National Rehabilitation Center
Abu Dhabi - UAE

Pharmacotherapy Specialist Role in Addiction Rehabilitation Centre

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National Rehabilitation Center - U.A.E

Poll 1

OBJCETIVES

The role of pharmacotherapy specialist in addiction rehabilitation center as part of integrated care.

Explain the difference of pharmacotherapy specialist role in rehabilitation vs acute healthcare setting.

Highlight the main responsibilities of pharmacotherapy specialist within multidisciplinary team.

Learning Outcomes

1

Understand the role that pharmacotherapy specialists can do within multidisciplinary team.

2

How to start pharmacotherapy services in addiction rehabilitation setting.

3

Explore the role of Pharmacoeconomics and pharmacogenetics in addiction rehabilitation setting.

Pharmacotherapy Definition

Pharmacotherapy is the treatment of health conditions by using pharmaceutical products (drugs) as medication.

Pharmacotherapy is of high quality when medication are used rationally (the patient receives the right medication at the right time , uses them in appropriate manner and benefits from them in the dosage matching their individual requirement for a sufficient period of time and at the lowest cost to them and the society

In Substance Use Disorder (SUD) treatment

combines the provision of comprehensive medication management (CMM) services with counseling and behavioral therapies as a holistic approach to recovery.

Acute Care Hospitals Vs Addiction Rehabilitation Setting

Acute Care Hospitals	Addiction Rehabilitation Setting
Patients	Person Served or Patients
Goals are easy to achieve through pharmacotherapy	Pharmacotherapy alone will not achieve the goals
Pharmacotherapy guidelines are well established	There are a lot of gaps that sill debatable
In case of relapse , patient will have the most impact	The Impact will affect patient , family and community

Misconceptions About Pharmacotherapy

The Five Most Common Myths About Medications for Addiction Treatment

- **Myth 1 : Medication for Opioid Use Disorder (MOUD) just "trades one addiction for another."**
- **Fact:**
  The American Society of Addiction Medicine (ASAM) defines addiction as a primary, chronic disease of brain reward, motivation, memory and related circuitry.
- people use a substance compulsively and continue using it even when there are negative consequences in their life. People with addiction often experience cravings to use a substance, as well as withdrawal symptoms when they stop using.
- Withdrawal symptoms are extremely unpleasant and have potentially dangerous physical and psychological effects.
- Both cravings and withdrawal contribute to cycles where people continue to use a substance and cannot stop.
- Medications for opioid use disorder such as **buprenorphine** or **methadone** work in the brain to treat cravings and withdrawal symptoms.
- These medications do NOT cause patients to feel "high" or "intoxicated" or "euphoric." The goal with MOUD treatment is for patients to feel normal so they can live a functional life – breaking the cycle where cravings and withdrawal symptoms dominate their life.

