Pharmaceutical care and Communication

Corner stones: In addition to the Accountable Behaviour.

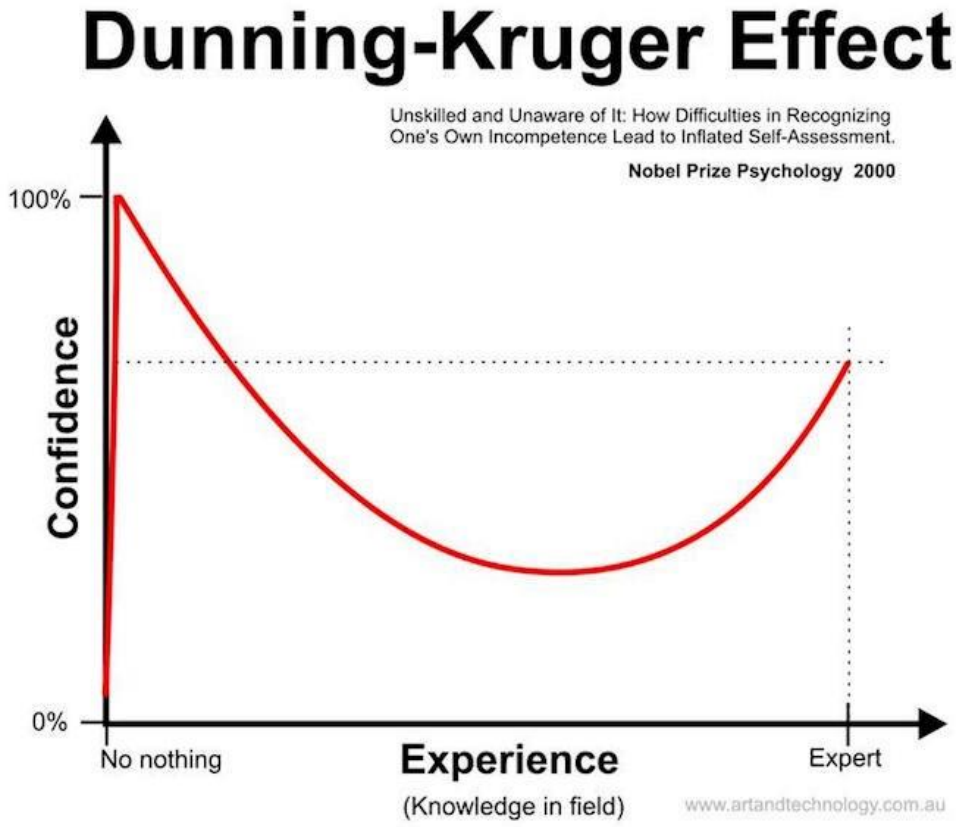
How to Develop your self	DV Equation & DK Curves + Building Capacity Tables
How to think	Six thinking hats
How to lead your time and Priorities	Priority Grid/ Goal setting/Gantt charts/Pomodoro/wellness
Understand real-life leadership	Five level of leadership

Contents

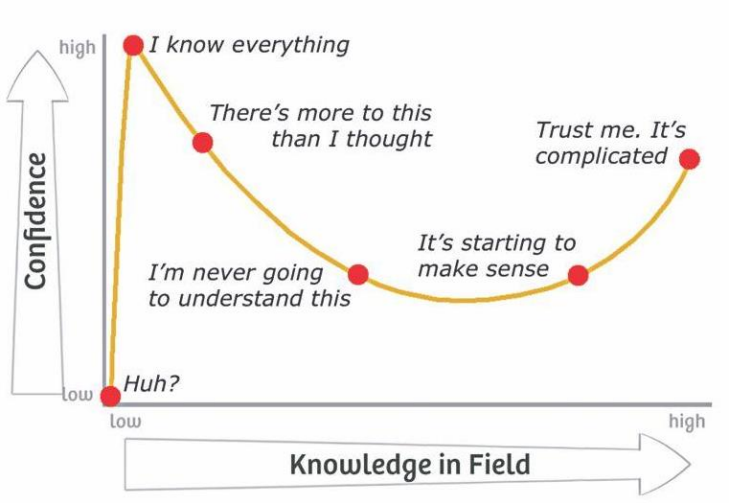
Learning Curve, the DK Effect

David Dunning and Justin Kruger research was interpreted to DK effect (5 stages)

a cognitive bias in which people of low ability have illusory superiority and mistakenly assess their cognitive ability (Skills , Knowledge) as greater than it is.



Ref: Kruger, Justin; Dunning, David (1999). "Unskilled and Unaware of It: How Difficulties in Recognizing One's Own Incompetence Lead to Inflated Self-Assessments". Journal of Personality and Social Psychology. 77(6): 1121-1134. doi:10.1037/0022-3514.77.6.1121



What is **Professional Development** ?

Why is it described as **Tantalization**?

Equation for Professional development

Professional Development = $(CXC)^R$

(Competence X Commitment)$^{(Behaviour + Attitude)}$

Competence = Knowledge + Skills

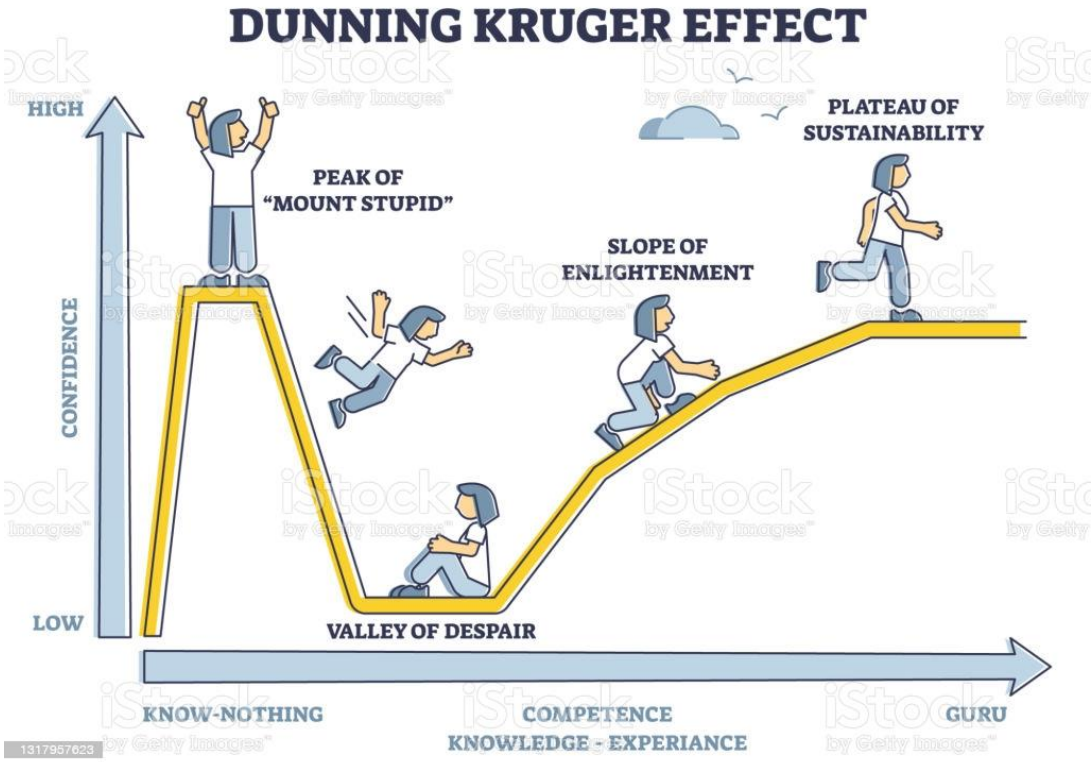
Knowledge = Knowing + Understanding, formal education.

Skills = Doing it + Practicing it, experience.

Commitment = Motivation + Confidence

Motivation = Enthusiasm (Internal + external) + Moral Satisfaction.

Confidence = Self-awareness + Believes + self-assurance.



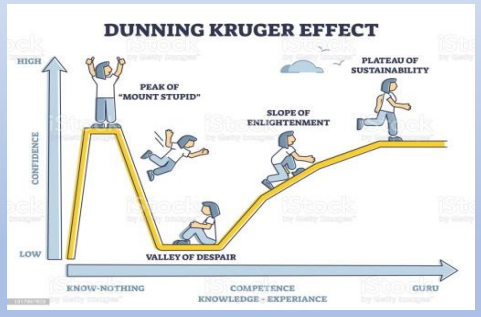
Let us See

-Ignorance is bliss
-Overestimated ability
-Lack of true awareness
-Confidence without foundation

-Start realizing gaps
-Humbling experience
-Recognizing limitations
-Growing self-awareness
-Decreasing confidence

-Emotional difficulty
- Frustration & Self-Doubt
- Navigating Uncertainty
- Building Resilience

-Skill development
-Knowledge development
- Effort and practice
- Focused learning
- Confidence with humility



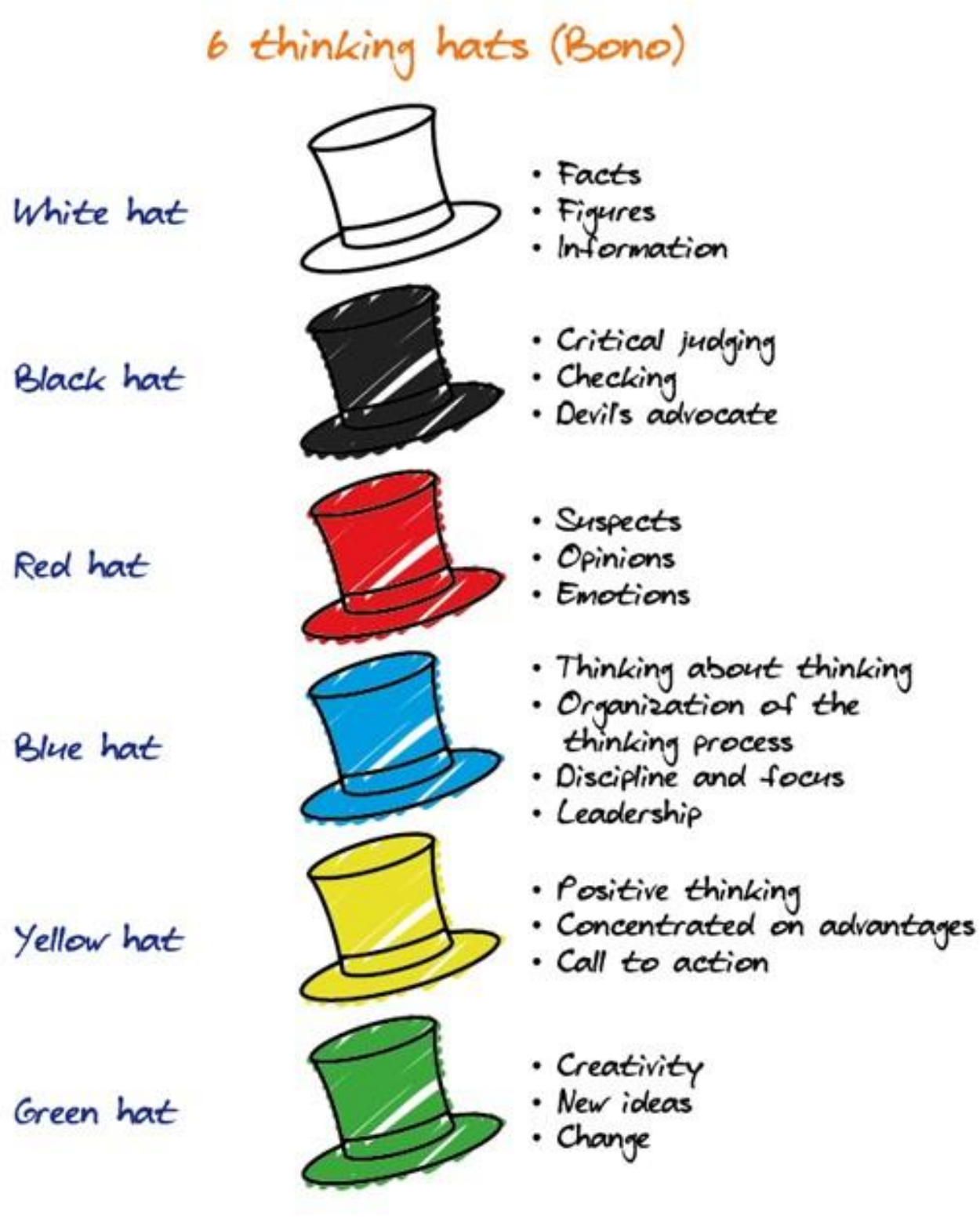
- Confident expertise
- Humble
- Continuous learning
- Respect other experts
- Identify the need for a development plan
- Being specialised

Full list Pharmacy Management & Leadership – Modules in Hashemite University			
Self-management & Leading interaction with others	**Management & Leading People (Manage others)**	**Management & Leading Business Operations**	**Management & Leading Economy (Microeconomy)**
Self-awareness	Coaching & Mentoring	Strategic planning	Understanding concepts
Behavioural sciences, Psychometric Analysis (Basic, advanced)	Management (Planning, Organising & controlling)	Business plan development	Budgeting
Effective Communication skills	Leadership (Basics, Intermediate, advanced)	Marketing & Advertising	Financial reports
Emotional intelligence	Team building and Motivation	Operation management	Accounting records
Time & Priority Management	Delegation	Total Quality Management	Pharmaco-economy (Basic, Advanced)
Goal setting	Performance managing	Crises Management	
Selling Skills (Basic, Advance level) Selling with Clinical Paper	Conflict resolution	Information management	
Presentation skills	Hiring & appraisals	**Pharmacy _Clinical Management**	
Negotiation techniques	Virtual team management	Medication Management, Therapy Management, Medication appropriateness	
Problem Solving and Stress Management	Feedback essentials	Systems for Medication Errors & Codes, Pharmacovigilance, and Side Effect Management	
Decision Making	Change Management	Health-related Quality of Life & Self Efficacy	
Creative Thinking, Innovation & Entrepreneurship	Risk Management	Adherence-compliance, Belief about medications.	

Scientific Learning Process & Stages	For the Public and Reality	Tips for the Leaders to Develop Subordinates
Unconscious Incompetence: This is the starting point for most individuals when encountering a new skill or topic. In this phase, a person lacks the necessary competency or ability, yet they tend to overestimate their capabilities. This overconfidence arises from a lack of awareness about the complexity of the task at hand.	**Mountain of Stupidity:** -Ignorance is bliss -Overestimated ability -Lack of true awareness -Confidence without foundation	**Mountain of Stupidity Phase (Unconscious Incompetence)** **Assessment:** Identify the specific skills & knowledge lack. **Provide Information:** Clearly explain what competencies are needed and why they are important. **Set Goals:** Help them set achievable goals to close these skills – knowledge gaps. **Exposure: Introduce them to the** resources (courses, materials, mentors) that can assist in skill acquisition.
Conscious Incompetence: As individuals learn and gain more experience, they often transition to this phase. Here, they start recognizing their limitations and become more aware of the gaps in their knowledge or skills. Confidence may decrease during this phase as the realization of their incompetence sets in.	**The Ascent, Despair - Learning** -Start realizing gaps -Humbling experience -Recognizing limitations -Growing self-awareness -Decreasing confidence	**The Ascent, Despair – Learning Phase (Conscious Incompetence)** **Structured Training**: Provide organized training sessions to build foundational skills. **Constructive Feedback**: Give timely and constructive feedback to guide improvement. **Practice**: Encourage regular practice to enhance competence. **Motivation**: Recognize their progress, boosting their motivation to keep learning**.**
The lowest point Individuals grapple with self-doubt and uncertainty. It's a period marked by emotional turbulence as the initial excitement gives way to the realization of the challenges ahead. However, navigating this valley is an opportunity to build resilience, pushing through difficulties and emerging with a deeper understanding of the subject matter. This phase often serves as **a turning point**, setting the stage for the transition toward the "Conscious Competence" phase, where focused learning and more grounded confidence await.	**Valley of Despair** The transition from the "Mountain of Stupidity" to the "Starting of Expert Peak," -Emotional difficulty - Frustration & - Self-Doubt - Navigating Uncertainty - Building Resilience	**Valley of Despair Phase (The lowest point)** **Psychological Support** **Provide Encouragement**: Reassure them that this phase is a natural part of the learning process, and they're not alone in facing these challenges. **Foster a Supportive Environment**: Create a safe space where they feel comfortable discussing difficulties and seeking help from peers or mentors. **Celebrate Learning:** Emphasize that mistakes and setbacks are opportunities for growth, fostering a mindset of continuous improvement **Goal Setting and Progress Tracking** **Goal Breakdown**: Help them break long-term goals into smaller, achievable milestones to maintain a sense of progress.

		Reinforce Purpose: Remind them of the value and reasons they chose to learn the skill, rekindling their motivation.
Conscious Competence With deliberate practice and continued learning, individuals gradually move into this phase. They become more skilled and competent, but it requires concentrated effort and focused attention. Confidence starts to increase, but it remains tempered by the awareness that there is still more to learn.	**Enlightenment Nearing the Summit** -Skill development -Knowledge development - Effort and practice - Focused learning - Confidence with humility	**Enlightenment Nearing the Summit Phase (Conscious Competence)** **Advanced Training:** Offer more specialized training to hone specific skills. **Encourage Problem-Solving**: Ask them to tackle real-world challenges that require critical thinking and creativity. Encourage them to devise solutions independently. **Autonomy and Responsibility**: Give them more autonomy in decision-making and problem-solving. This boosts confidence and reinforces their conscious competence. **Regular Review**: Schedule regular reviews to ensure skills remain sharp. Identify areas for refinement and additional training as needed.
Unconscious Competence (10,000 working hours) This is the mastery phase. Individuals who reach this level have honed their skills to a point where they can perform the task with ease and precision, often without conscious effort. Confidence is high in this phase (80%), but interestingly, it tends to be more grounded and humble compared to the unwarranted confidence displayed in the "unconscious incompetence" phase.	**1st level Expert Peak** - Confident expertise - Humble - Continuous learning - Respect other experts - Identify the need for a development plan - Being speclialised	**Expert Peak Phase (Unconscious Competence)** **Mentorship Roles**: Encourage them to mentor colleagues or new team members in areas where they've achieved unconscious competence. This reinforces their knowledge and fosters a culture of continuous learning. **Cross-Training**: Introduce opportunities for them to learn skills from other departments or fields. This diversifies their expertise and keeps them engaged. **Professional Development**: Sponsor attendance at conferences, workshops, and advanced training. Encourage them to stay at the forefront of industry trends. **Leadership Skills**: Foster leadership skills by involving them in decision-making, guiding projects, or leading a team. This deepens their understanding while nurturing leadership potential.

The Six Thinking Hats



See the more detailed figure for the Six thinking hates

HAT		PERSPECTIVE
FACTUAL	White Hat: 	**Motto:** "The facts, just the facts." **Focus:** Facts, objective information, data. **Questions to explore:** • What information is currently accessible? • What does the data tell us, as it is? • What else do we need? • How will we obtain any necessary or lacking information?
OPTIMIST	Yellow Hat: 	**Motto:** "We can make it work." **Focus:** Benefits, possibilities, improvement, suggestions, advantages. **Questions to explore:** • What are benefits or positive outcomes associated with this decision? • What are the advantages of this solution? • What's the best strategy for handling this situation? • How do we make it work?
JUDGE	Black Hat: 	**Motto:** "Yes, but…" **Focus:** Risks, difficulties, problems, issues, failures, concern, caution. **Questions to explore:** • Does this work? • How could this possibly fail? • How can we make this financially feasible? • What should we be concerned about? • Where should we proceed with caution?
EMOTION	Red Hat: 	**Motto:** "My gut tells me…" **Focus:** Feelings, emotions, hunches, intuition. **Questions to explore:** • What does this feel like to me? • How are people feeling? • What reactions do we need to anticipate? • What impression does this give to others?
CREATIVE	Green Hat: 	**Motto:** "What if…? **Focus:** Creativity, alternatives, new ideas, forward thinking. **Questions to explore:** • What ideas haven't been tried before? • Can we approach this in another way? • How can I uniquely tackle this problem? • How can we embrace a different viewpoint?
CONDUCTOR & Analysis	Blue Hat: 	**Motto:** "Analysis and next step actions'' What are our next steps?" **Focus:** Definitions, observations, summaries, conclusions, next steps. **Questions to explore:** • What have we done so far? • Where should we go from here? • What results do we want? • What is the best pathway of action to take?

Remember

Do not **Assume**, ask the **Right Question**, get the **Right Answer**, Implement the **Right Action**

Time and Priority Management

Goal Settings and priorities / Eisenhower priority Matrix

	Urgency	
	Urgent	Not urgent
Important		
Not Important		

Priorities/ Eisenhower principle

Parameters		Urgent	Not urgent
		to-do's that shout Now! / *reactive* mode, one marked by a defensive, negative, hurried, and narrowly-focused mind set	Operate in a responsive mode, which helps us remain calm, rational, and open to new opportunities
Important (80%)	long-term mission, values, and goals. (Maslo pyramid of needs)	➢ Necessity , ➢ Demand, ➢ Fire fighting Zone - **Priority 2**	➢ Quality ➢ Personal leadership, ➢ Core Value Zone - **Priority 1**
Not important (20%)	Time waster, 1st to blame in failure situation	➢ Deception , ➢ Illusion, ➢ Distraction Zone - **Priority 3**	➢ Waste , ➢ Escape, ➢ Disaster, ➢ Slow silent killer Zone. - **Priority 4**

Eisenhower principle- Examples

	Urgent (5-10%)	Not urgent (70-75%)
Important (80%)	**Crises , Problems, Deadlines :** -Medical Cases, Emergencies -Attending class & assignment -Deadline Manage Project -Reports & other submissions -Meeting & appointments -Last Minute Changes -Unscheduled Re-work -Forcing decision and closure -Critical Demand from supervisor or customer -Dealing with late input from supervisor	**Long-term mission, values, and goals & improving yourself** -Planning : Vision/Perspective -System & Process Development -Change Directions or Strategies -Balance of the Majors : Physical, Mental, Spiritual, Relationship (Family, society, friends & work) Professional (task commitment and competence, goal achievements and development) -Discipline -Control (preparation, anticipation & crisis prevention, and deadline-avoiding tasks) -Training and development -Thoughtful high quality work
Not important (20%) *-I am busy so I must be doing well.*	**Interruptions** Drop-in visitors/Pointless routines or activities/Phone calls/ Public meetings/Logistics/Mail that do not increase productivity & effectiveness/ Interruption/ Routine non essential reports/ Accumulated unresolved trivia	- Over analysis (Paralysis) - Duplicative of paper work - Pointless web surfing/ Scrolling through Facebook, Twitter/ Mindless TV watching - Playing video games - Gambling / - Gossip. Idle speculation - Target-less shopping / Smoking, drinking - Excessive relaxation , long vacations.

