In the name of ALLAH

Rational use of Drugs

Dr. Amir Rezazadeh

CLINICAL PHARMACIST

ASSISTANT PROFESSOR OF CLINICAL PHARMACY (IUMS)

Introduction

Medicine is considered as strategic goods worldwide and, therefore, a huge amount of health care budget is spent on it.

- **Worldwide** more than **50% of all medicines** are prescribed, dispensed, or sold inappropriately while 50% of patients fail to tak

Overuse, misuse and underuse are all irrational use of drugs

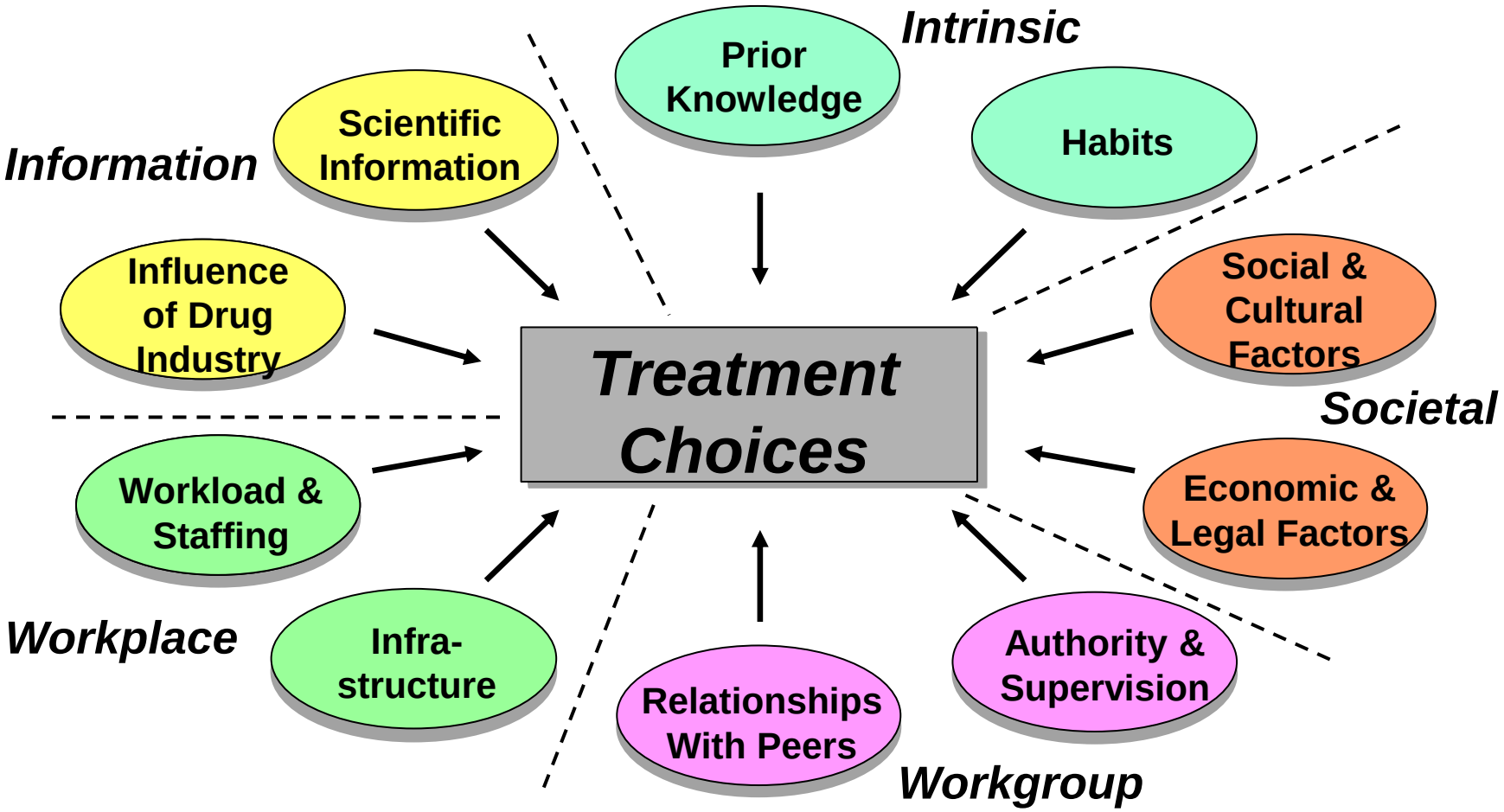
The rational use of drugs requires that patients receive medications appropriate (effective and safe) to their clinical needs, in doses that meet their own individual requirements for an adequate period of time, and at the lowest cost to them and their community.

