictor</b>	<b>Study</b>
Presence of psychological problems, particularly depression	van Servellen et al., <sup>51</sup> Ammassari et al., <sup>52</sup> Stilley et al. <sup>53</sup>
Presence of cognitive impairment	Stilley et al., <sup>53</sup> Okuno et al. <sup>54</sup>
Treatment of asymptomatic disease	Sewitch et al., <sup>55</sup>
Inadequate follow-up or discharge planning	Sewitch et al., <sup>55</sup> Lacro et al. <sup>56</sup>
Side effects of medication	van Servellen et al. <sup>51</sup>
Patient's lack of belief in benefit of treatment	Okuno et al., <sup>54</sup> Lacro et al. <sup>56</sup>
Patient's lack of insight into the illness	Lacro et al., <sup>56</sup> Perkins <sup>57</sup>
Poor provider–patient relationship	Okuno et al., <sup>54</sup> Lacro et al. <sup>56</sup>
Presence of barriers to care or medications	van Servellen et al., <sup>51</sup> Perkins <sup>57</sup>
Missed appointments	van Servellen et al., <sup>51</sup> Farley et al. <sup>58</sup>
Complexity of treatment	Ammassari et al. <sup>52</sup>
Cost of medication, copayment, or both	Balkrishnan, <sup>59</sup> Ellis et al. <sup>60</sup>



**“What fits your busy schedule better, exercising one hour a day or being dead 24 hours a day?”**

# STRATEGIES TO IMPROVE ADHERENCE





- ✓ **Simplify regimen**
  - ✓ **Impart knowledge**
  - ✓ **Modify patient beliefs & human behavior**
  - ✓ **Provide communication & trust**
  - ✓ **Leave the bias**
  - ✓ **Evaluate adherence**
-



- Adjust timing, frequency, amount, and dosage.
- Match regimen to patients' activities of daily living.
- Recommend all medications be taken at same time of day .
- Encourage use of adherence aids



# Simplify Regimen

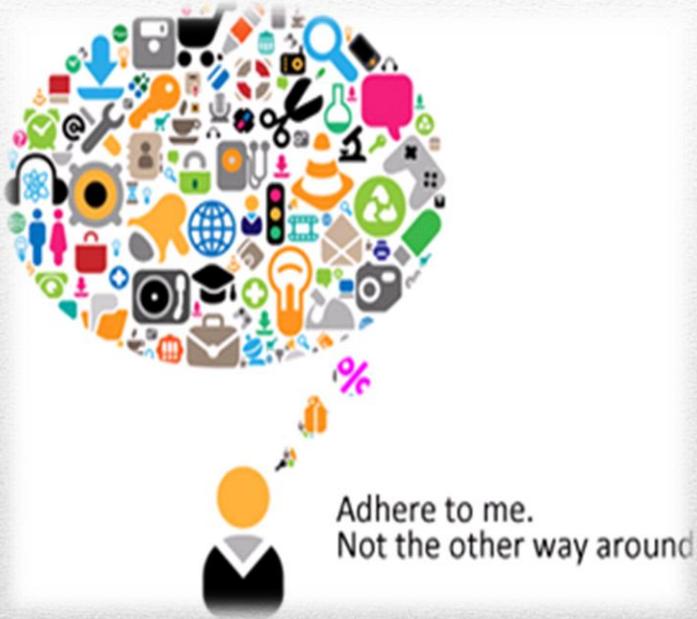
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- Patient-provider shared decision making
- Provide clear instructions (written & verbal)
- Reinforce all discussions often, especially for low-literacy patients
- Involve family & friends in the discussion when appropriate

# Impart knowledge

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- Empower patients to self-manage their condition
- Address fears & concerns (perceived barriers) of taking the medication
- Provide rewards for adherence

**Modify patient beliefs & human behavior**

---

**TALK TO  
YOUR PATIENTS  
ABOUT TAKING  
THEIR MEDS**



## ***FACTS !!***

- At least **50%** of patients leave the office not understanding what they have been told !!
- Physicians interrupt patients on average of **22 sec.**
- **54%** - patient problems & **45%** patient concerns are neither elicited by physician nor disclosed by patient