Priority Matrix in Practice

Parameters		Urgent (5-10%) to-do's that shout Now! / *reactive* mode, one marked by a defensive, negative, hurried, and narrowly-focused mind set	Not urgent (70-75%) Operate in a responsive mode, which helps us remain calm, rational, and open to new opportunities
Important (80%)	long-term mission, values, and goals. Maslo pyramid.	➢ **Necessity , Demand, Fire fighting Zone** ➢ Typically consist of crises, problems, or deadlines. ➢ **Action: Manage** ➢ Apply: Cushion Principles , Stress & Crises Management. 	➢ **Quality & Personal leadership**. ➢ Long-term mission, values, and goals & improving yourself ➢ **Action: Focus , Invest , Plan to do and Concern** ➢ Apply : Diligence & Discipline Strategic Planning. - SMARTiER, OATS, 5w & 1h 
Not important (20%)	Time waster, 1st to blame in failure situation	➢ **Deception , Illusion, Distraction Zone 15%** ➢ Interruptions from other & concern their own priorities. ➢ **Action: Ask for rational, Caution, Delay or Delegate or Reject (be smart)** ➢ Apply: Value rating, Rational to Say No, Rescheduling.	➢ **Waste , Escape , Disaster , Slow killer Zone. 5%** ➢ Usually : Extra/ Entertainment ➢ **Action: Avoid – Dump it, RESIST AND CEASE** ➢ Apply: Time Schedule, Awareness. 

1)Objective, Goal Settings

Method A) SMARTi & SMRTiER

Should be SMARTi and even SMARTiER

Specific / **M**easurable / **A**ctionable – **A**chievable – **A**greed*

Realistic, **R**elevant / **T**ime bond – **T**angible / **I**ncremental* /**E**thical Approval/**R**ecordable

*Effort impact grid

Impact	High	**Quick wins**	**Major projects**
	Low	Fill in	Thankless
		Low	High
		Effort	

Method B) OATS

Outcomes: By … I want to … I will have ….

Activities: To do list & Priorities A= Must B= should C= can. D= Nice to do.

Time frame

Scheduled stepwise

Method C) W Family & H

What, why, when, who, where and how. In addition to evaluation of available options by using: which + specification (which is less cost, which is more better)

2)Balance Model for good wellness

 # Occupational
- Engaging in rewarding activities
- Making good use of time - Having satisfying work
- Being a volunteer - Being creative

 # Emotional
- Being self-aware - Having a positive outlook
- Managing feelings well - Accepting yourself
- Having good coping skills

 # Spiritual
- Finding meaning in life
- Experiencing connection with God
- Appreciating life, joy, and beauty
- Practicing your faith - Celebrating cultural identity

 # Intellectual
- Being a lifelong learner - Being curious
- Sharing knowledge & experiences
- Mastering new skills - Expanding knowledge

 # Physical
- Being active - Eating well - Getting enough sleep
- Being safe and secure - Do Sports

 # Social
- Being connected with your society
- Caring for and about others
- Giving and receiving support
- Having intimate and meaningful relationships
- Being an active member of the community

3) Scheduling

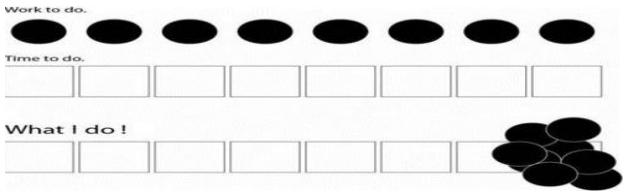
A) Schedule is a **written commitment** to accomplish tasks within a specific time frame.

- It lets you **visualize your available time** and your plan for allocating it.
- And it permits you to easily see uncommitted **blocks of time**.
- Most important, it shows you whether your **A- and B-priority tasks** are occupying most of your time—as they should be.

B) Schedule is away for you to break large projects into easier-to-manage chunks.

Sequence Tasks

- (Component parts … Pomodori)



3)Scheduling – Pomodoro & Gantt

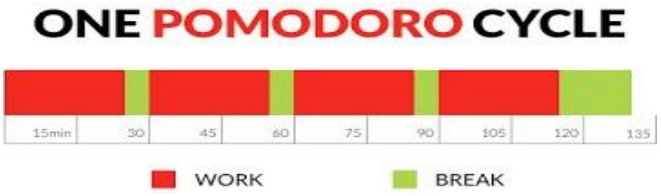
The Pomodoro Technique®

- Was developed by Francesco Cirillo in the 1980s.

➢ Newsweek listed the Pomodoro Technique as one of the best ways to "Get Smarter in 2012“
➢ it was voted the "Most Popular Productivity Method" by the Lifehacker community.

- **Step1: Divide your work to many pomodori component parts**
- **Step 2: Set your timer, work on each pomodori for25 min**
- **Step3: Take short break 5 -10 minutes**
- **Step 4: Continue Your Work Sessions and Take a Longer Break.**

The Twenty Minute Break: Reduce Stress, Maximize Performance, Improve Health and Emotional Well -Being Using the New Science of Ultradian Rhythms



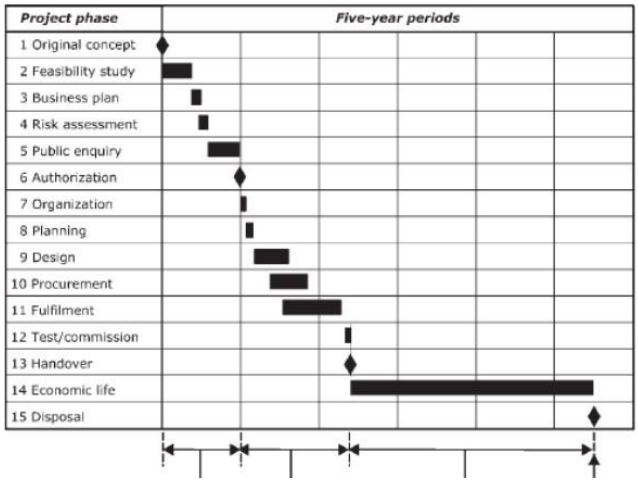
Scientific Evidence for the small part components , From MindTools

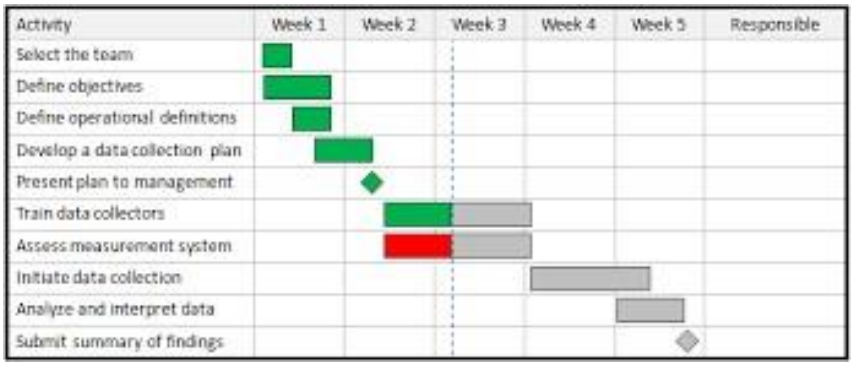
- *’A 2008 University of Illinois **study** showed that being tethered to your desk for long hours actually reduces your productivity, while regular short breaks help to keep you focused and energized’*

- ***‘research** by Swedish sports scientist Dr Elin Ekblom-Bak, published in 2010 BMJ, shows that, while exercise is vital for good health, only regular breaks from your desk can reduce these health risks. ’*

- **Sedentary time :** should be defined as the muscular inactivity rather than the absence of exercise.

Gantt Charts





Gantt chart should basically provide managers with the following easily understood summary

1. Start and endpoints as well as the intermediate steps or tasks.
2. Work scheduled for specific time periods.
3. How much of the work was completed.
4. The tasks owners or performers.

Simple Gantt chart: all the tasks have been set out clearly on a time scale

Linked Gantt chart: clearly indicate how the start of one task is dependent upon the completion of one or more other tasks. **Cornerstones identified**

Complex advanced Gantt charts: shows more details as step owner and financial related details and resources … etc

4)Cause of Procrastination	**Antidotes** **Admit you're procrastinating—and get the job done.**
Unpleasant or uninteresting task,	• Delegate the task—it may not be unpleasant to someone else. • Do the hardest tasks when your power and energy are at their highest. • Schedule the task in a way that makes turning back impossible. • **Get on with the job: Activity can help dispel non positive feelings.**
Loss of Motivation	• Know yourself, recharge your motivation battery; **Reward Yourself**: - Red Energy is motivated by Achievements and results. - Blue energy is motivated by correct work and structure. -Yellow energy is motivated by creativity and social recognition. -Green energy is motivated by attention and welling to help. • **Get on with the job: Activity can help enhancing motivation.**
Fear of failure; seeking for Perfectionism	• If you lack the training or **resources needed** to complete an assignment, say so—and get the help you need. • If your fear stems from lack of self-confidence, defuse it by **being proactive** and **planning** all the things you'll have to do to complete the job. • **Get on with the job: Activity can help dispel fear.**
Unclear starting point, Complex project	• **Just jump in and start working**. You'll likely find a productive way forward. • Break the job **into component parts Pomodoro tactic and time framing,** then specify tasks needed to complete each part. • **Sequence Taks**—then tackle the first task. • **Get on with the job: Activity can help clarifying your pathway.**
Being busy with other issues!	• Remind yourself with your **gaols and priorities**. • **Close everything** that you don’t need to do your task. (webpages, Mobile, TV) **Pomodoro cycles** • Remove any **source of distraction** on your working area. • **Get on with the job: Activity creates a positive cascade of your work to be done.**

The 5 level of Leadership by Maxwell

Level 1 — Position
The lowest level of leadership—the entry level.
After all, anyone can be appointed to a position!
While nothing is wrong with having a leadership position, everything is wrong with relying only on that position to get people to follow.

Hint:
People who remain on the position level may find it difficult to work with volunteers. Why? Because position does not automatically result in influence, and volunteers are aware that they don't have to follow anyone. They truly only follow if they want to.

Furthermore, difficult to impact on non-job-related issues.

But the news is not all bad about this level.
It is a prime place for you to begin investing in your growth and potential as a leader.

Level 2 — Permission

Level 2 is based on relationship.
At this level, people choose to follow because they want to. In other words, they give the leader Permission to lead them.

Level 2 is where solid, lasting relationships are built that create the foundation for the next level.

Level 3 — Production

The best leaders know how to motivate their people to GTD – get things done! And getting things done is what Level 3 is all about.

On this level, leaders who produce results build their influence and credibility. People still follow because they want to, but they do it because of more than the relationship. People follow Level 3 leaders because of the record of accomplishment.

Level 3 leadership still need to do the things that make Level 2 happen. They just add Level 3 strategies to the mix. And as they become effective at Level 3, they are ready to layer on the goals of the next levels.

Level 4 — People Development

Level 4 can be summed up in one word: Reproduction. Your goal at this level is to identify and develop as many leaders as you can by investing in them and helping them grow.

The more you raise up new leaders, the more you will change the lives of all members of the organisation.
As a result, people will follow you because of what you've done for them personally.
And as an added bonus, some of those mentoring relationships are likely to last a lifetime.

Level 5 — Pinnacle

The highest level of leadership is also the most challenging to attain. It requires longevity as well as intentionality. You simply can't reach Level 5 unless you are willing to invest your life into the lives of others.

But if you stick with it, if you continually focus on both growing yourself at every level, and developing leaders who are willing and able to develop other leaders, you may find yourself at the Pinnacle.

Level 5 leaders often transcend their position, their organization, and sometimes their industry.

Accountable Behaviour

Hold responsibility and ownership

Looking for facts not assumptions

Complement rather than complain

Problem solver rather trouble maker

Take initiatives and implement actions

Resilient and independent

Talk about ideas and objectives

Exuding connection and collaboration

Want others to succeed

Negative Mindset

Finger point and blame

Assume without validation

Complain and sabotage

Provide no practical solutions

Want others to carry out the work

Always dependent and demanding

Talk about people and conflicts

Exuding hatred grudge and anger

Can not appreciate others success

صفات السلوك الواعي المسؤول

يهتم بالأفكار و التقييم الموضوعي للأمور

يبادر بالتعاون و الاتصال الإيجابي مع الأخرين

يحب لغيره من الخير ما يحبّه لنفسهّ

يبادر لتقديم الحلول ولا يفتعل المشاكل

يتّخذ زمام المبادرة فعلا و ليس قولا فقط

قادر على التأقلم و العمل دون اتكال على الأخرين

يتحمل نتائج تصرفاته و يمتلك إدارة قرارته

يبحث عن الحقائق ولا يتبع الظنون

متعاون أكثر مما هو متذمر و كثير الشكوى

Designed and Prepared
By
Dr. Mohanad Odeh
Pharmacy School
Pharmacy Management &
Pharmaceutical Care
Innovation Centre

منظومة السلوك السلبي

مشغول بأشخاص الأخرين والتعليق عليهم

مشغول بالكراهية الحاقدة و الغيرة و حمل الضغائن

لا يستطيع تشجيع الاخرين على النجاح

لا يقدّم أيّة حلول عملية أو واقعية

يتطلب من الأخرين القيام بأعماله و أعمالهم

دائم التذمر و الشكوى و الاتكال على الاخرين

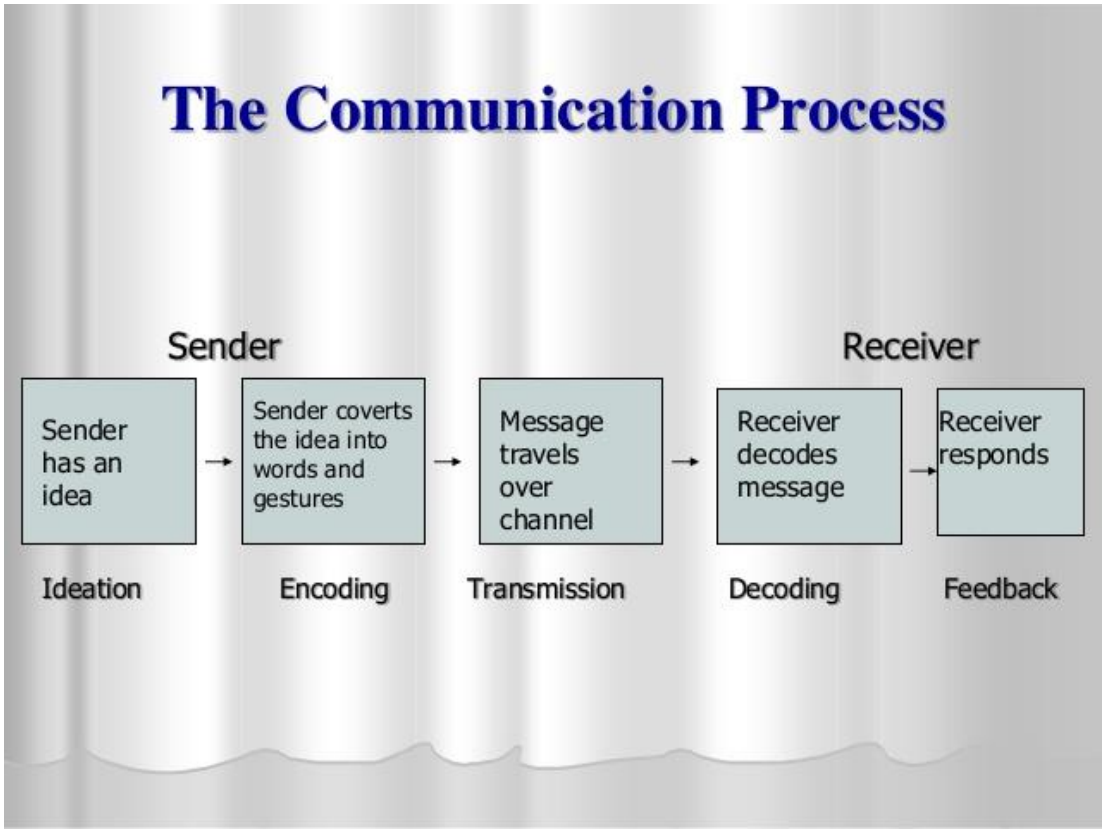
يلوم الأخرين و يشكك بهم و يتهمهم دوما

يفترض دون الاعتماد على دليل واقعي ملموس

كثير الشكوى و افتعال المشاكل أو النعرات

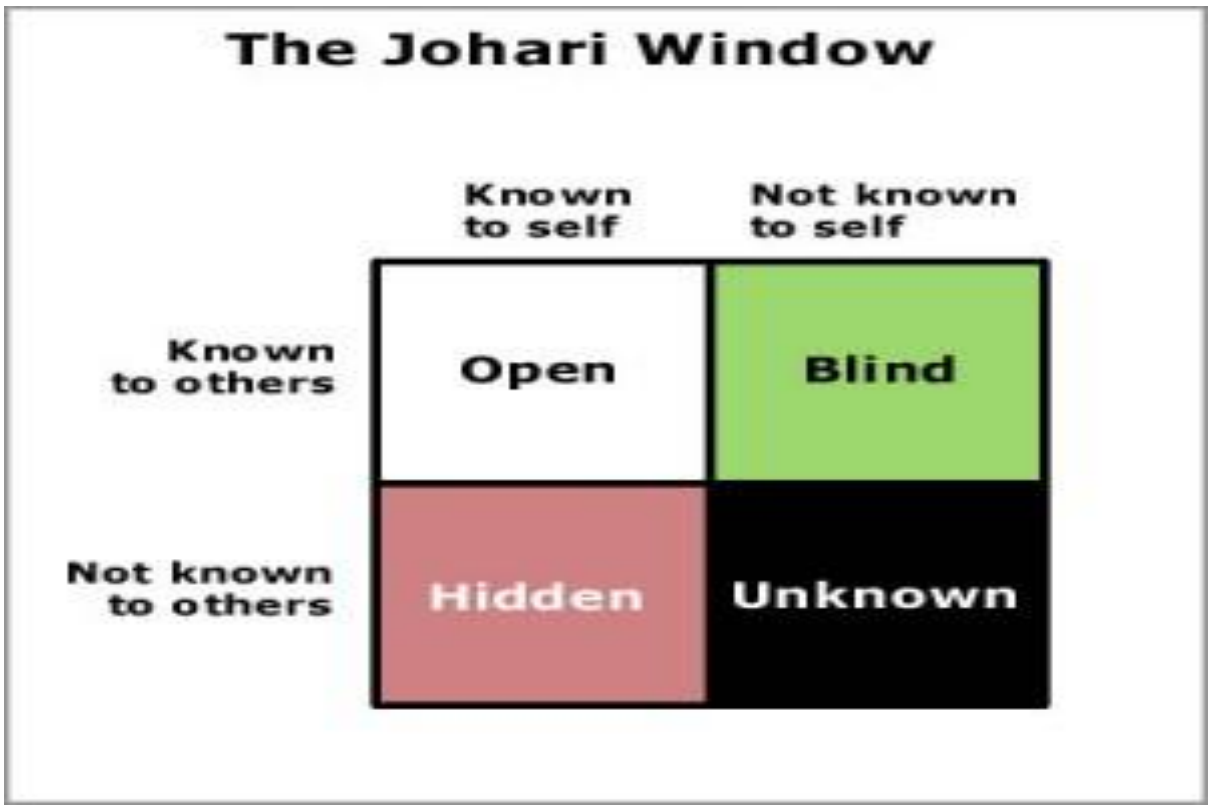
Basics for Development

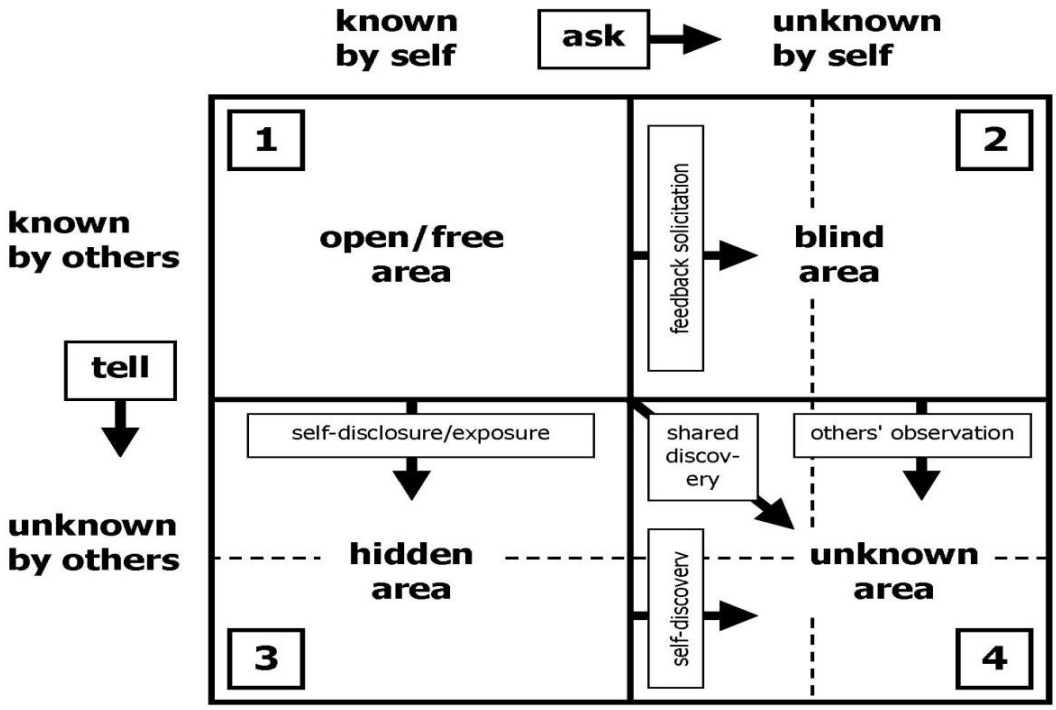
Basic Communication Skills (1) Classical Model & Johari



Johari Window

		Your Self	
		Yes (known)	No (Unknown)
Others	Yes (known)		
	No (Unknown)		





Listening Skills and Empathy

Hearing = Ear function to receive sounds.

Listening = pay attention (Ear and Mind) in order to hear. (Perceiving, paying attention, remembering)

Active Listening = Hence its name, it is to activate your listening.

Responsible Listening = Take responsibility.

Active Listening = Hence its name, it is to activate your listening:

Repeating: use exactly the same words.

Rephrasing: repeat with synonyms

Paraphrasing: Rendering by expressing the meaning with different descriptions or summarising.

Reflecting: Rendering by using your own word with emphasis the **emotional** dimension.