WHO conference of experts Nairobi 1985

- **Correct drug**
- **Appropriate indication**
- **Appropriate drug considering efficacy, safety, suitability for the patient, and cost**
- **Appropriate dosage, administration, duration**
- **No contraindications**
- **Correct dispensing, including appropriate information for patients**
- **Patient adherence to treatment**

Could there have been a better term than "Rational" ?

Many Factors Influence Use of Medicines



DRUG USE INDICATORS Continued

Prescribing indicators

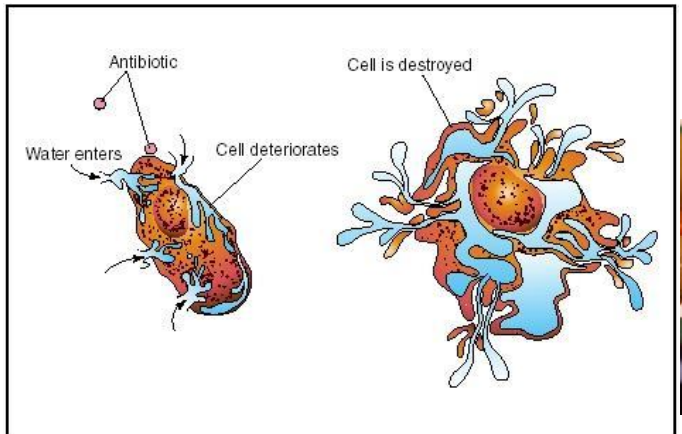
1. Average number of drugs per encounter
2. Percentage of drugs prescribed by generic name
3. Percentage of encounters with an antibiotic prescribed
4. Percentage of encounters with an injection prescribed
5. Percentage of drugs prescribed from essential drugs list or formulary

Strategies to reduce Irrational use of drugs

- **1. Educational:** patient / physician / pharmacist/ nurses,…
- **Continuous education is necessary**

- **2. Economical penalties! For physician,..**
- **3. Clinical Practice guideline/ regulatory affairs**

Rational Use of ANTIBIOTICS



Antibiotic Therapy principles

- **1. Empirical therapy** Vs definite therapy
- 2. What are suspected microorganism?

- 3**. G Positive Target:** MSSA/MRSA/Streptococcus
- 4. **G Negative bacteria**: E Coli/ Pseudomonas/ Acinetobacter, Klebsiella,…

1. **.Right person/ right drug /right dose/ right route/ right time**
2. **Side effects**
3. **Drug interaction**

I’m #CombatingAMR

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What is antimicrobial resistance?

- Antimicrobial resistance happens when **microorganisms** (such as bacteria, fungi, viruses, and parasites) **change** when they are exposed to antimicrobial drugs.

- As a result, the **medicines become ineffective** and **infections persist** in the body, increasing the risk of spread to others.

Why is antimicrobial resistance a global concern?

- **New resistance mechanisms** are emerging and **spreading globally**
- Without effective antimicrobials for prevention and treatment of infections, medical procedures such as **organ transplantation**, **cancer chemotherapy**, **diabetes management** and **major surgery** **become very high risk**.
- **Cost**
- **Prolonged illness**
- **Lengthier stays in hospitals**
- **Mortality**

What accelerates the emergence and spread of antimicrobial resistance?

- Antimicrobial resistance occurs **naturally over time**, usually through genetic changes.

- However, the **misuse,** and **overuse** of antimicrobials is accelerating this process.

Four Core Actions to Fight Resistance

1 PREVENTING INFECTIONS, PREVENTING THE SPREAD OF RESISTANCE

Avoiding infections in the first place reduces the amount of antibiotics that have to be used and reduces the likelihood that resistance will develop during therapy. There are many ways that drug-resistant infections can be prevented: immunization, safe food preparation, handwashing, and using antibiotics as directed and only when necessary. In addition, preventing infections also prevents the spread of resistant bacteria.