**Provide communication & trust**

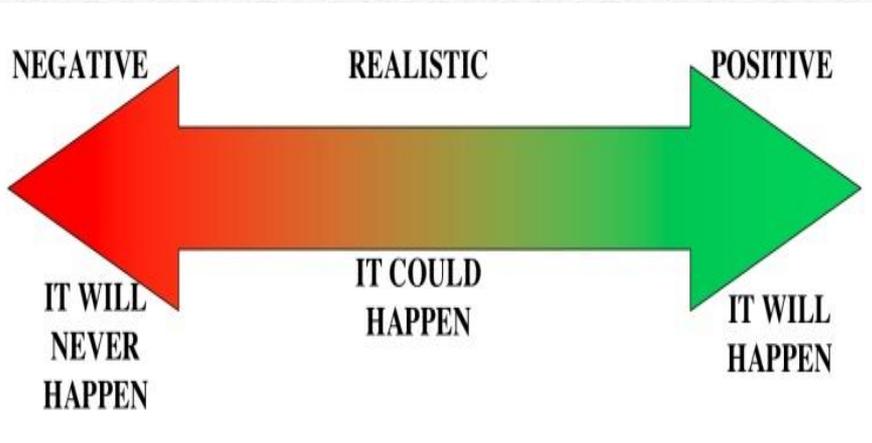
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- Improve interviewing skills.
- Practice active listening.
- Provide emotional support.
- Provide clear, direct, & thorough information.
- Elicit patient's input in treatment decisions.
- Allow adequate time for patients to ask questions.
- **Build TRUST.**

**Provide communication & trust**

---



- Examine self-efficacy
- Acknowledge biases in medical decision-making
- Review communication style to see if it is patient-centered

**Leave the bias**

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- Self-reports are the most commonly used tool in measuring adherence.
- Review patient's medication containers, noting renewal dates



# Evaluating adherence

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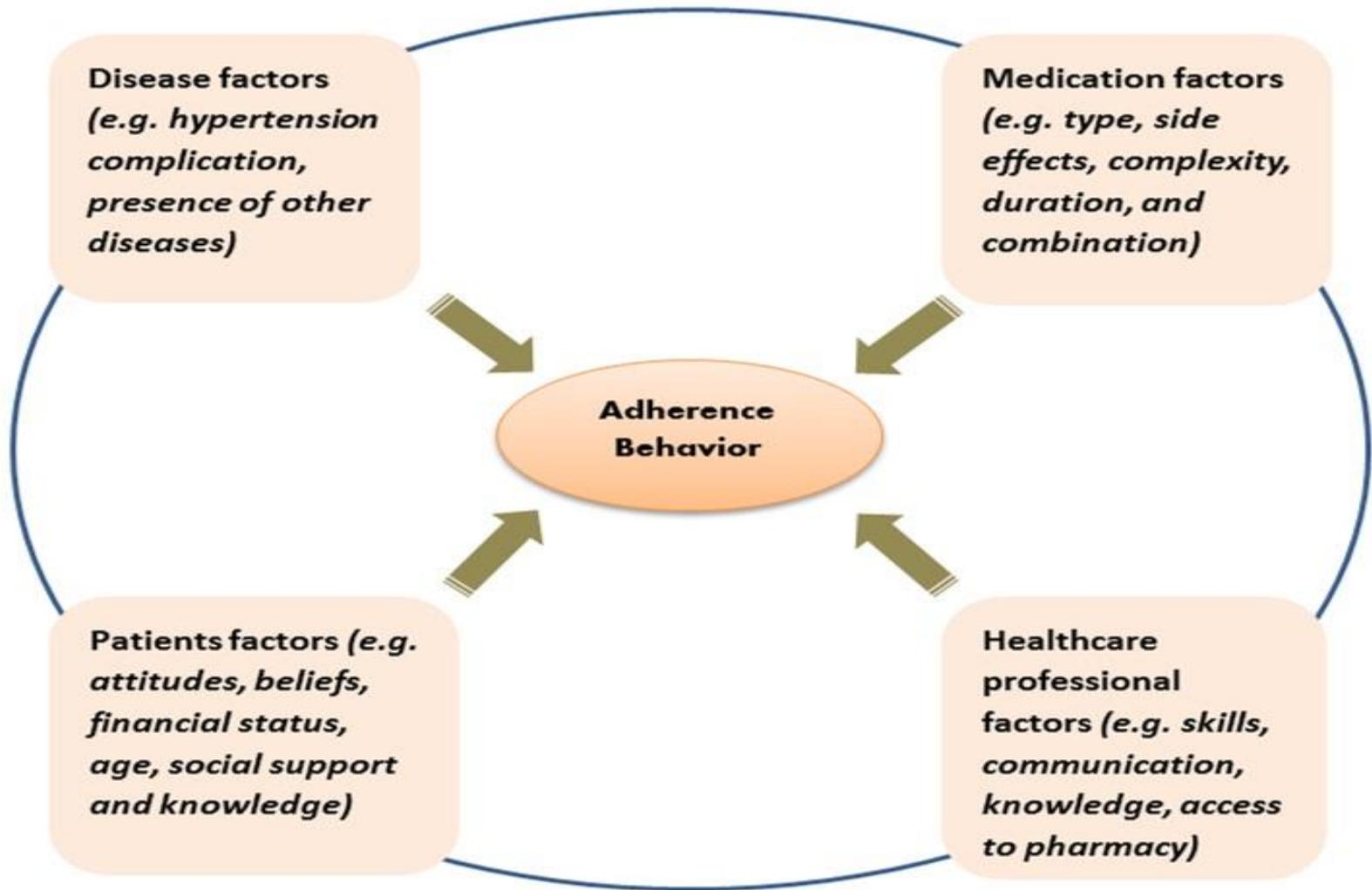
**Table 1. Methods of Measuring Adherence.**