Empathy vs Sympathy! what are the differences?

Responsible Listening: take responsibility

- React (+ve & favourable) to your active listening, By implementing good actions.

LISTEN

Look interested – Relax, smile, eye contact, remove all kind of distraction.

Involve yourself by 2 pathway communications.

Stop talking, opposing, assuming, jumping, interruption. Stay on target.

Test your understanding … **Probing**

Empathy ; put yourself in speaker's shoes!

Neutralise your feelings

Feedback

The Feedback is the process that ensures the receiver has received the message and interpreted it correctly as it was intended by the sender. It increases the effectiveness of the communication as it permits the sender to know the efficacy of his message.

On the other hand, It can be a kind of helpful information or criticism that is given to someone to say what can be done to improve a performance, product, etc.

Barriers of delivering feedback

It's difficult to seek or give feedback because We:

1. Un-awareness of its **value** and impact.
2. Lack of knowledge and **skills** of both **seeking and delivering feedback**.
3. Believe that the other person cannot handle the feedback.
4. Have had **previous experiences** in which the receiver didn't change or was defensive to feedback.
5. **Worry** that the other person will not like you.
6. Believe that feedback is only **negative**!
7. Feel the **feedback isn't worth the risk!**

Types of feedback

1. Positive Feedback
2. **Developmental feedback** (Negative!)
3. Description Feedback.
4. **Corrective feedback (warning letters**)

Types of feedback receivers

A) Feedback: Negative receiver

1. Becoming defensive.
2. Self-Justification.
3. Cannot separate the person giving the feedback from the feedback itself.
4. Volley ball approach (Argue)
5. Excuse, Resist, fight …etc.

B) Feedback: Passive receiver

1. Dismissing the information by denying accuracy.
2. Detached 3. Underestimate its value and benefit. 4. Ignore or Forget.

C) Feedback: Assertive receiver (positive)

1. Accepting and praising when it is given.
2. Being open and engaged.
3. Accepting feedback without denial.
4. Being sincere.
5. Respecting the speaker.
6. Active listening to the message.
7. Probing for better understand, if needed.
8. Double check your understanding.

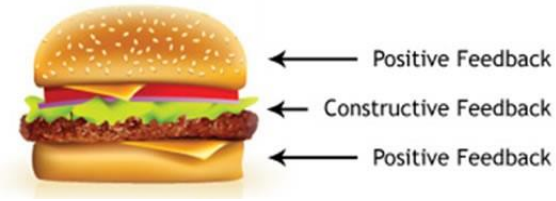
Tips to Deliver feedback

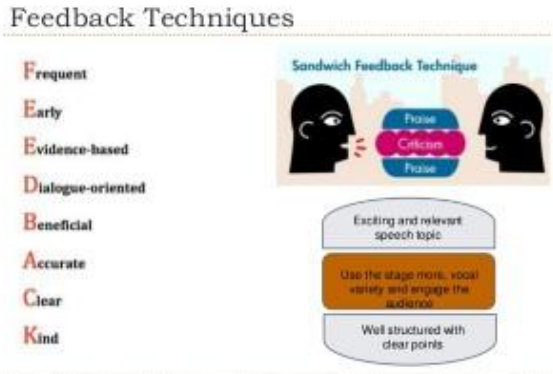
1) Clear about what you say.
2) Specific, cases & examples.
3) Behaviour not the person.
4) Observation not intention.
5) Description not Judgment
6) 'I' statements for opinion
7) Self-discovery better than pointing.
8) Guidance better than advice.
9) Future-focused Not simply pinpoint critic; Suggests future action Don't dwell on the past.
10) Encouraging

Before you speak THINK

True, **H**elpful, Inspiring, **N**ecessary, **K**ind.

Structured Feedback Method, Burger Technique





Levels of Self Expression

X Person is bad.

X Person behaved in bad way.

X Person at (y) situation behaved in bad way.

X Person at (y) situation at (t) time behaved in bad way.

In my opinion X Person at (y) situation at (t) time behaved in bad way.

ALL above but behaved description (Not Good)

……

In my opinion, I see the behaviours of the x person are good in the following xyz, to be even better, I hope to receive so and so from x person behaviour …

(where so and so is the positive side you would like to receive from x person).

Tips, Steps for Receiving Feedback

1. **Agree on a time and place for the session that will help you feel at ease and enable you to concentrate on the feedback.**
    - Be specific; ask for feedback on specific issues, as: I may receive your feedback on my English vocabulary Or Grammar, Or Results, Method …etc.

2. **Plan how you will be open to the feedback.**
    - If you think you might get upset, consider strategies for staying calm.
    - Focus on what you want to learn from the feedback and write those objectives down.
    - Separate the person giving the feedback from the feedback itself.

3. **Stay open to the feedback given.**
    - Resist the urge to justify your behavior.
    - Take notes if this helps you focus on what is being said.
    - Work hard at understanding the other person's point of view.
    - Use active listening techniques, such as rephrasing what you've heard or asking questions for clarification.

4. **Clarify the context from your perspective.**
    - If necessary, provide a differing description of the event, or offer details that the giver doesn't have.
    - Keep in mind that the purpose of the feedback is to improve your performance.

5. **Decide what you can learn from the feedback.**
   Don't overreact; consider the feedback and requests.
    - Assess the giver's intention and the validity of the feedback.
        a) Does the giver want to work with you to help you improve?
        b) Does the giver have any direct control over your work?
        c) Have you heard this feedback before, from someone else?
        d) Does this person have knowledge about you and your situation?
        e) What facts can you agree on?
        f) What can you improve for next time?

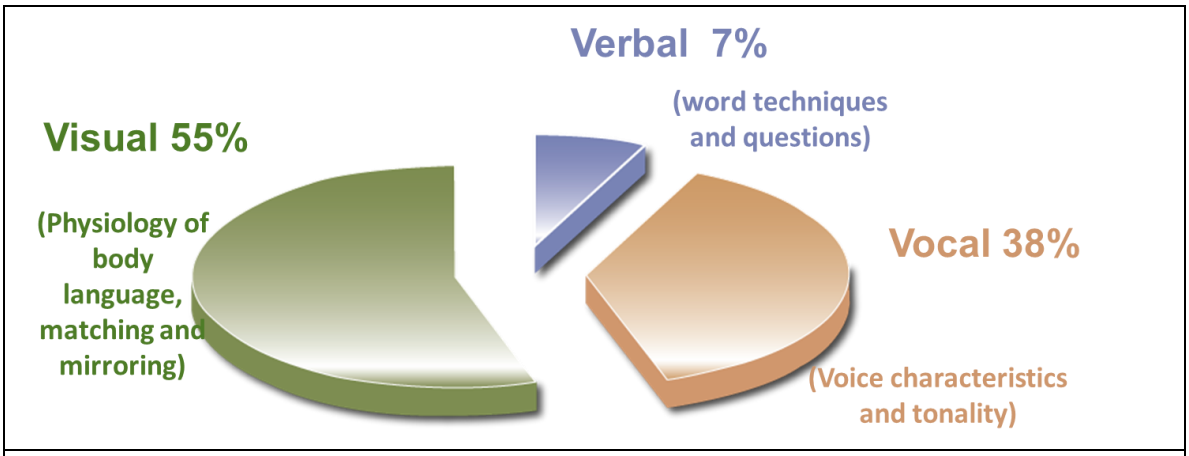
6. **Consider your options for responding, then decide on an action.**
   You can: Accept the feedback and also you can Decline it!

7. **Describe your commitment and time frame.**
   Include the reasoning behind what you believe you cannot accomplish.

8. **Thank the other person for the feedback and ask for his or her support in helping you achieve the goal.**

Basic Communication (2) Mehrabian theory

Mehrabian theory 'Three V's of communication Verbal, Visual and Verbal' Figure below shows the Mehrabian formula, Total acceptance (liking) = 55% Visual + 38% Vocal + 7% Verbal.
To build Rapport with the patient.



Mehrabian Formula for liking in human communication

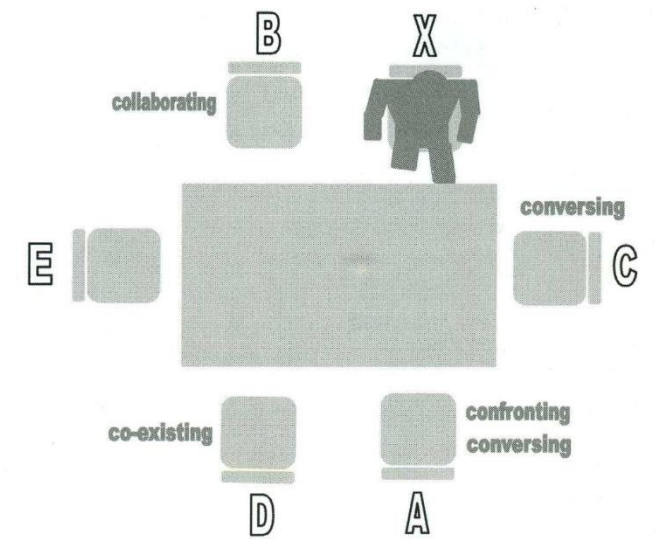
A) 55% Visual & the Nonverbal communication

Proxemics (the use of space) kinesics (body movement) Oculesics (eye contact) Olfactics (smell) Chromatics (colours) Haptics (touch) and silent.

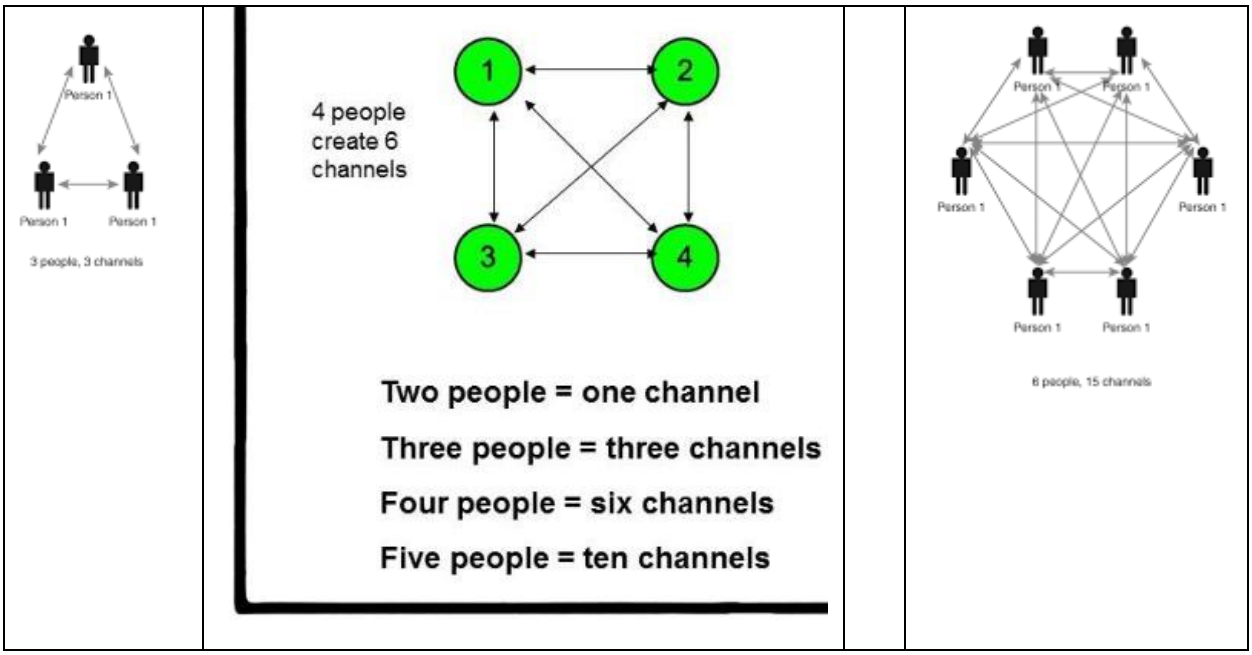
A. 1) PROXEMICS

It is the study into how people physically place themselves in relation to other people and objectives. The structure and use of space, is a powerful nonverbal tool.
Applying these ideas in real life situations can really help produce the desired functions of a space e.g. creating spaces for social conversation, negotiation, or collaboration

A-1.1 Using the office space

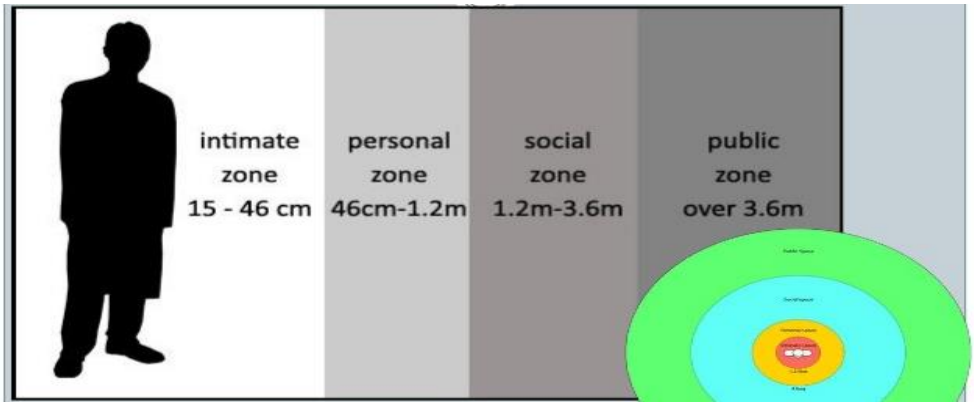


Communication channels



Communication channels = N (N-1) / 2 Where N is the number of persons.

A-1.2 **Using distance zones**



A.2) KINESICS

The manner in which you use your arms, legs, hands, head, face, and torso.

As a health care professional, you need to generate a feeling of empathy and commitment to the helping of others. It is apparent, therefore, that your body movement or kinesics should complement this role.

Closed Body Language	Open Body Language
Crossed arms or legs	Uncrossed arms and legs
Body turns away from the person	Body faces the person
Body leans back	Body leans forward
Head faces away from the person as the eyes look at the ground or stagnate elsewhere	Head faces the person as the eyes either look at the person or surroundings
Eyes are tense	Eyes are relaxed
Lowered eyebrows	Raised eyebrows
Frowns	Smile
Mouth is closed	Mouth is slightly opened
Muscles are tense	Muscles are relaxed
Tight clothing	Loose clothing
Expressionless face	Expressive face

Behavioral Response Chart

B E A T V	Positive - Truthful	Negative – Deceptive
Behavior	Open Point to self Relaxed Maintain Norm Turing in Full expressions Leaning in showing interest Become and Stay Angry At Accusation	Stop Movement, Turn Away, Close Up Lock Legs, Tight Position, Point Away Grooming gestures, Lean back, Partial Expressions, Arms Tight Lack of Anger When Should be Expected
Eye Contact	**Good Eye Contact During Answers** Eye Contact While Listening Break Eye Contact To Think Break Contact In Frustration	**Break Eye Contact During Answers** Examples: Blink, Roll Eyes, Close Eyes Glance Away, Hand Over Eyes Lint Picking, Look at Fingers, Glasses Or Other Objects, Rub Eyes
Answer	Direct Answers, Full Sentences Include Self, Use Harsh Words Focus Suspicion, Lack of Flag Phrases Stay on subject, Clear Answers	Partial Answers, Flag Phrases, Stuttering Exclude Self, Use Soft Words, No Answer Spread Suspicion, Incomplete Sentences Repeat The Question, Unclear Answer Interrupting Speech, Change Subject
Timing	On Time For The Question Thinking When Required No Thinking When Not Required	Too Fast Or Too Slow For The Question Thinking When Not Required No Thinking When Required Answer before the question is completed
Voice	Normal Speed, Even Tone Clear Speech, Loud When Angry	Pitch High = Fear Pitch Low = Emotion Voice volume low, Mumble

B) Vocal communication 38%

Volume / Clarity and Variety:

Tone = a particular quality, way of sounding, modulation, or intonation of the voice (Rhythm)

Pace = speed which somebody speaks (Rate of delivery)

Pitch = rate of vibration of the vocal folds

Emphasis, Stress or Articulation (Power):

"**I** didn't tell the patient you were wrong." (Somebody else told the patient.)
"I **didn't** tell the patient you were wrong." (I emphatically did not.)
"I didn't **tell** the patient you were wrong." (I implied it.)
"I didn't tell **the patient** you were wrong." (I told someone else.)
"I didn't tell the patient **you** were wrong." (I told the patient someone else was wrong.)
"I didn't tell the patient you **were** wrong." (I told the patient you're still wrong!)
"I didn't tell the patient you were **wrong**." (I told the patient something else about you.)

I did not tell the patient take this medication three times a day.
I didn't say the hospital service was bad.

C) Verbal communication 7%

Patient will not remember what you say ... the patient may remember how did you say it.

However, Professional pharmacist should use professional and scientific vocabulary.

To build Rapport with the patient.

Emotional Fulfilment: Giving your customer 'the experience of being understood.'

Rational Fulfilment: Sharing knowledge & facts / product specifications and information.

Rapport	Relationship
Established quickly. Based on the immediate interaction and how you behave.	Long-term effort. Based on common experiences or other connections between people.

Rapport + consistency = Trust.

Match and Mirror to build rapport	
If the customer (patient, provider, friend, manager …etc)	**You might…**
Makes a large gesture with his arm.	Make a similar, smaller gesture.
Talks quickly and with great passion. (or vice versa)	Subtly match his pace and level of enthusiasm.
Shifts from leaning left to right.	Lean the same direction, either matching or mirroring.
Nods a lot.	Nod occasionally.
Makes eye contact frequently.	Mirror the level of eye contact the customer uses.

Advanced Communication: Motivational Interviewing

1) Definition/ 2) Principles/ 3) Strategies/ 4) Techniques and approaches/ 5) Change formula

6) example of resistance 7) levels of training.

---

1) Definition & Background:

Motivational interviewing is an intervention designed for situations in which a patient needs to make a behaviour change but is unsure about it, sometimes to the extent of being quite hostile to the idea. The first paper on MI, written by a psychologist in New Mexico called Bill Miller in 1983, tackled this issue, and was rooted in his own clinical practice.

In summary Bill Miller suggested that rather than seeing patient's (Alcoholic) denial as poor willpower or lack of motivation to solve the problem, it might be more helpful to see this outcome as a product of the situation in the counselling session. When we confront anyone with something, we are likely to increase their resistance and hear them argue the opposite side.

These ideas started to circulate, and came to the attention of Stephen Rollnick, a clinical psychologist originally from South Africa but then working in (Addictions) in the UK.

A commonly used definition of MI is: 'A goal directed, patient-centred counselling style for eliciting behaviour change by helping patients to explore and resolve ambivalence.' (Rollnick and Miller, 1995) (Note **Goal directed is better than the originally written definition directive).

2) Principles of Motivational Interviewing:

1) Principle 1: don't tell people what to do.
People do what they want to do in most cases, they rarely do what they have been told to do

2) Principle 2: listen is more important than talking

3) Principle 3: let the patient tell you they need to change
'People believe what they hear themselves say'. Blaise Pascal noted that: people are much better persuaded by reasons they think up themselves than those thought up by others

4) Principal 4: cognitive dissonance
People are struggling with a choice about changing, which is making them feel uncomfortable

5) Principle 5: Most people need to feel confident before trying to change
Someone will feel confident and are much more likely to succeed. Mi is explicit about the need to keep morale high

6)Principle 6: Ambivalence is normal

3) Strategies in Motivational interviewing

The strategies of motivational interviewing are more persuasive than coercive, more supportive than argumentative

The four principle strategies of MI are:

1. Get a conversation going - express empathy through reflective listening.

2. Develop discrepancy between a patients' goals or values and their current behaviour.

Develop discrepancy between patients' goals or values and current behaviour, helping patients recognize the discrepancies between where they are and where they hope to be.

3. Avoid argument and direct confrontation and adjust to resistance rather than opposing it directly.

4. Support self-efficacy and optimism; that is, focus on patients' strengths to support the hope and optimism needed to make change.

4) Techniques and approaches

OARS Technique/ Approach

- **O**pen Questions (Not simple the WH questions VS the Module questions.
- **A**ffirmations (to make statements of recognition of patient strengths)
- **R**eflective Listening
- **S**ummaries

FRAMES Technique/ Approach

- **F**eedback regarding personal risk, which is given and usually includes normative (descriptive) of implications
- **R**esponsibility for change is placed squarely and explicitly with the individual. Patients have the choice to either continue their behaviour or change it.
- **A**dvice about changing is clearly given in a non-judgmental manner. It is better to suggest than to tell. Asking patients' permission to offer advice can make patients more receptive to that advice.
- **M**enu of patient self-directed change options is offered.
- **E**mpathic counselling, showing warmth, respect, and understanding, is emphasized.
- **S**elf-efficacy or optimistic empowerment is engendered in the person to encourage change.

Closed Question	Open Question
So you are here because you are concerned about not using your nebuliser?	Tell me, what is it that brings you here today?
Do you agree that it would be a good idea for you to use your nebuliser regularly?	What do you think about the possibility of using your nebuliser regularly?
First, I'd like you to tell me about the medicines you take. On a typical day, what do you take?	Tell me about your nebuliser use during a typical week.
Do you like to smoke?	What are some of the things you like about smoking?
How has your use of medicines been this week, compared to last: more, less, or about the same?	What has your use of medicines been like during the past week?
How long ago did you use your nebuliser?	Tell me about the last time you used your nebuliser

5) Change Formula: Equation of Change

$$\text{Change} = \frac{D*V*F}{R+C+1}$$

D = Dissatisfaction with how things are now, i.e. the Need for change

V = Vision of the new status

F= First, concrete steps that can be taken towards the vision

R= Resistance of change

C= Cost of change or change requirements

Note the original theory Gleicher, Dannemiller , Beckhard---Harris (D x V x F > R)

6) Examples which indicate a resistance mood:

There are many examples of resistance talk, many of which you will be familiar with:

Disagreeing. “Yes, but...”

Discontinuing “I’ve already tried that.”

Interrupting “but...”

Side-tracking “I know you want me to do my airway clearance, but did you notice I gained 5 pounds? You have to admit I’ve been doing a great job with my weight!”

Unwillingness “I don’t want to have to do that as well”

Blaming “It’s not my fault. If only my parents...Or if the government Or if the Dr …etc”

Arguing "How do you know?"

Challenging "Well the medication doesn't make a difference to MY lung functioning"

Minimizing. "I'm not that sick"

Pessimism. "I keep trying to do better but nothing seems to help."

Excusing: "I know I should eat more calories, but with my job I'm always on the go and it's hard to prepare and then sit down for a big meal"

Ignoring.