Four Core Actions to Fight Resistance

2 TRACKING

CDC gathers data on antibiotic-resistant infections, causes of infections and whether there are particular reasons (risk factors) that caused some people to get a resistant infection. With that information, experts can develop specific strategies to prevent those infections and prevent the resistant bacteria from spreading.

Four Core Actions to Fight Resistance

3 IMPROVING ANTIBIOTIC PRESCRIBING/STEWARDSHIP

Perhaps the single most important action needed to greatly slow down the development and spread of antibiotic-resistant infections is to change the way antibiotics are used. Up to half of antibiotic use in humans and much of antibiotic use in animals is unnecessary and inappropriate and makes everyone less safe. Stopping even some of the inappropriate and unnecessary use of antibiotics in people and animals would help greatly in slowing down the spread of resistant bacteria. This commitment to always use antibiotics appropriately and safely—only when they are needed to treat disease, and to choose the right antibiotics and to administer them in the right way in every case—is known as antibiotic stewardship.

Four Core Actions to Fight Resistance

4 DEVELOPING NEW DRUGS AND DIAGNOSTIC TESTS

Because antibiotic resistance occurs as part of a natural process in which bacteria evolve, it can be slowed but not stopped. Therefore, we will always need new antibiotics to keep up with resistant bacteria as well as new diagnostic tests to track the development of resistance.

ANTIMICROBIAL STEWARDSHIP

1. Antibiotics are the second most common class of drugs that cause adverse effects.

2. Antibiotics are the most common class of medication to be associated with prescribing errors.

3. Antimicrobials can account for up to 30% of hospital pharmacy budgets, with up to 50% of antimicrobial use being inappropriate, leading to increased cost, increased selection of resistant pathogens, an increased selection of opportunistic infections (OIs)

ANTIMICROBIAL STEWARDSHIP

- Definition: **Multidisciplinary** coordinated **interventions** designed to improve and measure the **appropriate use** of antimicrobial agents to **promote the selection of optimal** antimicrobial drug regimen, including dosing, duration, and route of administration.

- Goals: To optimize clinical outcome while minimizing unintended consequences of antimicrobial use, which include the emergence of **antimicrobial resistance** and adverse drug reactions.

- In addition, a responsible approach to the use of antimicrobial agents should reduce the overall costs associated with treatment.

ANTIMICROBIAL STEWARDSHIP

- 1.Prospective audit with intervention and feedback (“back-end” strategy)
  a. Allows flexibility and minimizes delay in administering therapy
  b. The most successful strategy involves direct communication with treating physicians and required
  documentation for acceptance of recommendation or rationale for denial.
- 2. Formulary restriction and preauthorization (“front-end” strategy).
  a. May be resource intensive, and prescribers may feel a loss of autonomy
  b. Initial choices of antimicrobials may be optimized through consultation with infectious disease experts.

Injectable Drugs

- Injection is one of the **most common medical procedures** in the health sector.
- Annually up to **16 billion injections** are prescribed in low- and middle-income countries (LMICs), many of them are not necessary for the patients, increase the healthcare costs and may result in side effects.

Currently over 40% of outpatient prescriptions in Iran contain at **least one injectable medicine**

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Policy Brief

Improving Injectable Medicines Prescription in Outpatient Services: A Path Towards Rational Use of Medicines in Iran

Firoozeh Bairami[1], Fatemeh Soleymani[2,3], Arash Rashidian[1,4*]

- **The recommended policy options** are targeted at **patients** and **public** (2 policies), **insurers** (2), physicians (1), pharmacies (1), and the Ministry of Health and Medical Education