<b>Test</b>	<b>Advantages</b>	<b>Disadvantages</b>
<b>Direct methods</b>		
Directly observed therapy	Most accurate	Patients can hide pills in the mouth and then discard them; impractical for routine use
Measurement of the level of medicine or metabolite in blood	Objective	Variations in metabolism and “white-coat adherence” can give a false impression of adherence; expensive
Measurement of the biologic marker in blood	Objective; in clinical trials, can also be used to measure placebo	Requires expensive quantitative assays and collection of bodily fluids
<b>Indirect methods</b>		
Patient questionnaires, patient self-reports	Simple; inexpensive; the most useful method in the clinical setting	Susceptible to error with increases in time between visits; results are easily distorted by the patient
Pill counts	Objective, quantifiable, and easy to perform	Data easily altered by the patient (e.g., pill dumping)
Rates of prescription refills	Objective; easy to obtain data	A prescription refill is not equivalent to ingestion of medication; requires a closed pharmacy system
Assessment of the patient’s clinical response	Simple; generally easy to perform	Factors other than medication adherence can affect clinical response
Electronic medication monitors	Precise; results are easily quantified; tracks patterns of taking medication	Expensive; requires return visits and downloading data from medication vials
Measurement of physiologic markers (e.g., heart rate in patients taking beta-blockers)	Often easy to perform	Marker may be absent for other reasons (e.g., increased metabolism, poor absorption, lack of response)
Patient diaries	Help to correct for poor recall	Easily altered by the patient
When the patient is a child, questionnaire for caregiver or teacher	Simple; objective	Susceptible to distortion

- Mrs. Noura is 55 year old , Known to Have HTN & high lipids
- Came for refill of her medication , 2 months late than her scheduled appointment.
- Examination : BP 150/90 , BMI 28
- Discuss possible causes of her non- adherence behavior ?

**CASE**

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- *Adherence to prescribed medication regimens is critical to patient outcomes*
- *Non-adherence is a multidimensional problem*
- *Provider should focus on communication skills, cultural sensitivity, & patient-centered care.*
- **SIMPLE** approach

# CONCLUSION

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