7) Six levels of training

1. Introduction to MI – Experience the bases of MI and decide level of interest in learning more

2. Application of MI: To learn one or more specific applications of MI

3. Clinical Training: To learn the basic clinical style of MI and how to continue learning it in practice

4. Advanced Clinical Training: To move from basic competence to more advanced clinical skillfulness in MI

5. Supervisor Training: To be prepared to guide on ongoing group in learning MI

6. Training for the Trainers: To learn a flexible range of skills and methods for helping others learn MI

Highly advanced communication Personal tailored communication

Section will be moved to final year students, i.e. graduated students.

For successful rapport building through matching and mirroring it is fruitful to understand how patients describe their medication (individual patient's trait, preference and perception)

For example; patient memorised the actual names of medication, or described the physical appearance (as colour or shape) or referred to the name of health care providers, or name of places or the purpose of medication … etc.

Moreover, **for advanced skilled practice**: special concern should be there also to understand the insight of patient's and the cognitive orientation (introverted[1] or extroverted[2] approach) as well as patient attitude toward receiving information (intuition[3] or sensing[4]).

[1] - Inward, the personal energy moves from outside to inside, Need Privacy, tend to receive actions and avoid starting communication, preference for inner self and ideas to understand and protect or nurture it, find people draining, less people interaction.

[2] Outward, the personal energy moves from inside to outside, need people and communication more than privacy, tend to start and initiate actions with others, preference for the outer world and one's own action and effect on it, find people energising, more people interaction.

[3] See the big picture with imagination and framework. Interpreting patterns, possibilities and meaning from information received.

[4] - See the details, with realistic down to earth facts. focusing on facts within information.

Pharmaceutical care Hand-out

Online lectures

Topic	Online Lecture	Time
Introduction to Pharma.Care Management	https://youtu.be/vYGMHLJE_qw	12
Phases and steps Pharmaceutical Care	https://youtu.be/LyBUaVPNnO8	13
Medicines Optimisation Principles	https://youtu.be/q_MNFXokIoc	15
Drug Related Problems	https://youtu.be/F0Mh1JfWmks	19
PCNE system	https://youtu.be/OKXtH85zOD4	21
Assessment of Appropriate prescribing	https://youtu.be/k6_3r1NM3wE	15
Beers, STOP/START, PRISCUS	https://youtu.be/fTtQLyPBR5E	15
1st Part of Side effects	https://youtu.be/niAlCzwyHLA	9
More about adverse events	https://youtu.be/8s_8C-dYF7I	24
Pharmacovigilance	https://youtu.be/9Nv6s0n91vE	21
Adherence Part 1	https://youtu.be/I6U3h0Xx5c4	25
Adherence Part 2	https://youtu.be/7PhNAFPAEG8	21
Believes about medications	https://youtu.be/NWM7gEXex3A	16
Quality of life	https://youtu.be/G3-tyiPPI9M	15
D-D interaction	https://youtu.be/HXKxzx5UgBs	24

First: Pharmaceutical Care Journey

1) Medicines Management & Pharmaceutical care

1st definition Pharmaceutical care by Hepler & Strand, 1990

is the provision of drug therapy for the purpose of achieving definite outcomes that improve a patient's quality of life.

In a relationship where the patient grants authority and the provider gives competence and commitment.

Medicines management is now one of the most commonly used terms to describe enhanced, patient centred pharmacy services in the UK. However, despite its widespread use there is no common agreement on its definition.

The 1st definition was:

The systematic provision of medicines therapy through a partnership of effort between patients and professionals, to deliver the best patient outcome at minimised cost' (Tweedie & Jones, 2001).

Others defined it as:

The entire way that medicines are selected, procured, delivered, prescribed, administered and reviewed to optimise the contribution that medicines make to producing informed and desired outcomes of patient care' (The Audit Commission, 2001).

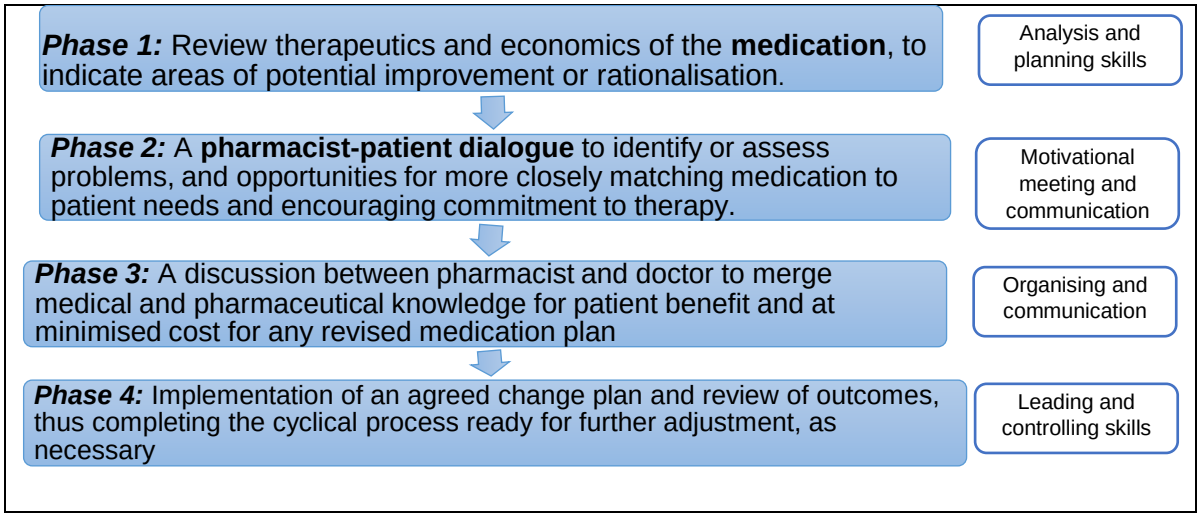
Best definition as per the NICE guidelines & UK The National Prescribing Centre:

System of processes and behaviours that determines how medicines are used by patients and healthcare services (National Prescribing Centre., 2001).

2) Thinking in a different way for Pharmaceutical Care

Thinking differently	
2) Toward patient centralised care	
FROM THIS	**TO THIS**
Focus on systems, processes and infrastructure	Focus on outcomes that matter to Patients
For the system first	For the patient first
Task Focus	Patient Focus
Driven by professionals (Persuasive professional)	Driven by customers and end users (Contractual agreement)
Adherence	Concordance
Expert HCP	Collaborator/Partner
Practices based on tradition	Practises based on evidence
Hospitals at the centre of service delivery	Services delivered closer to home
Talking	Listening
Active/passive relationship	Active/active relationship
Repetitive	Flexible and skilful
Limited rapport	Create rapport
One size fits all	Tailored per patients need
Drug X is …	Patient X is ….
Disease X is …	Patient who had X disease is …
The pharmacist needs to further develop or acquire new skills and knowledge, especially in communication, customer relationship, data usage, therapy management and process personalization	

3) The Phases and steps for the Pharmaceutical care, Medicines Management



Standard phases for medicines management interventions, modified (Tweedie & Jones, 2001)

Ten steps to achieve comprehensive medication management

1. Identify patients who have **not achieved** clinical goals of therapy.

Phase 1&2

2. Understand the patient's **personal medication experience**/history and **preferences/beliefs**.

3. Identify **actual use** patterns of all medications including over-the-counter, bioactive supplements, and prescribed medications.

4. **Assess each medication** (in the following order) for appropriateness, effectiveness, safety (including drug interactions), and adherence, focused on achievement of the clinical goals for each therapy.

5. **Identify all drug therapy problems** (the gap between current therapy and that needed to achieve optimal clinical outcomes).

Phase 3

6**. Develop a care plan** addressing recommended steps, including therapeutic changes needed to achieve optimal outcomes.

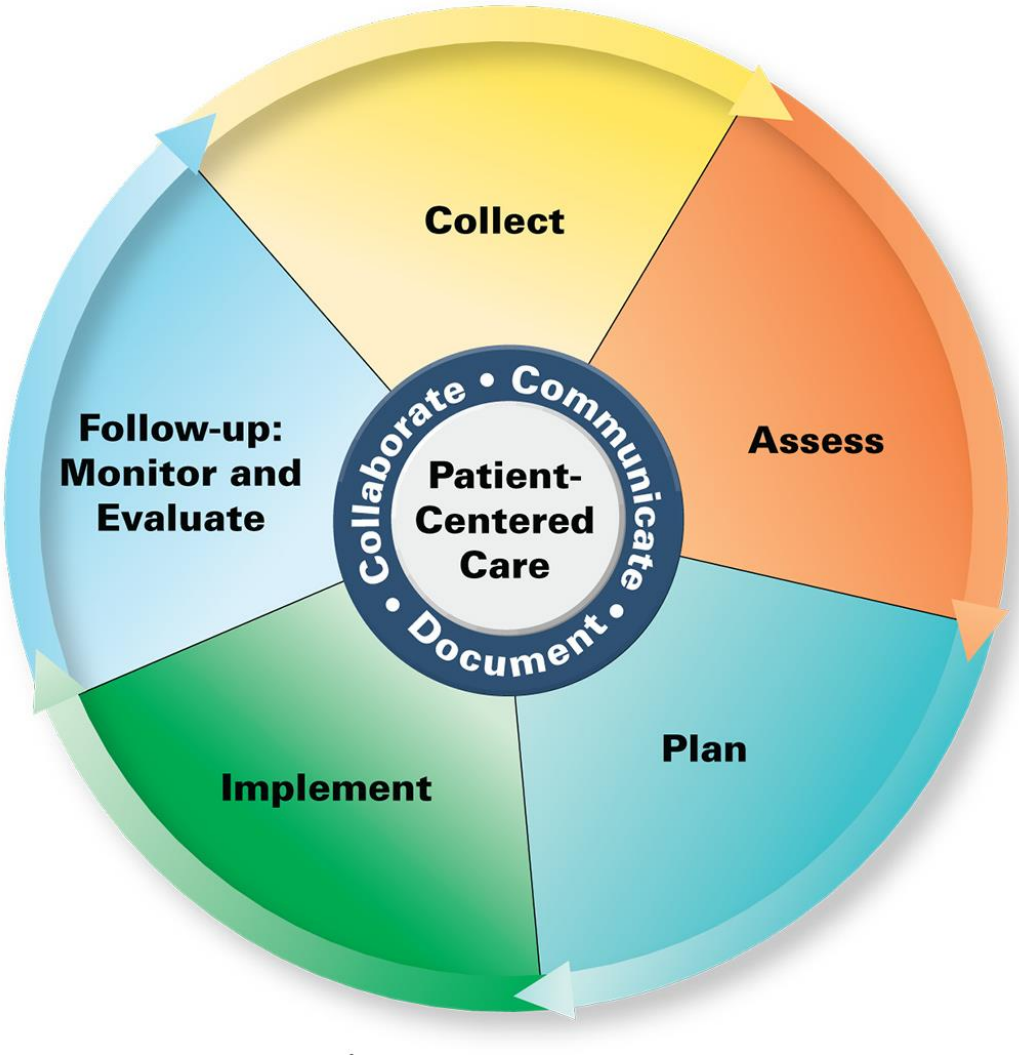
7. **Patient agrees with and understands care plan**, which is communicated to the prescriber/provider for his or her consent/support. **Concordance vs Adherence**

8. **Document** all steps and current clinical status versus goals of therapy.

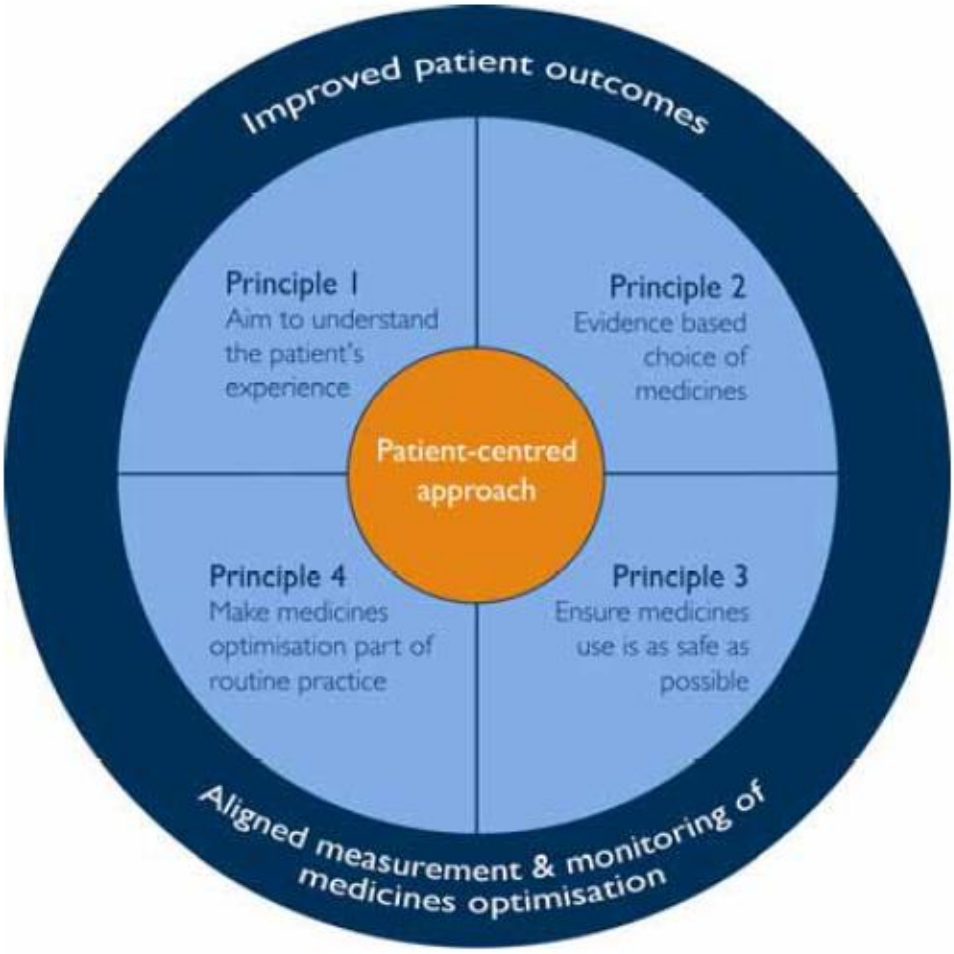
Phase 4

9. **Follow-up evaluations** with the patient are critical to determine effects of changes, reassess actual outcomes, and recommend further therapeutic changes to achieve desired clinical goals/outcomes, other team members and personalized (patient unique) goals of therapy are understood by all team members.

10. Comprehensive medical management is a **reiterative process**—care is coordinated with personalized (patient unique) goals of therapy are understood by all team members.


Collect
Assess
Plan
Implement
Follow-up: Monitor and Evaluate
Collaborate • Communicate • Document •
Patient-Centered Care

4) Medicines Optimisation Principles and subsequent outcomes and influences



Principle 1: Aim to understand Patient's Experience

Outcomes this principle is intended to influence:

1) Patients are more engaged, understand more about their medicines and are able to make choices, including choices about prevention and healthy living.

- Measured by patient communication outcomes

2) Patients' beliefs and preferences about medicines are understood to enable a shared decision about treatment.

- Measured by Medication Beliefs questionnaires

3) Patients are able to take/use their medicines as agreed.

- Measured by Adherence (details on adherence lecture)

4) Patients feel confident enough to share openly their experiences of taking or not taking medicines, their views about what medicines mean to them, and how medicines impact on their daily life.

- Measured by Satisfaction questionnaires and quality of life questionnaires.

Principle 2: Evidence based choice of medicines

Outcomes this principle is intended to influence

1) Optimal patient outcomes are obtained from choosing a medicine using best evidence (for example, following NICE guidance, local formularies etc) and these outcomes are measured.

2) Treatments of limited clinical value are not used and medicines no longer required are stopped.

Principle 3: Ensure medicines use is as safe as possible AND Cost Effective

Outcomes this principle is intended to influence:

1) Incidents of avoidable harm from medicines are reduced.

2) Patients remain well and there is a reduction in admissions and readmissions to hospitals related to medicines usage.

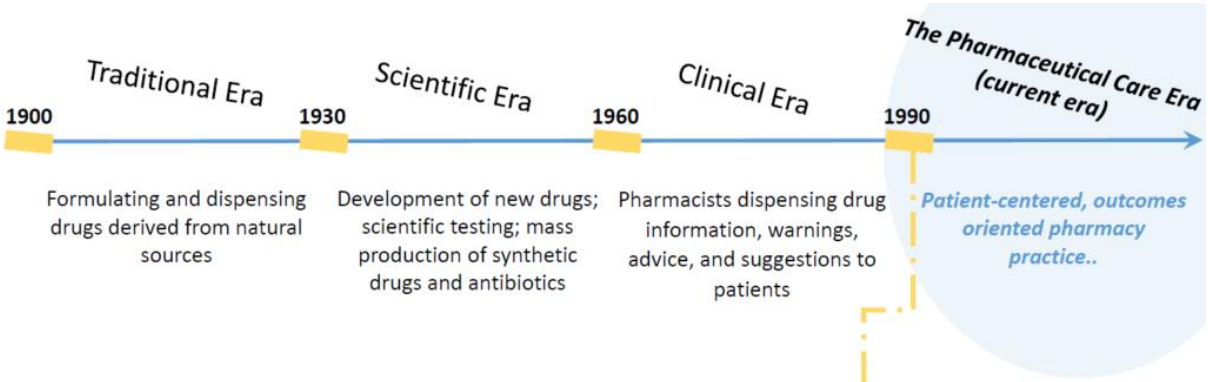
3) Application of cost effective and pharmacoeconomics principles (greater value for money invested in medicines)

Principle 4: Make medicines optimisation part of routine practice

1) Patients receive consistent messages about medicines because the healthcare team liaise effectively.

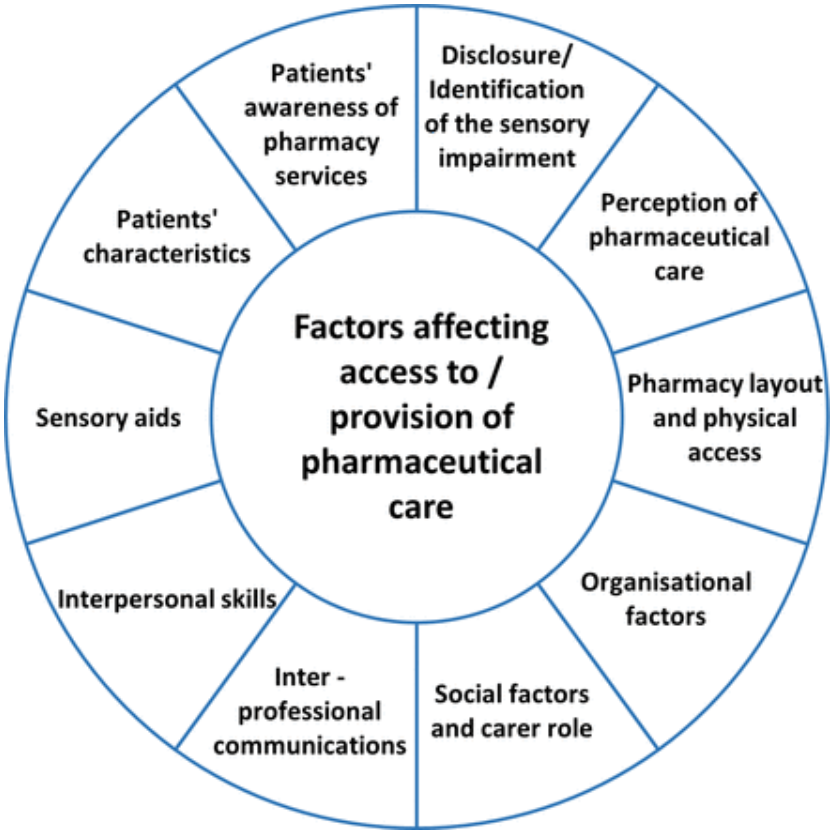
2) It becomes routine practice to signpost patients to further help with their medicines and to local patient support groups.

3) The impact of medicines optimisation is routinely measured.



The Pharmaceutical Care Era (current)

Pharmacist need to work together with the patient and the patient's other healthcare providers to promote health, to prevent disease, and to assess, monitor, initiate, and modify medication use to assure that drug therapy regimens are safe and effective.



Has she seen me?': a multiple methods study of the pharmaceutical care needs of older people with sensory impairment in Scotland

Second: Systems Medication (Drug) Related Problems

Be aware you should know:

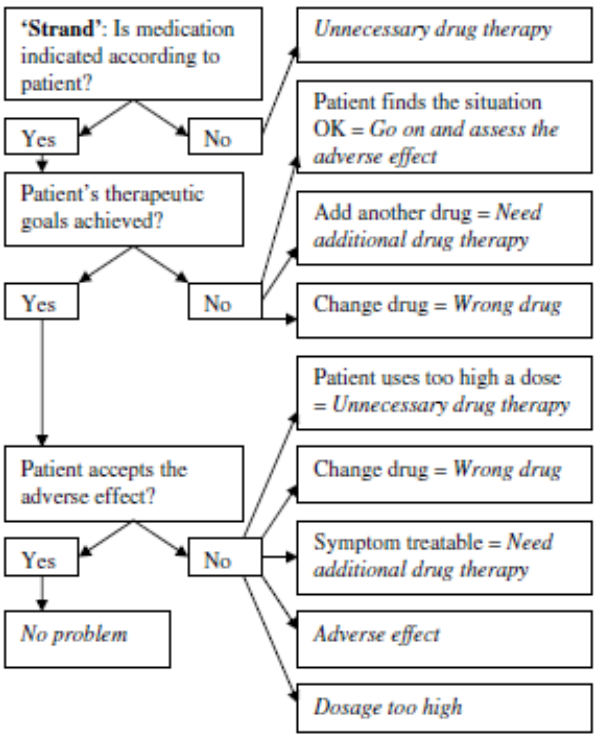
1) It is not simple the Adverse drug reactions, Drug-related problems (DRP) are events or circumstances involving drug therapy that actually or potentially interfere with desired health outcomes.

2) DRP and its classifications keep on consciously updated, and they may be varied:

Change over years, time / Based on country and area / Based on Patient criteria (Inpatient vs Outpatients, Chronic vs Acute / based on purpose (for description, for management, for statistic, for economy …etc)

3) Here we will have a quick general overview of systems in USA, Spain, Netherlands, Sweden and Jordan. PLUS, the European System

1) Cipolle/Morley/ Strand classification



Community pharmacies in the US to evaluate pharmacists' activities in their daily provision of pharmaceutical care. This Classification can only be employed when the event has already been experienced by the patient.