Table. Policy Options

Policy Options	Policy Description	Advantages/Disadvantages
1. Developing evidence-based clinical guidelines containing recommendations for appropriate prescribing	This policy option targets doctors and is designed in response to a perceived lack of knowledge about effective alternative methods for patient management.	This Policy has a low implementing cost – is expected to have a modest effect for a reasonable period of time. Its feasibility is acceptable.
2. Enforcing the regulations for dispensing of non-prescription medicines	In response to providing injectable medicines without prescription. It is aimed at pharmacies.	The cost of implementing this policy is low with a good effect in reasonable period of time. However, the feasibility of implementing it is low.
3. Using mass media to increase public awareness regarding side effects of injection	Public may demand injectable medicines. Using mass media can Increase awareness of a large number of people.	We expect a small effect from this policy, effective use of mass media might be costly. The durability and feasibility of implementing is reasonable.
4. Interventions to change public attitude toward reducing injectable medicines demand	Because of lack of knowledge people think injecteble medicines are more effective than other form of medicines. In this regard, increasing knowledge is useful which is possible with changing public attitude.	We can implement this policy easily with a low cost but as the target group is the whole society and the policy is not personalized the effect is low and will decrease during time.
5. Increasing coordination between the insurer and MoHME monitoring activities	Insurance organizations can play an effective role in managing prescribing injectable medicines and this would be possible with the leverage of monitoring activities.	Even though the cost of implementing this policy is high but the effect is very good and can last for a long time and it can be easily implemented.
6. Changing the policy of auditing the number of medicinal items in each prescription to the content of prescriptions (interactions, effectiveness, relevance)	Insurers can check the content of a prescription to watch which form of medicines have been prescribed rather than to check the number of medicinal items (The current policy is to count the number of medicines).	Implementing this policy can be considered as a rational choice because with a reasonable cost we will have a very good effect in a long period of time.
7. Developing clear guidance for use of injectable medicines in outpatient settings	MoHME as the main policy-maker in the country can control the issue by developing proper guidelines regarding injection.	This policy can be implemented easily by a reasonable cost. However, its effect is low and it can last for a long period of time.

Abbreviation: MoHME, Ministry of Health and Medical Education.