DRPs were classified as follows:
i. Unnecessary therapy (Indication Or dose)
ii. Need for additional therapy
iii. Wrong drug
iv. Dosage is too low (refer to i)
v. Need additional drug therapy
vi. Adverse drug reaction
vii. Dose is too high
viii. Adherence problem

2) American Society of Hospital Pharmacists (ASHP) classification

In this classification, the DRPs were classified as follows:

i. Medication with no indication
ii. Condition for which no drug is prescribed
iii. Medication prescribed inappropriately for a particular condition
iv. Inappropriate dose, dosage form, schedule, route of administration, or method of administration
v. Therapeutic duplication
vi. Prescribing of medication to which the patient is **allergic**
vii. Actual and potential adverse drug events
viii. Actual and potential drug–drug, drug–disease, drug–nutrient, and drug–laboratory test interactions that are clinically significant
ix. Interference with medical therapy by **social or recreational drug use**
x. Failure to receive the full benefit of prescribed therapy
xi. Problems are arising from the **financial impact of therapy**
xii. **Lack of understanding** of the medication
xiii. Failure of the patient to adhere to the regimen.

3) Granada consensus

In 1998, a group of Spanish experts reached a consensus on the definition and analysis of DRPs.
In this classification the DRPs were classified as follows:

TABLE I – Classification of 'Drug Related Problems' (DRP)

Necessity	Problem
Necessity	DRP 1: The patient suffers from a health problem as a result of not taking the medicine that he needs.
	DRP 2: The patient suffers from a health problem as a result of taking a medicine that he does not need.
Effectiveness	DRP 3: The patient has a health problem resulting from a non-quantitative ineffectiveness of a medicine.
	DRP 4: The patient has a health problem resulting from a quantitative ineffectiveness of a medicine.
Safety	DRP 5: The patient suffers from a health problem as a consequence of a non-quantitative safety problem of a medicine.
	DRP 6: The patient suffers from a health problem as a consequence of a quantitative safety problem of a medicine.

4) Hanlon approach (University of Pittsburgh)

Hanlon et al. have developed a method for assessing the appropriateness of medication based on the medication appropriateness **index (MAI).**
In this classification, the DRPs were classified as follows:

i. indications
ii. effectiveness
iii. Correct directions
iv. Practical directions
v. Drug – Drug interaction
vi. Drug disease-condition interaction

vii. Duplication
viii. Duration of therapy
ix. Economic justification
x. Improper drug selection

5) National Coordinating Council

for Medication Error Reporting and Prevention (NCC-MERP) taxonomy of medication errors.
In this classification, the DRPs were classified as follows:
i. The medication is in control of the health care professional, patient, or consumer.
ii. Dose omission
iii. Improper dose
iv. Wrong strength/concentration
v. Wrong drug
vi. Wrong dosage form
vii. Wrong technique (includes inappropriate **crushing** of tablets)
viii. Wrong route of administration
ix. Wrong date (probably relating to administration)
x. Wrong duration
xi. Wrong time
xii. **Wrong patient**
xiii. **Monitoring** error (includes contraindicated drugs)
xiv. **Deteriorated** drug error (dispensing drug that has expired)
xv. Other**.**

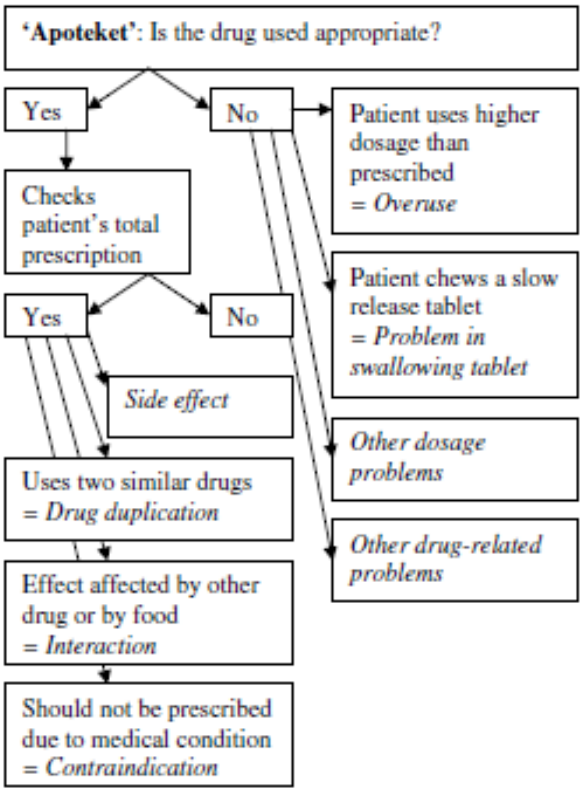
6) SHB-SEP classification

The Health Base Foundation developed this system in The Netherlands for use in pharmacy software's based on the medical **Subjective/ Objective/Evaluation/Plan structure**; however, the S and O codes have been combined into one problem description.

The main problem categories comprise both a patient- and pharmacy-oriented perspective.
The system is still being revised regularly, but each updated version is not sequentially numbered to facilitate differentiation from previous versions.
i. Patient initiative doubts or insufficient understanding (also second opinion)
ii. Question about drug use (dosage/advice/way of use)
iii. Worries about complications/adverse reactions
iv. Self-care advice
v. Advice on medical aids
vi. Information request (general/disease/complaint/disorder)
vii. Pharmacy team initiative administration
viii. Alterations in prescription (not based on medication-surveillance signal)
ix. Evaluation as result of a consultation by invitation
x. Evaluation without patient consultation.

7) Apoteket Classification System

Apotek n (definite singular apoteket) a is pharmacy in Swedish language.
Apoteket AB has developed a classification system that Swedish pharmacies can use when **counselling patients.**



Over dose

Dosage form related problem**. Swallow problem**

Drug duplication

Drug interaction (Drug or Food interaction)

Contraindication

Side effects of medication

8) Pharmaceutical Care Network Europe (PCNE) system

The original classification was created in 1999 by pharmacy practice researchers during a working conference of the PCNE in an effort to develop a standardized classification system that is suitable and comparable for international studies. Last version V8 June 2017. Updated to be in 2019

It has the following Domains
Domain P: Problem

1.Treatment effectiveness There is a (potential) problem with the (lack of) effect of the therapy	**P1.1** No effect of drug treatment/ therapy failure **P1.2** Effect of drug treatment not optimal **P1.3** Untreated symptoms or indication
2. Treatment safety Patient suffers, or could suffer, from an adverse drug event	**P2.1** Adverse drug event (possibly) occurring
3. Others	**P3.1** Problem with cost-effectiveness of the treatment **P3.2** Unnecessary drug-treatment **P3.3** *Unclear problem/complaint. Further clarification necessary (please use as escape only)*

See the other Domains:
Domain C: Cause of Problem (Prescribing, Dispensing, Use)
Domain I: Planned Interventions
Domain A: Intervention Acceptance
Domain O: Status of ADP

	Primary Domain	Code V8.01	Cause
Prescribing	1. Drug selection The cause of the (potential) DRP is related to the selection of the drug	C1.1	Inappropriate drug according to guidelines/formulary
		C1.2	Inappropriate drug (within guidelines but otherwise contra-indicated)
		C1.3	No indication for drug
		C1.4	Inappropriate combination of drugs or drugs and herbal medication
		C1.5	Inappropriate duplication of therapeutic group or active ingredient
		C1.6	No drug treatment in spite of existing indication
		C1.7	Too many drugs prescribed for indication
	2. Drug form The cause of the DRP is related to the selection of the drug form	C2.1	Inappropriate drug form (for this patient)
	3. Dose selection The cause of the DRP is related to the selection of the dose or dosage	C3.1	Drug dose too low
		C3.2	Drug dose too high
		C3.3	Dosage regimen not frequent enough
		C3.4	Dosage regimen too frequent
		C3.5	Dose timing instructions wrong, unclear or missing
	4. Treatment duration The cause of the DRP is related to the duration of treatment	C4.1	Duration of treatment too short
		C4.2	Duration of treatment too long
Disp	5. Dispensing The cause of the DRP is related to the logistics of the prescribing and dispensing process	C5.1	Prescribed drug not available
		C5.2	Necessary information not provided
		C5.3	Wrong drug, strength or dosage advised (OTC)
		C5.4	Wrong drug or strength dispensed
Use	6. Drug use process The cause of the DRP is related to the way the patient gets the drug administered by a health professional or carer, despite proper dosage instructions (on the label)	C6.1	Inappropriate timing of administration and/or dosing intervals
		C6.2	Drug under-administered
		C6.3	Drug over-administered
		C6.4	Drug not administered at all
		C6.5	Wrong drug administered
	7. Patient related The cause of the DRP is related to the patient and his behaviour (intentional or non-intentional)	C7.1	Patient uses/takes less drug than prescribed or does not take the drug at all
		C7.2	Patient uses/takes more drug than prescribed
		C7.3	Patient abuses drug (unregulated overuse)
		C7.4	Patient uses unnecessary drug
		C7.5	Patient takes food that interacts
		C7.6	Patient stores drug inappropriately
		C7.7	Inappropriate timing or dosing intervals
		C7.8	Patient administers/uses the drug in a wrong way
		C7.9	Patient unable to use drug/form as directed
	8. Other	C8.1	No or inappropriate outcome monitoring (incl. TDM)
		C8.2	Other cause; specify
		C8.3	No obvious cause

The Planned Interventions

N.B. One problem can lead to more interventions

Primary Domain	Code V8.01	Intervention
No intervention	I0.1	No Intervention
1. At prescriber level	I1.1	Prescriber informed only
	I1.2	Prescriber asked for information
	I1.3	Intervention proposed to prescriber
	I1.4	Intervention discussed with prescriber
2. At patient level	I2.1	Patient (drug) counselling
	I2.2	Written information provided (only)
	I2.3	Patient referred to prescriber
	I2.4	Spoken to family member/caregiver
3. At drug level	I3.1	Drug changed to ….
	I3.2	Dosage changed to …..
	I3.3	Formulation changed to …..
	I3.4	Instructions for use changed to …..
	I3.5	Drug stopped
	I3.6	New drug started
4. Other intervention or activity	I4.1	Other intervention (specify)
	I4.2	Side effect reported to authorities

Acceptance of the Intervention proposals

N.B. One level of acceptance per intervention proposal

Primary domain	Code V8.01	Implementation
1. Intervention accepted (by prescriber or patient)	A1.1	Intervention accepted and fully implemented
	A1.2	Intervention accepted, partially implemented
	A1.3	Intervention accepted but not implemented
	A1.4	Intervention accepted, implementation unknown
2. Intervention not accepted (by prescriber or patient)	A2.1	Intervention not accepted: not feasible
	A2.2	Intervention not accepted: no agreement
	A2.3	Intervention not accepted: other reason (specify)
	A2.4	Intervention not accepted: unknown reason
3. Other (no information on acceptance)	A3.1	Intervention proposed, acceptance unknown
	A3.2	Intervention not proposed

Status of the DRP

N.B. This domain depicts the outcome of the intervention. One problem (or the combination of interventions) can only lead to one level of solving the problem.

Primary Domain	Code V8.01	Outcome of intervention
0. Not known	O0.1	Problem status unknown
1. Solved	O1.1	Problem totally solved
2. Partially solved	O2.1	Problem partially solved
3. Not solved	O3.1	Problem not solved, lack of cooperation of patient
	O3.2	Problem not solved, lack of cooperation of prescriber
	O3.3	Problem not solved, intervention not effective
	O3.4	No need or possibility to solve problem

Third: Assessment of Appropriate prescribing

Implicit (judgement-based)

•rely on expert professional judgement
•focus on the patient, address entire medication regimen (patient specific)
•time consuming
•low reliability
•e.g. statement: „Is there an indication for the drug? “ (Medication Appropriateness Index)
•e.g. tools: MAI, Lipton criteria

Explicit (criterion-based)

•developed from literature reviews, expert opinions, consensus techniques
•lists of drugs, drug-classes, dosages known to cause harmful effects (drug/disease specific)
•applied with little/no clinical judgement
•low cost
•don‘t address burden of co-morbidities, patient preferences => rigid standards
•regular updates are needed
•country-specific adaption necessary
•e.g. statement: „Avoid benzodiazepines (any type) for treatment of insomnia, agitation, or delirium in older adults. “(Beers, 2012)
•e.g. tools: Beers, McLeod, START, STOPP, PRISCUS

Medication Appropriateness Index			**Score**
1. Is there an indication for the drug?	Indicated 0	Not Indicated 3	
2. Is the medication effective for the condition?	Effective 0	Ineffective 3	
3. Is the dosage correct?	Correct 0	Incorrect 2	
4. Are the directions correct?	Correct 0	Incorrect 2	
5. Are the directions practical?	Practical 0	Impractical 1	
6. Are there any clinically significant drug-drug interactions?	No 0	Yes 2	
7. Are there any clinically significant drug-disease/condition interactions?	No 0	Yes 2	
8. Is there unnecessary duplication with other drug(s)?	None 0	Duplication 1	
9. Is the duration of therapy acceptable?	Acceptable 0	Unacceptable 1	
10. Is this drug the least expensive alternative compared to others of equal utility?	Yes 0	No 1	
Total			**0-18**

Beers criteria (USA)

first developed in 1991 for nursing home residents using consensus techniques

potentially inappropriate drugs for people aged ≥ 65

•34 generally avoided medications/classes

•14 conditions and medications that should be avoided in these conditions

•5 medication to be used with caution

Organ System or Therapeutic Category or Drug	Rationale	Recommendation	Quality of Evidence Strength of Recommendation

STOPP (Screening Tool of Older Person‘s potentially inappropriate Prescriptions)

2008, Ireland, consensus techniques

aged ≥ 65

65 criteria arranged according to physiological system accompanied by explanation why the prescription is potentially inappropriate (overprescribing)

e.g. „Beta-blocker in combination with verapamil or diltiazem (risk of heart block).“

START (Screening Tool to Alert doctors to the Right Treatment)

2008, Ireland, consensus techniques

aged ≥ 65

22 medications arranged according to physiological system (they are effecting) that should be considered for people with certain conditions (underprescribing)

e.g. „Beta-blocker with ischaemic heart disease. “

PRISCUS list

2010, Germany, consensus techniques, based on Beers 1997/2003,

aged ≥ 65

83 potentially inappropriate medications, designed for German health-care system

provides main concerns, possible therapeutic alternatives and precautions

Medication	**Main concerns (selected)**	**Possible therapeutic alternatives**	**Precautions to be taken when these medications are used**

Fourth: Side effects & Adverse Drug Reactions

A) Classifications and Definitions

1) Definitions

•**A side-effect** is any effect caused by a drug other than the intended therapeutic effect, whether beneficial, neutral or harmful. The term 'side-effect' is often used interchangeably with 'ADR' although the former usually implies an effect that is less harmful, predictable and may not even require discontinuation of therapy (e.g. ankle oedema with vasodilators).

•**An adverse drug outcome** is an unwanted or harmful reaction experienced following the administration of a drug or combination of drugs under normal conditions of use. **Adverse effect** is seen from the point of view of the drug, whereas an **Adverse reaction** is seen from the point of view of the patient. While both can be attributed to some action of a drug, the **Adverse event** is an adverse outcome that occurs while a patient is taking a drug, but is not or not necessarily attributable to it.

•**Drug toxicity** describes adverse effects of a drug that occur because the dose or plasma concentration has risen above the therapeutic range, either unintentionally or intentionally (drug overdose).

•**Drug abuse** is the misuse of recreational or therapeutic drugs that may lead to addiction or dependence, serious physiological injury (such as damage to kidneys, liver, heart), psychological harm (abnormal behavior patterns, hallucinations, memory loss), or death.

2) Side effects classification based on prevalence and incidence

•Very common: more than 1 in 10 people are affected
•Common: between 1 in 10 and 1 in 100 people are affected
•Uncommon: between 1 in 100 and 1 in 1,000 people are affected
•Rare: between 1 in 1,000 and 1 in 10,000 people are affected
•Very rare: fewer than 1 in 10,000 people are affected

3) Standard & Classical classification of Adverse Drug Reactions

They are classified as Type A (intrinsic) or Type B (idiosyncratic).

Type A are predictable, dose-related toxicities, often identified in preclinical or clinical trials, and usually occur in overdose settings or with pre-existing hepatic impairment.

Type B are not clearly related to increasing dose and are associated with drug-specific and patient-specific characteristics and environmental risks. Rare Type B reactions are often identified postmarketing.

4) Adverse Drug reaction according Merck Manual for professionals

Dose-related ADRs are particularly a concern when drugs have a narrow therapeutic index (eg, hemorrhage with oral anticoagulants). ADRs may result from decreased drug clearance in patients with impaired renal or hepatic function or from drug-drug interactions.

Allergic ADRs are not dose-related and require prior exposure. Allergies develop when a drug acts as an antigen or allergen. After a patient is sensitized, subsequent exposure to the drug produces one of several different types of allergic reaction. Clinical history and appropriate skin tests can sometimes help predict allergic ADRs.

Idiosyncratic ADRs are unexpected ADRs that are not dose-related or allergic. They occur in a small percentage of patients given a drug.

Idiosyncrasy (idios, own, synkrasis, mixing together) is an imprecise term that has been defined as a genetically determined abnormal response to a drug, but not all idiosyncratic reactions have a pharmacogenetic cause. The term may become obsolete as specific mechanisms of ADRs become known.

Adverse Drug Reactions Classification

Characteristics	Type A	Type B
Dose dependency	Dose Related	Dose Relationship is unclearly defined
Frequency of Occurrence	Common	Uncommon
Severity of Reaction	Variable but usually mild	Variable, but proportionately more severe
Host factors	Genetic factors might be important	Dependent on host factors
Animal models	Usually reproducible in animals	Unknown in animal models
Percentage proportion of adverse drug reaction	80%	20%
Predictable from known pharmacology	Yes	Not usually
First detection (Clinical Trials)	Phase I - III	Phase IV, occasionally phase III
Clinical burden	High morbidity & Low Mortality	High morbidity & High mortality

5) Classification based on severity of Adverse Drug Reactions (ADRs)

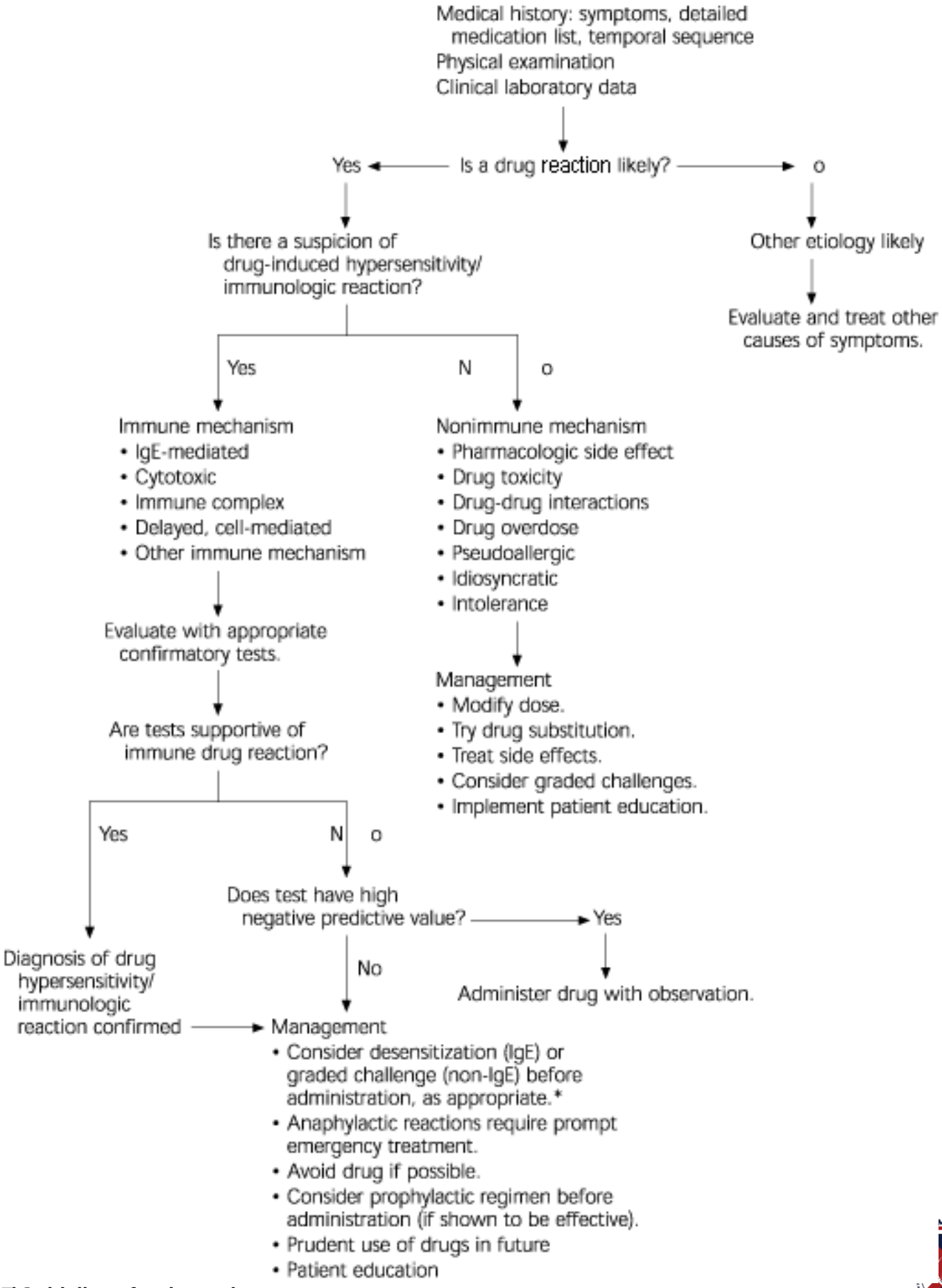
Severity	Description	Example
Mild	No antidote or treatment is required; hospitalization is not prolonged.	Antihistamines (some): Drowsiness, Opioids: Constipation
Moderate	A change in treatment (eg, modified dosage, addition of a drug), but not necessarily discontinuation of the drug, is required; hospitalization may be prolonged, or specific treatment may be required.	Hormonal contraceptives: Venous thrombosis NSAIDs: Hypertension and edema
Severe	An ADR is potentially life threatening and requires discontinuation of the drug and specific treatment of the ADR.	ACE inhibitors: Angioedema Phenothiazines: Abnormal heart rhythm
Lethal	An ADR directly or indirectly contributes to a patient's death.	Acetaminophen overdosage: Liver failure Anticoagulants: Hemorrhage

6) Immunologic and Nonimmunologic Drug Reactions

TYPE	*EXAMPLE*
Immunologic	
Type I reaction (IgE-mediated)	Anaphylaxis from β-lactam antibiotic
Type II reaction (cytotoxic)	Hemolytic anemia from penicillin
Type III reaction (immune complex)	Serum sickness from anti-thymocyte globulin
Type IV reaction (delayed, cell-mediated)	Contact dermatitis from topical antihistamine
Specific T-cell activation	Morbilliform rash from sulfonamides
Fas/Fas ligand-induced apoptosis	Stevens-Johnson syndrome (Anti-gout medications, such as allopurinol)
	Toxic epidermal necrolysis
Other	Drug-induced, lupus-like syndrome (hydralazine (rate roughly 20%), procainamide (rate roughly 20%, 5-8% if taken for 1 y), quinidine, isoniazid, and minocycline.
Nonimmunologic	
Predictable	
Pharmacologic side effect	Dry mouth from antihistamines
Secondary pharmacologic side effect	Thrush while taking antibiotics
Drug toxicity	Hepatotoxicity from methotrexate
Drug-drug interactions	Seizure from theophylline while taking erythromycin
Drug overdose	Seizure from excessive lidocaine (Xylocaine)
Unpredictable	

TYPE	*EXAMPLE*
Pseudoallergic	Anaphylactoid reaction after radiocontrast media
Idiosyncratic	Hemolytic anemia in a patient with G6PD deficiency after primaquine therapy
Intolerance	Tinnitus after a single, small dose of aspirin

G6PD = glucose-6-phosphate dehydrogenase.



7)Guidelines for drug adverse event

8) Diagnostic Testing and Therapy for Drug Hypersensitivity

IMMUNE REACTION	*LABORATORY TESTS*	*THERAPEUTIC CONSIDERATIONS*
Type I (IgE-mediated)	Skin testing	Discontinue drug.
	RAST	Consider epinephrine, antihistamines, systemic corticosteroids, bronchodilators.
	Serum tryptase	Inpatient monitoring, if severe
Type II (cytotoxic)	Direct or indirect Coombs' test	Discontinue drug.
		Consider systemic corticosteroids.
		Transfusion in severe cases
Type III (immune complex)	ESR	Discontinue drug.
	C-reactive protein	Consider NSAIDs, antihistamines, or systemic corticosteroids; or plasmapheresis if severe.[18]
	Immune complexes	
	Complement studies	
	Antinuclear antibody, antihistone antibody	
	Tissue biopsy for immunofluorescence studies	
Type IV (delayed, cell-mediated)	Patch testing	Discontinue drug.
	Lymphocyte proliferation assay	Consider topical corticosteroids, antihistamines, or systemic corticosteroids if severe.

RAST = radioallergosorbent test; ESR = erythrocyte sedimentation rate

9) Adverse Drug Reactions(ADRs) and Drugs that cause them

Drugs in Jordan The new way to think about Side Effects

Symptoms : What are drugs that their Side effects are related to this symptoms

10) Further reading

Toxic epidermal necrolysis (TEN) is a potentially life-threatening dermatologic disorder characterized by widespread erythema, necrosis, and bullous detachment of the epidermis and mucous membranes, resulting in exfoliation and possible sepsis and/or death. TEN can be induced by drugs or infection or can be idiopathic. Medications are the major precipitating cause. Numerous medications have been implicated

Antibacterial drugs associated with TEN include the following:

• Sulfonamides (4.5 cases per million users per week)

• Chloramphenicol • Macrolides (eg, erythromycin) • Penicillins • Quinolones (eg, ciprofloxacin, trovafloxacin)

Anticonvulsants associated with TEN include the following:

• Phenobarbital • Phenytoin • Carbamazepine • Valproic acid • Lamotrigine

TEN in patients taking anticonvulsants has most often been reported within 2 months of starting the drug. However, some cases associated with long-term use have been reported.

NSAIDs associated with TEN include the following:

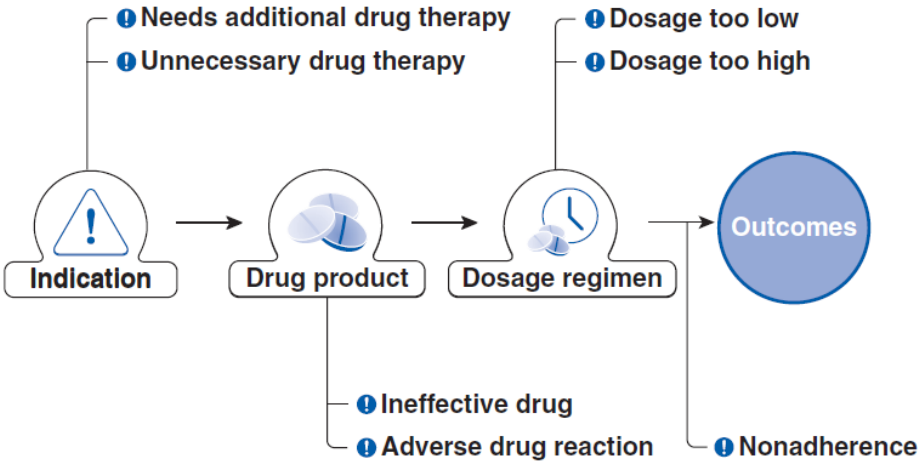
• Phenylbutazone and oxybutazone • Ibuprofen • Indomethacin

• Oxicams (eg, piroxicam, tenoxicam) - Implicated more often than other NSAIDs

With allopurinol, risk is not constant over time. Patients have a 5.5 relative risk. However, during the first 2 months of therapy, the relative risk is 52, and the long-term therapy risk is 0.5.

No laboratory test is able to confirm a specific drug etiology. A causal link is suggested when TEN occurs during the first 4 weeks of medication therapy, usually between 1 and 3 weeks. Drugs with longer half-lives and those with circulating active metabolites may result in more fulminant disease.

11) Some Additional Notes on the Adverse Drug reactions and Medication Related Problems



Top 10 of drugs causing fatal adverse reactions	Top 20 of drugs causing hospitalizations, prolonged hospitalizations, life-threatening condition, and disability

Drug top 10	Drug top 20
Methotrexate	Methotrexate
Warfarin	Theophylline
Opioids	NSAID
Digoxin	Opioids
Theophylline	Digoxin
Other anticoagulants	Acetylic salicylic acid
Acetylic salicylic acid	Diuretics
NSAID	Antiepileptics
Beta-blockers	Beta-blockers
Antibiotics	Warfarin
	Other anticoagulants
	Potassium-sparing diuretics
	Antibiotics
	Sulfonylureas
	ACE inhibitors
	Glucocorticoids
	Antipsychotics
	Calcium-channel blockers
	Insulin
	Antidepressants

Reference:
Eva A. Saedder & Birgitte Brock & Lars Peter Nielsen & Dorthe K. Bonnerup & Marianne Lisby. Eur J Clin Pharmacol (2014) 70:637–645. DOI 10.1007/s00228-014-1668-z

B) PHARMACOVIGILANCE

Pharmaco + Vigilance (Medicines) (To Watch)

According to WHO-:

 Science and activities relating to the detection, assessment, understanding and prevention of adverse effects and any other drug related problems.

 This applies throughout the life cycle of a medicine equally to the pre-approval stage as to the post approval.

CAUSALITY ASSESSMENT Definition: -

 Causality assessment is the assessment of relationship between a drug treatment and the occurrence of an adverse event.

 It is also used to evaluate and to check that the particular treatment is the cause of an observed adverse event or not.

 It is an essential part of ADR report and important task, conducted by National Pharmacovigilance Programme in each country.

1) The Naranjo algorithm, Naranjo Scale, or Naranjo Nomogram

It is a questionnaire designed by Naranjo *et al*. for determining the likelihood of whether an ADR (adverse drug reaction) is actually due to the drug rather than the result of other factors. i.e., it used for assessment of causal relationship between drug and the adverse event.

Scoring: ≥ 9 = definite ADR // 5-8 = probable ADR // 1-4 = possible ADR // 0 = doubtful ADR

Naranjo Adverse Drug Reaction Probability Scale				
Question	Yes	No	Do Not Know	Score
1. Are there previous *conclusive* reports on this reaction?	+1	0	0	
2. Did the adverse event appear after the suspected drug was administered?	+2	-1	0	
3. Did the adverse reaction improve when the drug was discontinued or a *specific* antagonist was administered?	+1	0	0	
4. Did the adverse event reappear when the drug was re-administered?	+2	-1	0	
5. Are there alternative causes (other than the drug) that could on their own have caused the reaction?	-1	+2	0	
6. Did the reaction reappear when a placebo was given?	-1	+1	0	
7. Was the drug detected in blood (or other fluids) in concentrations known to be toxic?	+1	0	0	
8. Was the reaction more severe when the dose was increased or less severe when the dose was decreased?	+1	0	0	
9. Did the patient have a similar reaction to the same or similar drugs in *any* previous exposure?	+1	0	0	
10. Was the adverse event confirmed by any objective evidence?	+1	0	0	
			TOTAL SCORE:	

2) WHO-UMC system provides practical tool for assessment of case reports for International drug monitoring (UPSSALA MONITORING CENTRE).

 System is used to detect unknown and unexpected adverse drug reaction. Assessment is based on following four criteria-:

a) Time relationships between the drug use and the adverse event.

b) Absence of other competing causes (medications, disease process itself).

c) Response to drug withdrawal or dose reduction (de-challenge).

d) Response to drug re-administration (re-challenge).

The level of causal association is grouped into four categories which are based on a number of the above criteria being met.

CERTAIN; - When all the four criteria (a,b,c,d) are met.

PROBABLE-: When criteria a, b and c are met.

POSSIBLE-: When only criteria a is met.

UNLIKELY-: When criteria a and b are not met.

Causality term Assessment criteria as by the WHO

Certain

- Event or laboratory test abnormality, with plausible time relationship to drug intake
- Cannot be explained by disease or other drugs
- Response to withdrawal plausible (pharmacologically, pathologically)
- Event definitive pharmacologically or phenomenologically (i.e. an objective and specific medical disorder or a recognised pharmacological phenomenon)
- Rechallenge satisfactory, if necessary

Probable /Likely

- Event or laboratory test abnormality, with reasonable time relationship to drug intake
- Unlikely to be attributed to disease or other drugs
- Response to withdrawal clinically reasonable
- Rechallenge not required

Possible

- Event or laboratory test abnormality, with reasonable time relationship to drug intake
- Could also be explained by disease or other drugs
- Information on drug withdrawal may be lacking or unclear

Unlikely

- Event or laboratory test abnormality, with a time to drug intake that makes a relationship improbable (but not impossible)
- Disease or other drugs provide plausible explanations

Conditional /Unclassified

- Event or laboratory test abnormality
- More data for proper assessment needed, or
- Additional data under examination

Unassessable /Unclassifiable

- Report suggesting an adverse reaction
- Cannot be judged because information is insufficient or contradictory
- Data cannot be supplemented or verified

3) Statistic assessment: Bayesian Adverse Reactions Diagnostic Instrument (BARDI)

 BARDI is used to calculate the odds in favour of a particular drug causing an adverse event compared with an alternative cause.

 The posterior odds (PsO) factor is calculated by considering six assessment subsets:

one deals with background epidemiologic or clinical trials information (the prior odds) and the other five deal with case specific information (the likelihood ratios).

PsO = PrO × LR(Hi) × LR(Ti) × LR(Ch) × LR(De) × LR(Re)

• Pro(the prior odds)- epidemiologic or clinical trials information •

The five likelihood ratios (LRs) deal with any information of differential diagnostic value under

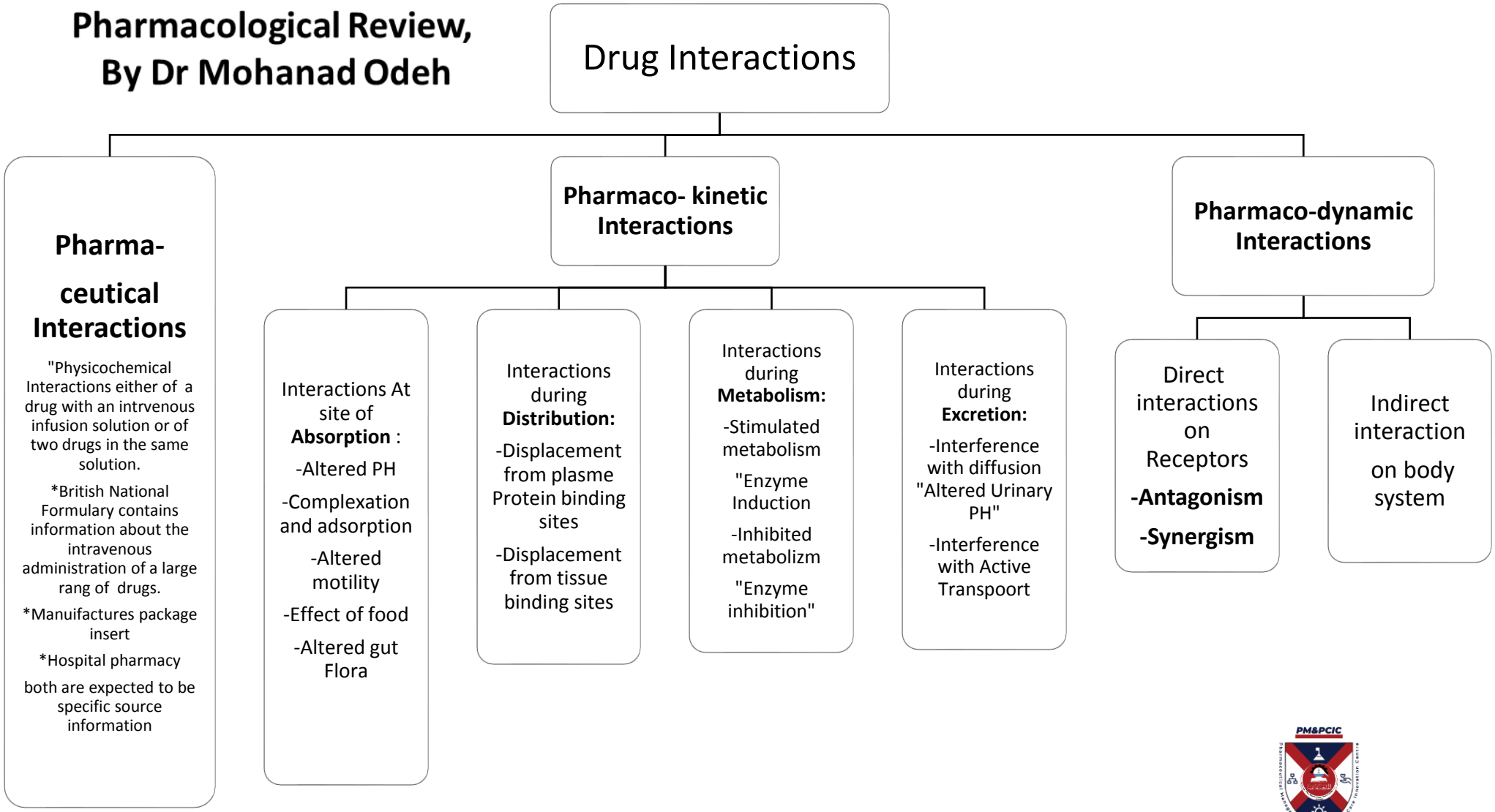
• patient history (Hi) • timing of the adverse event with respect to drug administration (Ti) • characteristics of the adverse event (Ch) • drug dechallenge (De) • drug rechallenge (Re)

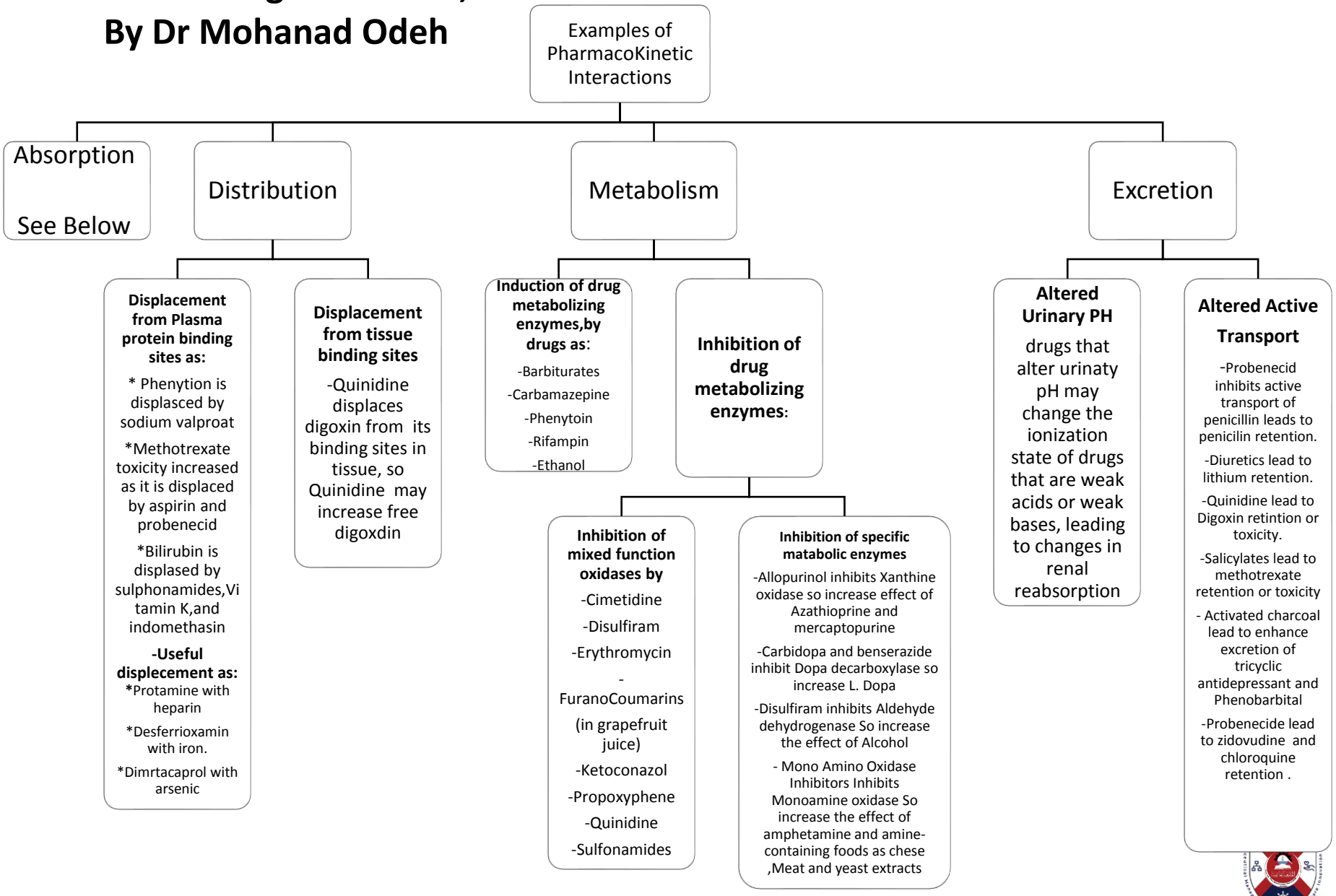
The Likelihood Ratio (LR) is the likelihood (probability of how much likely) that a given test result would be expected in a patient with the target disorder compared to the likelihood that that same result would be expected in a patient without the target disorder.

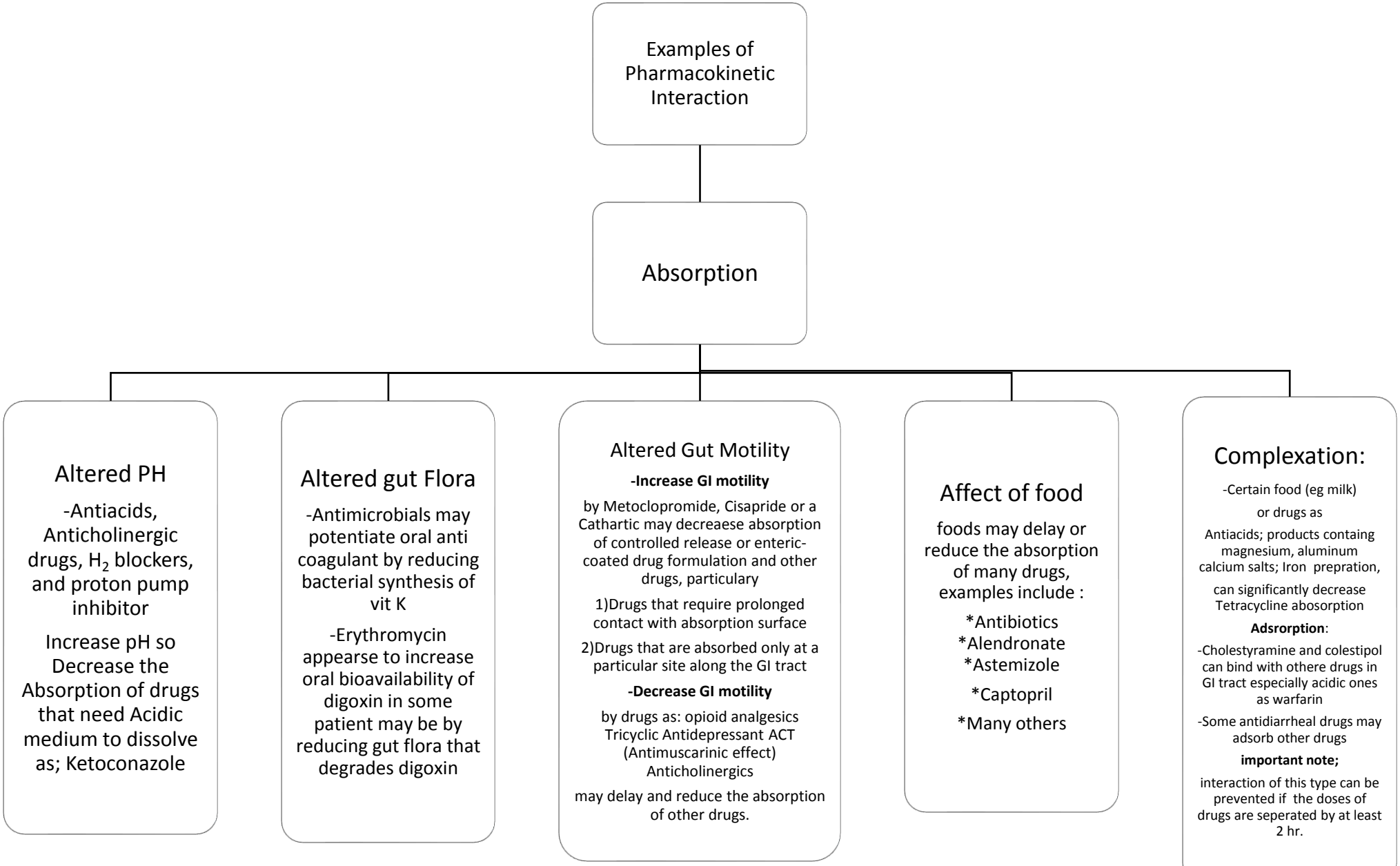
What is the Difference between **Likelihood Ratio & Probability ?**