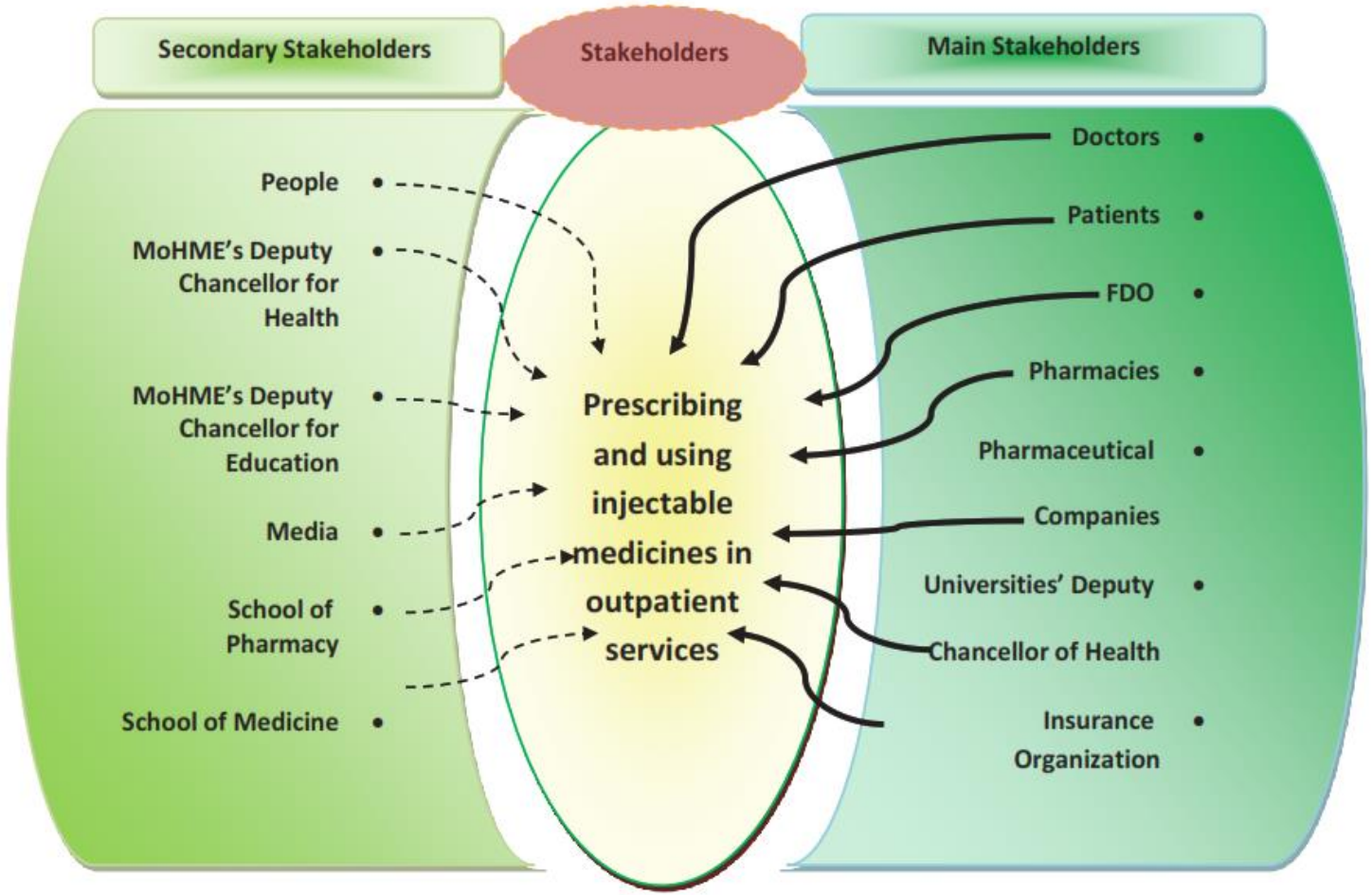

Figure. Main Stakeholders of Prescribing and Using Injectable Medicines in Outpatient Services. FDO, Food and Drug Organization.

Injectable drugs in hospital

- **For high-risk injectable practices:**

- Provide **written essential technical information** and procedures.

- Use injections that are prepared or **used in closed**, not open, systems.
- Reinforce and audit policy to ensure all syringes and infusions containing injectable medicines that leave the hands of practitioners during use, are labelled.
- **Prepare all cytotoxic and total parenteral nutrition (TPN)** products, and make all additions to TPN, in the pharmacy department.

Injectable drugs in hospital

- Provide ready-to-administer or **ready-to-use injectable** products of standard strength.
- **This will minimize risks when preparing and administering injectable medicines.**

- **Provide dose calculation tools**. For example, dosage charts for a range of body weights that eliminate the need for calculating doses.
- **Use double checking systems** such as an independent check by another practitioner (satellite pharmacist), and dose checking software in 'Smart' infusion pumps and syringe drivers.
- **Use infusion monitoring** forms and check lists for the duration of the administration

Injectable drugs in hospital

- Ensure there are **up-to-date protocols and procedures for prescribing, preparing and administering** injectable medicines in all clinical areas

- **Protocols for Antibiotics/ Specific medication (Eg Rituximab) and so on.**

- **Considering patient status** (kidney, hepatic impairment,..), Drug Interaction ,… MONITORING (TDM/Scr ,…)

NHS

Healthcare staff need to have full technical information about the following for all injectable medicines products used in clinical areas:

Reconstitution	Manufacturer's recommended solution (diluent) for diluting and reconstituting a freeze-dried powder.
Concentration of final solution	Recommended concentration and volume for administration, stating maximum concentration where applicable.
Example calculations	Examples of dose, preparation and rate of administration calculations.
Dilution/flush solutions	Information concerning physical and chemical compatibility with diluents and infusion fluids.
Stability in solution	Recommended expiry for the prepared final injection or infusion.
Administration rate	For bolus administration and infusion for all routes of administration.
Compatibility information (for commonly used mixtures in specialist areas only)	Mixed in the same syringe or infusion, in administration tubing and at Y-sites and three-way taps where mixing occurs.
Special handling information	If special precautions and handling methods have to be used during preparation and administration e.g. protect from light.
Specialist technical information (where relevant)	pH, osmolarity, sodium content and displacement values.

References for checking Injectable drugs compatibilities

- 1. Lexi Drugs (IV-Compatibilities/ Nursing)
- 2. Handbook on injectable drugs
- 3. Micromedex- IV compatibilities

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- **Awareness , Knowledge, Awareness and Knowledge…**