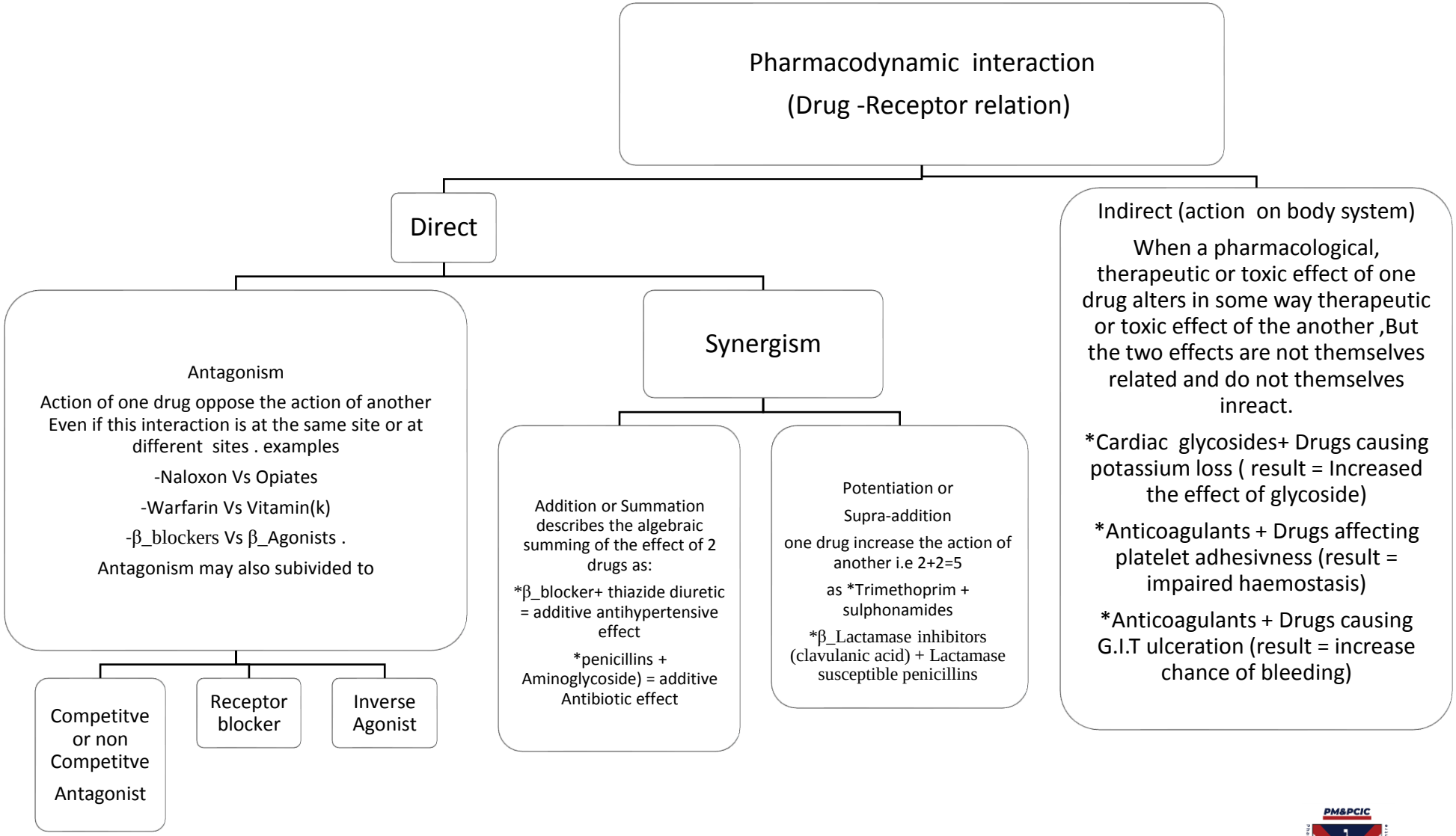
Fifth: Drug interactions

Drugs in Jordan Plus Basic Pharmacological Review, By Dr Mohanad Odeh




Examples of PharmacoKinetic Interactions
Absorption
See Below
Distribution
Metabolism
Excretion
Displacement from Plasma protein binding sites as:
* Phenytion is displaced by sodium valproat
*Methotrexate toxicity increased as it is displaced by aspirin and probenecid
*Bilirubin is displaced by sulphonamides,Vitamin K,and indomethasin
-Useful displecement as:
*Protamine with heparin
*Desferrioxamin with iron.
*Dimrtacaprol with arsenic
Displacement from tissue binding sites
-Quinidine displaces digoxin from its binding sites in tissue, so Quinidine may increase free digoxdin
Induction of drug metabolizing enzymes,by drugs as:
-Barbiturates
-Carbamazepine
-Phenytoin
-Rifampin
-Ethanol
Inhibition of drug metabolizing enzymes:
Inhibition of mixed function oxidases by
-Cimetidine
-Disulfiram
-Erythromycin
-FuranoCoumarins (in grapefruit juice)
-Ketoconazol
-Propoxyphene
-Quinidine
-Sulfonamides
Inhibition of specific matabolic enzymes
-Allopurinol inhibits Xanthine oxidase so increase effect of Azathioprine and mercaptopurine
-Carbidopa and benserazide inhibit Dopa decarboxylase so increase L. Dopa
-Disulfiram inhibits Aldehyde dehydrogenase So increase the effect of Alcohol
- Mono Amino Oxidase Inhibitors Inhibits Monoamine oxidase So increase the effect of amphetamine and amine-containing foods as chese ,Meat and yeast extracts
Altered Urinary PH
drugs that alter urinaty pH may change the ionization state of drugs that are weak acids or weak bases, leading to changes in renal reabsorption
Altered Active Transport
-Probenecid inhibits active transport of penicillin leads to penicilin retention.
-Diuretics lead to lithium retention.
-Quinidine lead to Digoxin retintion or toxicity.
-Salicylates lead to methotrexate retention or toxicity
- Activated charcoal lead to enhance excretion of tricyclic antidepressant and Phenobarbital
-Probenecide lead to zidovudine and chloroquine retention .


Examples of Pharmacokinetic Interaction
Absorption
Altered PH
-Antiacids, Anticholinergic drugs, H_2 blockers, and proton pump inhibitor
Increase pH so Decrease the Absorption of drugs that need Acidic medium to dissolve as; Ketoconazole
Altered gut Flora
-Antimicrobials may potentiate oral anti coagulant by reducing bacterial synthesis of vit K
-Erythromycin appearse to increase oral bioavailability of digoxin in some patient may be by reducing gut flora that degrades digoxin
Altered Gut Motility
-Increase GI motility
by Metoclopromide, Cisapride or a Cathartic may decreaese absorption of controlled release or enteric-coated drug formulation and other drugs, particulary
1)Drugs that require prolonged contact with absorption surface
2)Drugs that are absorbed only at a particular site along the GI tract
-Decrease GI motility
by drugs as: opioid analgesics Tricyclic Antidepressant ACT (Antimuscarinic effect) Anticholinergics
may delay and reduce the absorption of other drugs.
Affect of food
foods may delay or reduce the absorption of many drugs, examples include :
*Antibiotics
*Alendronate
*Astemizole
*Captopril
*Many others
Complexation:
-Certain food (eg milk)
or drugs as
Antiacids; products containg magnesium, aluminum calcium salts; Iron prepration,
can significantly decrease Tetracycline abosorption
Adsrorption:
-Cholestyramine and colestipol can bind with othere drugs in GI tract especially acidic ones as warfarin
-Some antidiarrheal drugs may adsorb other drugs
important note;
interaction of this type can be prevented if the doses of drugs are seperated by at least 2 hr.


Pharmacodynamic interaction
(Drug -Receptor relation)
Direct
Indirect (action on body system)
When a pharmacological, therapeutic or toxic effect of one drug alters in some way therapeutic or toxic effect of the another ,But the two effects are not themselves related and do not themselves inreact.
*Cardiac glycosides+ Drugs causing potassium loss (result = Increased the effect of glycoside)
*Anticoagulants + Drugs affecting platelet adhesivness (result = impaired haemostasis)
*Anticoagulants + Drugs causing G.I.T ulceration (result = increase chance of bleeding)
Antagonism
Action of one drug oppose the action of another Even if this interaction is at the same site or at different sites . examples
-Naloxon Vs Opiates
-Warfarin Vs Vitamin(k)
-β_blockers Vs β_Agonists .
Antagonism may also subivided to
Competitve or non Competitve Antagonist
Receptor blocker
Inverse Agonist
Synergism
Addition or Summation describes the algebraic summing of the effect of 2 drugs as:
*β_blocker+ thiazide diuretic = additive antihypertensive effect
*penicillins + Aminoglycoside) = additive Antibiotic effect
Potentiation or
Supra-addition
one drug increase the action of another i.e 2+2=5
as *Trimethoprim + sulphonamides
*β_Lactamase inhibitors (clavulanic acid) + Lactamase susceptible penicillins

Some Drugs with Potentially Serious Drug Interactions (Any drug to be used concurrently with one of these drugs should be thoroughly evaluated for possible Drug interactions)

Mechanism	Examples
Narrow margin of safety	Antiarrhythmic drugs (eg, quinidine) Antineoplastic drugs (eg, methotrexate) Lithium, Theophylline, Warfarin
Extensive metabolism by certain hepatic enzymes	Alprazolam, Amitriptyline, Atorvastatin, Carbamazepine, Clozapine, Corticosteroids, Cyclosporine, Diazepam, Imipramine, Lovastatin, Midazolam, Olanzapine, Phenytoin, Protease inhibitors, Sildenafil, Simvastatin, Tacrolimus, Tadalafil, Theophylline, Triazolam, Vardenafil, Warfarin
Inhibition of certain hepatic enzymes	Cimetidine, Ciprofloxacin, Clarithromycin, Diltiazem, Erythromycin, Fluconazole, Fluoxetine, Fluvoxamine, Itraconazole, Ketoconazole, Nefazodone, Paroxetine, Ritonavir, Telithromycin
Induction of certain hepatic enzymes	Barbiturates (eg,phenobarbital), Carbamazepine, Phenytoin, Rifabutin, Rifampin, St. John's wort

Selected Drug Interactions

Affected Drug	Interacting Agent	Comments
Alendronate	Food	Food (eg, orange juice, coffee, mineral water) may markedly reduce the absorption and efficacy of alendronate, which must be taken with plain water at least 1/2 h before the first food, beverage, or drug of the day.
Astemizole **Cisapride**	Food , Clarithromycin Erythromycin Fluvoxamine Itraconazole Ketoconazole Nefazodone Troleandomycin	Food may reduce the absorption of astemizole by up to 60%. Astemizole should be taken on an empty stomach (eg, >: 2 h after a meal), with no additional food taken for > 1 h after dosing. Elevated serum concentrations of astemizole and cisapride can cause serious cardiovascular reactions (eg, ventricular arrhythmias). The interacting drugs inhibit the hepatic metabolism of these drugs, increasing their serum concentrations and the risk of toxicity. Concurrent use must be avoided. The nonsedating antihistamines loratadine and fexofenadine have not been associated with serious cardiovascular reactions and may be used instead of astemizole.
Azathioprine Mercaptopurin	Allopurinol	Allopurinol inhibits xanthine oxidase, which metabolizes azathioprine and mercapto-purine, so that the action of these drugs is markedly increased. With concurrent use of allopurinol, the dose of azathioprine or mercaptopurine should be reduced to 1/3 to 1/4 the usual dose.

Affected Drug	Interacting Agent	Comments
Benzodiazepiru (eg, alprazolam, diazepam, triazo-lam)	Fluvoxamine Nefazodone	Fluvoxamine, nefazodone, and other drugs that inhibit hepatic enzymes may increase the action of most benzodiazepines. Alternatives should be considered; eg, certain benzodiazepines that undergo glucuronide conjugation (lorazepam, oxazepam, and temazepam) are not likely to interact with drugs that inhibit hepatic enzymes. Concurrent use of fluvoxamine and diazepam is not advised. If fluvoxamine is used with alprazolam, the dose of alprazolam should be at least halved, then titrated to the lowest effective dose. If nefazodone is used with alprazolam or triazolam, the initial dose of alprazolam should be reduced by 50%, and that of triazolam by 75%.
Benzodiazepines	Cimetidine	Cimetidine inhibits oxidative metabolic pathways and can increase the action of drugs so metabolized; it does not affect the action of lorazepam, oxazepam, or temazepam.
Certain benzodiazepines (eg, triazolam) **Cyclosporine** **Felodipine** **Nifedipine** **Nisoldipine**	Grapefruit juice	Grapefruit juice inhibits CYP3A4. a cytochrome P-450 enzyme, and thereby in-creases the bioavailability of certain drugs and increases their effect.
CNS depressants (eg, benzodi-azepines, antipsychotic drugs, tri-cycUc antide-pressants, most antihista-mines, certain analgesics)	Other CNS depressants, including alcoholic beverages	If more than one CNS depressant is used, response may be excessive, requiring dose reduction of one or both drugs. Patients must be told that these drugs may produce drowsiness and sedation and that the risk increases when such drugs are used concurrently.

Affected Drug	Interacting Agent	Comments
Digoxin	Potassium-depleting diuretics (eg, hydro-chlorothiazide, furosemide)	If potassium depletion occurs and is not corrected, the heart may become more sensitive to digoxin's effects, and adverse reactions (eg, arrhythmias) may result. Serum K concentrations should be monitored. K supplementation is provided on an individual basis. Not all patients need supplementation; it may cause hyperkalemia in some.
Fluoroquinolones (eg, ciprofloxacin) Tetracyclines	Metal-containing products (eg, iron salts, antacids containing aluminum, magnesium, or calcium)	Metals may bind with tetracyclines and fluo-roquinolones in the GI tract, reducing their absorption and activity. The interval between taking a tetracycline and a metal-containing product should be as long as possible (a 2 h). If possible, metal-containing products should not be used with a fluoroquinolone. If concurrent use is unavoidable, the interval between taking them should be as long as possible (a 2 h), and the fluoroquinolone should be given first.
Levodopa	Pyridoxine	Pyridoxine accelerates the decarboxylation of levodopa to its active metabolite, dopamine, in peripheral tissues. Unlike levodopa, dopamine cannot cross the blood-brain barrier to produce an antiparkinso-nian effect. Giving carbidopa with levodopa prevents pyridoxine from interfering.
MAO inhibitors (phenelzine, tranylcypromine)	Indirectly acting sympathomimetic amines (eg, am phetamine, ephedrine, phenylpropanolamine)	Concurrent use can cause serious reactions (eg, severe headache, hypertensive crisis, cardiac arrhythmias) and must be avoided.

Affected Drug	Interacting Agent	Comments
MAO inhibitors (phenelzine, tranylcypromine)	Tricyclic antidepressants (eg, amitriptyline, imipramine)	Concurrent use can cause serious reactions (eg, tremors, convulsions, hyperthermia) and, for most patients, must be avoided. Generally, treatment with one should not be initiated until 14 days after therapy with the other has been discontinued. Some patients who do not respond to a single antidepressant have been treated with both types of drug. Such therapy must be closely monitored.
MAO inhibitors (phenelzine, tranylcypromine)	Selective serotonin reup-take inhibitors (fluoxetine, fluvoxamine, paroxetine, sertraline)	Concurrent use can cause serious reactions (eg, rigidity, delirium, hyperthermia) and must be avoided. Treatment with one should not be initiated until *s:* 14 days after therapy with the other has been discontin-ued. Because fluoxetine and its major metabolite have long elimination half-lives, a 5 wk should elapse between discontinuation of fluoxetine and initiation of an MAO inhibitor.
MAO inhibitors (phenelzine, tranylcypromine)	Foods with a high tyramine content (eg, cer-tain cheeses, particularly strong or aged varieties; certain alcoholic bever-ages)	Serious reactions (eg, hypertensive crisis) can occur if patients talking an MAO inhibitor consume these foods, which must be avoided.
***Oral* contraceptives**	Barbiturates Carbamazepine Phenytoin Rifabutin Rifampin	The interacting drugs induce hepatic enzymes, increasing the rate of metabolism of oral contraceptives and possibly decreasing their action; an unplanned pregnancy may result. Additional contraceptive measures should be used during therapy with such drugs.

Affected Drug	Interacting Agent	Comments
***Oral* contraceptives**	Antibiotics	A few reports have suggested that antibiotics reduce oral contraceptive action (presumably by decreasing serum estrogen concentrations), resulting in unplanned pregnancies. Although this risk appears very low, additional contraceptive measures should be used during antibiotic therapy.
Theophylline	Cimetidine Ciprofloxacin Enoxacin Erythromycin Grepafloxacin	Concurrent use can elevate serum theophylline concentrations and cause theophylline toxicity. Drugs that inhibit hepatic enzymes (eg, those listed) may inhibit theophylline metabolism and increase its serum concentrations. Alternatives not likely to interact should be considered—eg, famotidine, nizatidine, and ranitidine for cimetidine, and azithromycin for erythromycin. If potentially interacting combinations must be used, therapy must be closely monitored.
Warfarin	Drugs that inhibit (eg, cimetidine) or induce (eg, barbiturates) hepatic enzymes	Drugs that inhibit hepatic enzymes may increase warfarin's activity and the risk of bleeding, and those that induce hepatic enzymes may reduce warfarin's action. Alternatives not likely to interact should be considered. If potentially interacting combinations must be used, therapy must be closely monitored, and dosage adjusted as necessary.
Warfarin	Foods high in vitamin K (such as broccoli, Brussels sprouts, spinach, and kale)	Such foods may reduce the effectiveness of warfarin, increasing the risk of clotting. Intake of such foods should be limited, and the amount consumed daily should remain constant
Warfarin	Aspirin	Aspirin may increase warfarin's activity and the risk of bleeding; generally, concurrent use should be avoided. However, in certain cardiovascular conditions, concurrent use provides additional benefit.

Drug – Drug Interactions:
https://www.drugs.com/drug_interactions.php#
It gives two level (Consumer & Professional)
Ability to save the list checked
It gives Drug Food interactions as well.
Drug Interaction Classification

Major	Highly clinically significant. Avoid combinations; the risk of the interaction outweighs the benefit.
Moderate	Moderately clinically significant. Usually avoid combinations; use it only under special circumstances
Minor	Minimally clinically significant. Minimize risk; assess risk and consider an alternative drug, take steps to circumvent the interaction risk and/or institute a monitoring plan
Unknown	No information available.

Example: Valproic Acid + Phenytoin = Moderate

Other Websites with Notes

https://www.merckmanuals.com/professional/druginformation/drug-interactions
Excellent, high level of professionalism

http://thedacare.staywellsolutionsonline.com/Library/DrugReference/DrugInteraction/
Medical overview of the drug interactions

https://www.webmd.com/interaction-checker/default.htm
https://reference.medscape.com/drug-interactionchecker
Both give brief about drug interactions

https://www.rxlist.com/drug-interaction-checker.htm

Poor resource

Paid, Not free resources:
https://www.medicinescomplete.com/about/index.htm
Lexi-comp: http://www.wolterskluwercdi.com/lexicomp-online/user-guide/tools-interactions/

Sixth: Selected Concepts

A) Adherence

1) Definitions

Compliance

The extent to which a person's behaviour (taking medications, following a recommended diet or executing lifestyle changes) coincides with medical or health advice.

Adherence

The extent to which a person's behaviour (taking medication, following a diet, and/or executing lifestyle changes) corresponds with agreed recommendations from a healthcare provider.

Concordance

Describes the relationship between health professionals and patients. Instead of patients either submitting (compliance) or agreeing (adherence) to decisions made by health professionals, in a concordant relationship the patient is an equal partner with the health professional in decision making.

Because concordance describes the interactions and agreement between patients and health professionals, patients cannot be described as non-concordant, only consultations can be non-concordant.

The most common used term is Adherence and Nonadherence patients.

- 8–11% of hospital admissions in older patients were attributed to poor adherence to medication
- Poorly adherent patients were 1.6 times more likely to be hospitalised and 1.8 times more likely to die than patients with good adherence (defined as those who collected more than 80% of their prescriptions)

2) Consequences of Nonadherence:

For the individual

- Treatment failure
- Drug resistance
- More complex treatment, more toxicity, uncertain progress, increased expense

From a public health perspective

- Transmission of resistant bacteria or virus
- Increased expense due to second line therapy

From a health economics perspective

- Negative impact on established cost-benefit of existing treatments

3) Categories of non-adherence

A) Primary vs secondary

• Primary non-adherence: patient does not have prescription for medicine dispensed

• Secondary non-adherence: patient has medicine dispensed but does not take it according to the prescribed regimen

B) Intentional vs unintentional non-adherence

• Intentional non-adherence: patient chooses not to take their medicine according to the prescribed regimen

• Unintentional non-adherence: patient either forgets, or is unable, to take their medicine according to the prescribed regimen

4) Dimensions of adherence (WHO, 2003)

- Social/economic factors
- Health system/healthcare team factors
- Condition-related factors
- Therapy-related factors
- Patient-related factors

A) Social/economic factors

age, social class, level of education, employment status, income, level of health literacy, access to health care facilities, health care insurance, accessing pharmacy, medication cost, cultural and lay beliefs about illness and treatment, lack of effective social support networks, unstable living conditions, and family dysfunction.

Poor adherence to medicines is higher in adolescents and elderly patients (but still present in all age groups).

B**) Health Care System Dimension**

1. Provider-patient relationship	2. Provider communication skills (contributing to lack of patient knowledge or understanding of the treatment regimen)
3. Disparity between the health beliefs of the health care provider and those of the patient	4.Lack of positive reinforcement from the health care provider
5.Weak capacity of the system to educate patients and provide follow-up	6.Lack of knowledge on adherence and of effective interventions for improving it
7.Patient information materials written are poor	8.Restricted formularies; changing medications covered on formularies
9.High service costs, copayments, or both	10.Poor access or missed appointments
11.Long wait times	12.Lack of continuity of care

C) **Condition-Related Dimension**

1. Chronic conditions 2. Lack of symptoms 3. Severity of symptoms 4. Slowly progressing disease 5. Depression 6. Psychotic disorders 7. Mental retardation/developmental disability

D) **Therapy-Related Dimension**

1. Complexity of medication regimen (number of daily doses; number of concurrent medications)
2. Treatment requires mastery of certain techniques (injections, inhalers)
3. Duration of therapy 4. Frequent changes in medication regimen
5. Lack of immediate benefit of therapy 6.Actual or perceived unpleasant side effects
8.Treatment interferes with lifestyle or requires significant behavioral changes

There is not much difference between levels of adherence between once and twice daily regimens (75% and 69% of all doses are taken, respectively), adherence is much lower with regimens that require medication to be taken three or four times daily (65% and 51% of all doses taken, respectively)

-- Drug forgiveness:
-The circumstance of how sensitive therapeutic success is under imperfect adherence
-A forgiving drug would be one in which therapeutic outcomes are robust to common patterns of imperfect adherence.
Forgiveness is a function of the duration of action and the dose interval of the drug, conceptually shown Forgiveness (f) = Duration of action (D) – dose interval (I).

Drug forgiveness (F) is the number of consecutive doses that can be missed while still maintaining a therapeutic effect

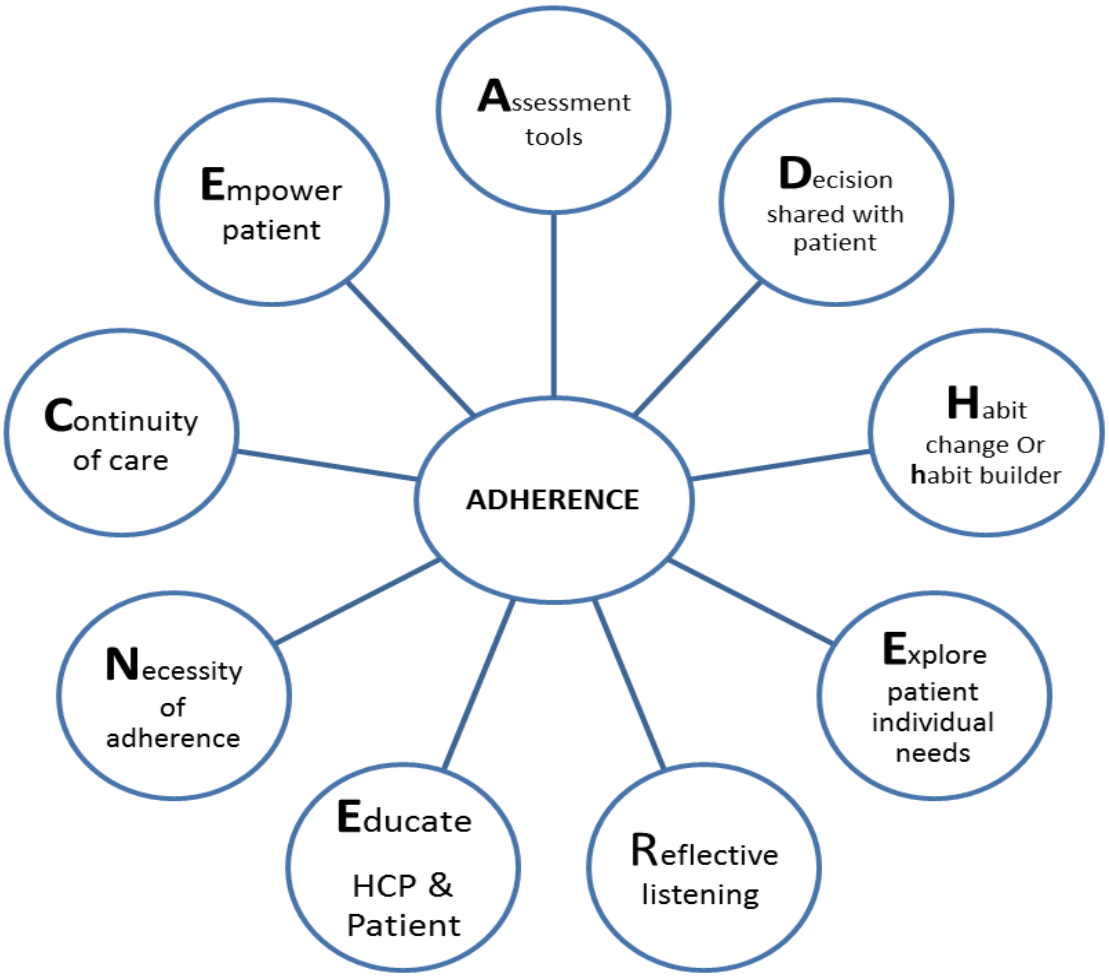
E) Patient-related factors

PHYSICAL FACTORS: 1. Visual impairment 2. Hearing impairment 3. Cognitive impairment 4. Impaired mobility or dexterity 5. Swallowing problems.

PSYCHOLOGICAL/BEHAVIORAL FACTORS:
1. Knowledge about disease
2. Perceived risk/susceptibility to disease
3. Understanding reason medication is needed
4. Expectations or attitudes toward treatment
5. Perceived benefit of treatment
6. Confidence in ability to follow treatment regimen
7.Motivation
8.Fear of possible adverse effects
9.Fear of dependence
10.Feeling stigmatized by the disease
11.Frustration with health care providers
12.Psychosocial stress, anxiety, anger
13.Alcohol or substance abuse

Table 14.2 Examples of interventions that have improved patient adherence

Patient group	Successful interventions	Reference
Patients with tuberculosis	Pharmacist education about medication	Clark *et al.*, 2007
Multiple patient groups	Medication reminder packaging	Heneghan *et al.*, 2006
Patients with hypertension or hyperlipidaemia	Dispensing medicines in blister pack; pharmacist-led education about medicines; regular follow-up with a pharmacist	Lee *et al.*, 2006
Multiple patient groups	Motivational interviewing	Rubak, 2005
Patients with HIV/AIDS	Improving practical medication management skills with individual patients over at least 12 weeks	Rueda *et al.*, 2006
Patients with hyperlipidaemia	Simplified medication regimens; improved patient information and education; reminders	Schedlbauer *et al.*, 2004
Patients with hypertension	Simplifying dosage regimens; medicine reminder charts; social support and family support	Schroeder *et al.*, 2004



Measures of adherence	Advantages	Disadvantages
Direct measures -Measurement of the drug or its metabolite concentration in body fluids, -Evaluation of the presence of a biological marker given with the drug -Direct patient's observation of medication-taking behaviour.	Most accurate Can provide physical evidence	Generate a Yes/No result only Varied drug metabolism Nonquantifiable biomarkers/drug metabolites Drug-drug interactions and drug-food interactions Expensive Require qualified staff and techniques to perform Bias occurs if patients know the schedule of the tests (white coat adherence)
Measures involving Electronic Medication Packaging (EMP) devices	Highly accurate Identify medication-taking pattern Identify partial adherence	Expensive Technical supports required Overestimation if patients accidently or purposefully actuate the container Inconvenience due to bulky container Pressure to patients
Measures involving secondary database analysis	Able to assess multidrug adherence Can identify patients at risk for treatment failure Provide medication-refilling pattern Complete dataset used are generally verified by a third party for insurance claim purpose	Assumptions are made (the medication-taking behaviour corresponds to prescription refilling and the medications are taken according to prescription) Fail to identify partial adherence Fail to identify barriers for the detected nonadherence Missing out prescriptions, if obtained outside the system Incomplete records, if drug discontinuation is verbally advised by prescriber
Measures involving clinician assessments and self-report	Low cost, Well-validated Easy to administer Real-time feedback Available, Flexible to accommodate different conditions Identify belief & barriers to adherence	Least reliable Relatively poor sensitivity and specificity Affected by communication skills of interviewers and questions in the questionnaire Patient's desirability can bias

5) Medication Adherence assessment, Self-report examples

A) Examples used Likert scale tool, Medication Adherence Report Scale (MARS)

The MARS is a self-report questionnaire with five items. All five items measure adherence by representing behaviours of **non-adherence** with prescribed medications. The respondent is asked to provide a frequency for each statement (*always, often, sometimes, rarely, never*).

The highest score of 5 points is awarded for the frequency 'never' while the lowest available score of 1 is awarded for the frequency 'always'. The total scores therefore range from 5-25, with higher scores being associated with better levels of adherence. Accepted adherence > or = 20 as total.

Your own way of using your medicines	Always 1	Often 2	Sometimes 3	Rarely 4	Never 5
I forget to use them					
I alter the dose					
I stop taking them for a while					
I decide to miss out a dose					
I take less than instructed					

B) Example used Yes, No tool, Morisky Medication Adherence Scales: MMAS-4 and MMAS-8

Score Yes=1; No=0

MMAS-4 Score	**MMAS-8 Score**
1) Do you ever forget to take your medicine?	1) Do you sometimes forget to take your pills?
2) Are you careless at times about taking your medicine?	2) People sometimes miss taking their edications for reasons other than forgetting. Thinking over the past two weeks, were there any days when you did not take your medicine?
3) Sometimes if you feel worse when you take the medicine, do you stop taking it?	3) Have you ever cut back or stopped taking your medicine without telling your doctor because you felt worse when you took it?
	4) When you travel or leave home, do you sometimes
	forget to bring along your medicine?
	5) Did you take all your medicine yesterday?
4) When you feel better do you sometimes stop taking your medicine?	6) When you feel like your symptoms are under control, do you sometimes stop taking your medicine?
	7) Taking medicine, every day is a real inconvenience for some people. Do you ever feel hassled about sticking to your treatment plan?
	8) How often do you have difficulty remembering to take all your medicine? (A = 0; B-E = 1) ___A. Never/rarely ___B. Once in a while ___C. Sometimes ___D. Usually ___E. All the time

Classification	**MMAS-4 Score**	**MMAS-8 Score**
High Adherence	0	0
Medium Adherence	1-2	1-2
Low Adherence	3-4	3-8

B) Beliefs about medicines questionnaire (BMQ)

The BMQ is a self-report questionnaire with ten items. Five items measure the necessity of medication (necessity scale) and the other five items measure the concern or risk consequences of taking medication (concern scale), as evaluated by the patient. A Likert scale, ranging from strongly disagree (score of 1) to strongly agree (score of 5) is used to indicate the response for each item.

The total score of the necessity scale and the concern scale range from 5 to 25. Higher scores for the necessity scale reflect higher perceived necessity of the prescribed medications i.e. stronger positive believes that the prescribed medicines are required by the patients to manage their illness. In contrast, higher scores for the concern scale reflect higher concerns and a more negative attitude toward medication use.

The differential between the necessity and the concern scales range from -20 to +20 and can be expressed in cost-benefit terms, in which risk or concerns (costs) are weighed against benefit, i.e. necessity.

Your Own view about medicines prescribed for you	***strongly agree 5***	***Agree 4***	***Uncertain 3***	***Disagree 2***	***strongly disagree 1***
My health, at present, depends on my medicines					
Having to take medicines worries me					
My life would be impossible without my medicines					
Without my medicines I would be very ill					
I sometimes worry about long-term effects of my medicines					
My medicines are a mystery to me					
My health in the future will depend on my medicines					
My medicines disrupt my life					
I sometimes worry about becoming too dependent on my medicines					
My medicines protect me from becoming worse					

Practical example for the analysis of BMQ

BMQ has been answered by 2 different group of patients. Basic level collection was at 2 weeks post hospital discharge time (pre-intervention) then during 3-month post discharge, the patients were randomised to receive educational interventions either by community pharmacists group or hospital pharmacist group. Then after 3-month patients were asked to answer the (post-intervention) assessment. Results are shown in the 3 tables below.

Notice:

Within group analysis: Same group analysis over different time set.

Between group analysis: Different group analysis at the same time.

1) Description Analysis

Beliefs about Medicines Questionnaire results

Question/Group/Timing	Community Group			Hospital Group		
	Two weeks post-discharge N=19	3 months post-discharge N=17	**Improvement**	Two weeks post-discharge N=17	3 months post-discharge N=15	**Improvement**
Necessity scale [a]						
My health, at present, depends on my medicines	100%	100%	0%	100%	100%	0%
My life would be impossible without my medicines	74%	82%	8%	76%	80%	4%
Without my medicines I would become very ill	79%	82%	3%	71%	67%	- 4%
My health in the future will depend on my medicines	79%	88%	9%	88%	100%	12%
My medicines protect me from becoming worse	89%	94%	5%	94%	100%	6%
Concerns scale [b]						
Having to take medicines worries me	58%	76%	18%	71%	80%	9%
I sometimes worry about the long-term effects of my medicines	32%	59%	**27%**	47%	67%	20%
My medicines are a mystery to me	63%	71%	8%	53%	67%	14%
My medicines disrupt my life	74%	76%	2%	82%	100%	18%
I sometimes worry about becoming too dependent on my medicines	53%	65%	12%	59%	87%	**28%**

Key				
	Yellow	No improvement	Red	Negative decline
	Green	Positive improvement	Dark green	Best improvement

a Percentage of patients with **high necessity score**. i.e. responded (agree) or (strongly agree) with the necessity scale statement

b Percentage of patients with **low concern score** i.e. responded (disagreeing) or (strongly disagreeing) with the concerns scale statement

2) Analysis; the mean for Concern and Necessity scores and the mean difference between two scales.

Table Within group analyses of the Beliefs about Medicines Questionnaire (BMQ)

Group	BMQ Scale	Mean at 2 weeks post-discharge (Standard deviation)	Mean at 3 months post-discharge (Standard deviation)	Mean difference	*P* value [a]	95% Confidence Interval	
						Lower	*upper*
Hospital n=15	Necessity	21.1 (3.1)	21.9 (2.8)	0.8	0.18	-1.9	0.38
	Concern	12.3 (3.3)	10.6 (3.4)	-1.7	0.012*	-2.9	- 0.43
	Necessity–Concerns Differential	8.9 (4.8)	11.3 (4.8)	2.4	0.009*	-4.1	-0.7
Community n=17	Necessity	21.4 (2.8)	21.5 (2.7)	0.1	0.93	-1.6	1.5
	Concern	14.3 (4.3)	11.8 (3.3)	-2.5	0.11	-0.6	5.7
	Necessity–Concerns Differential	7.1 (4.7)	9.7 (5.1)	2.6	0.15	-6.2	1.1
Combined Intervention group n=32	Necessity	21.3 (2.9)	21.7 (2.7)	0.4	0.42	-1.3	0.56
	Concern	13.3 (3.0)	11.2 (3.4)	-2.1	0.016*	-3.8	-0.43
	Necessity–Concerns Differential	7.9 (4.8)	10.4 (5.0)	2.5	0.015*	-4.5	-0.53

[a] paired t-test, repeated measurement
* The mean difference is significant.

Between subject analysis of the Beliefs about Medicines Questionnaire data

Scale	Group	2 weeks post-discharge			3 months post-discharge		
		Mean	Difference	*P* value [a]	Mean	Difference	*P* value [a]
Necessity	Hospital	21.1	0.3	0.85	21.9	0.4	0.68
	Community	21.4			21.5		
Concern	Hospital	12.3	2.0	0.29	10.6	1.2	0.34
	Community	14.3			11.8		
Necessity–Concerns Differential	Hospital	8.9	1.8	0.49	11.3	1.6	0.39
	Community	7.1			9.7		

[a] Independent t-test

C) Health related quality of life

Health-related quality of life (HRQoL) is an assessment of how the individual's well-being may be affected over time by a disease, disability, or disorder.

Tools for assessment (Example of General tools):

1) Example of tools that are used for specific diseases

1) The Stroke Specific Quality of Life scale SS-QOL: It is a patient-centred outcome measure intended to provide an assessment of health-related quality of life (HRQOL) specific to patients with stroke only.

2) International Consultation on Incontinence Questionnaire-Short Form (ICIQ-SF) in urinary incontinence.

3) European Organisation for Research and Treatment of Cancer (EORTC), measurement system for use in clinical trials in oncology.

And too many others

2) Two examples for general health related tools

i) Short-Form Health Survey (SF-36, SF-12, SF-8): Brief description.

Composed of eight sections as follows:

Physical component summary (PCS)

1) Physical functioning
2) Physical role functioning
3) Bodily pain

Mental component summary (MCS)

4) Emotional role functioning
5) Social role functioning
6) Mental health

General

7) Vitality (energy and fatigue)
8) General health perceptions

For your further information you can read: https://www.rand.org/health/surveys_tools/mos/36-item-short-form.html

ii) The EuroQol Group Measurements: EQ-5 Domains (3 levels of 5 levels)

The EQ-5D-3L which is a self-completion questionnaire to measure patient reported outcomes.

It consists of two parts.

First part is a descriptive system with **five dimensions**:

1) Mobility 2) Self-care 3) Usual activities 4) Pain or discomfort 5) Anxiety or depression.

The 3L models: (level 1 = no problem, level 2 = some or moderate problem, level 3 = extreme problem).

The most recent update form indicates 5 levels: Where, each dimension has 5 levels: (1=no problems, 2= slight problems, 3= moderate problems, 4= severe problems and 5=extreme problems).

The second part is a visual analogue scale (VAS) on which the best imaginable health state is marked by 100 and the worst state is marked by 0.

- **There are two main approaches to the interpretation of the EQ-5D-3L or 5L results.**

The first approach direct use the VAS.

The second approach is more complex and require the use of country specific formula to represent the results as an index score. This index score is useful for cost utility analyses, as it can be used to calculate QALYs (quality adjusted life years). This approach cannot be done without introducing an exogenous source of variance, and indeed several countries have created specific value sets, that were obtained from representative samples of their general population. **An online calculator** based on the (TTO analysis Time tradeoff) is available at the following website: https://euroqol.org/wp-content/uploads/2016/09/EQ-5D-5L_UserGuide_2015.pdf.

The online calculator gives the utility index score (for example 0.60, or 0.89 … etc where 1.0 = perfect health, 0 = death). Based on the patient answers (the patient's selection of levels in each domain) of the questionnaire.

Under each heading, please tick the ONE box that best describes your health TODAY

MOBILITY

I have no problems in walking about	✓
I have slight problems in walking about	☐
I have moderate problems in walking about	☐
I have severe problems in walking about	☐
I am unable to walk about	☐

SELF-CARE

I have no problems washing or dressing myself	☐
I have slight problems washing or dressing myself	✓
I have moderate problems washing or dressing myself	☐
I have severe problems washing or dressing myself	☐
I am unable to wash or dress myself	☐

USUAL ACTIVITIES *(e.g. work, study, housework, family or leisure activities)*

I have no problems doing my usual activities	☐
I have slight problems doing my usual activities	☐
I have moderate problems doing my usual activities	✓
I have severe problems doing my usual activities	☐
I am unable to do my usual activities	☐

PAIN / DISCOMFORT

I have no pain or discomfort	☐
I have slight pain or discomfort	☐
I have moderate pain or discomfort	☐
I have severe pain or discomfort	✓
I have extreme pain or discomfort	☐

ANXIETY / DEPRESSION

I am not anxious or depressed	☐
I am slightly anxious or depressed	☐
I am moderately anxious or depressed	☐
I am severely anxious or depressed	☐
I am extremely anxious or depressed	✓

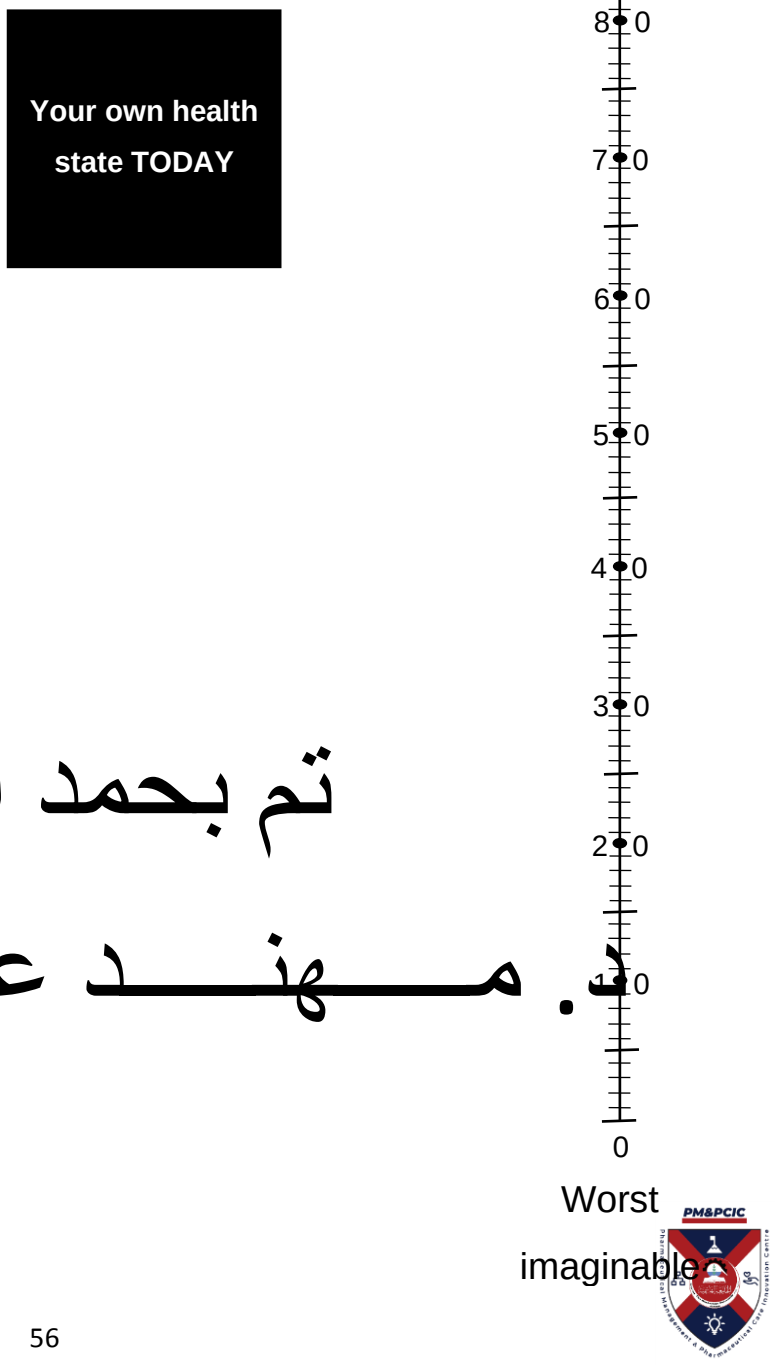
Levels of perceived problems are coded as follows:

✓	
☐	
☐	
☐	Level 1 is coded as a '1'
☐	
☐	
✓	Level 2 is coded as a '2'
☐	
☐	
☐	
☐	Level 3 is coded as a '3'
☐	
✓	
☐	
☐	
☐	Level 4 is coded as a '4'
☐	
☐	
✓	
☐	
☐	Level 5 is coded as a '5'
☐	
☐	
☐	
✓	

To help people say how good or bad a health state is, we have drawn a scale (rather like a thermometer) on which the best state you can imagine is marked by 100 and the worst state you can imagine is marked by 0.

We would like you to indicate on this scale how good or bad your own health is today, in your opinion.

Please do this by drawing a line from the box below, to whichever point on the scale indicates how good or bad your health state is today.



تم بحمد الله

د. مـــــهنـــــد عـــــــودة