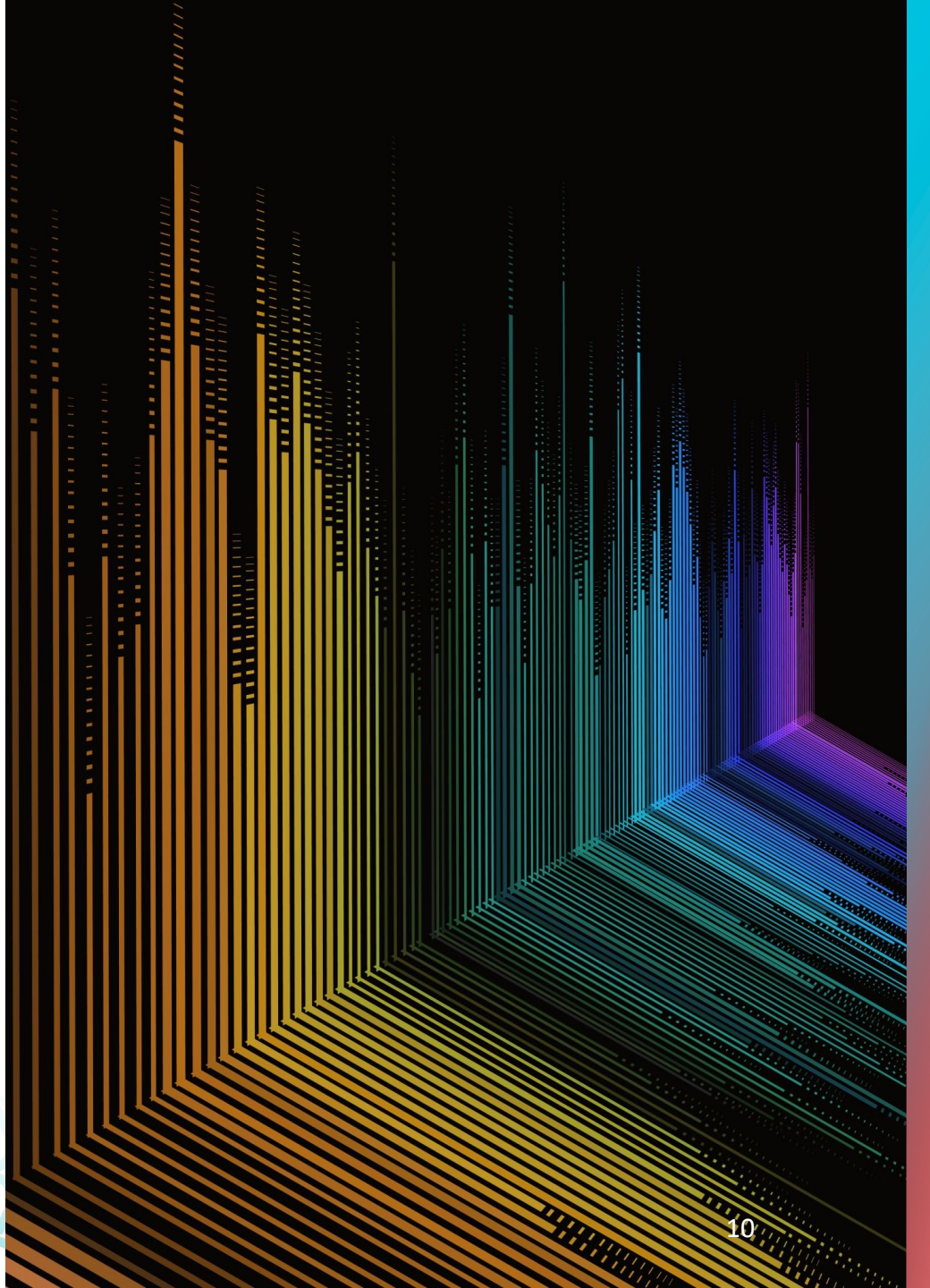
https://medicine.umich.edu/dept/psychiatry/news/archive/202405/five-most-common-myths-about-medications-addiction-treatment
by Drs. Cameron Coleman and Nathan Menke

Myth 2 : There is no proof that Medication for Opioid Use Disorder (MOUD) is better than abstinence.

- **Fact:** Not true! Studies have consistently shown that people with Opioid Use Disorder will return to using opioids about 90% of the time when they do not receive medication treatment and try to stop .
- This happens even for people who go through “detox” in a hospital or rehab program.
- Nine times out of ten, people will return to using opioids within one to three months.
- In contrast, studies have consistently shown that patients treated with buprenorphine or methadone have much lower rates of returning to using – between 40% to 50%. This is a huge improvement!
- Studies have also shown numerous other benefits to medications for Opioid Use Disorder.
- Patients are more likely to stay enrolled in a treatment program, less likely to be incarcerated, and less likely to acquire infections from drug use (such as HIV or Hepatitis C).
- Pregnant people treated with medication for Opioid Use Disorder are less likely to have pregnancy complications. Most importantly, people treated with methadone and buprenorphine are less likely to overdose and less likely to die.
- In summary, there is ample proof that treatment with MOUD is better than abstinence and it helps save lives.

Myth 3: There are no medications for the treatment of Alcohol Use Disorder.

- **Fact:**There are three medications that are FDA approved for treatment of Alcohol Use Disorder:
- **Naltrexone** (available as a daily pill or a monthly injection), **Acamprosate**, and **Disulfiram**.
- Naltrexone and Acamprosate both reduce the risk of returning to drinking and are generally well tolerated with minimal side effects.
- Other medications – such as **Gabapentin** and **Topiramate** – are not FDA approved for Alcohol Use Disorder, but there is a growing body of evidence that they may be effective.

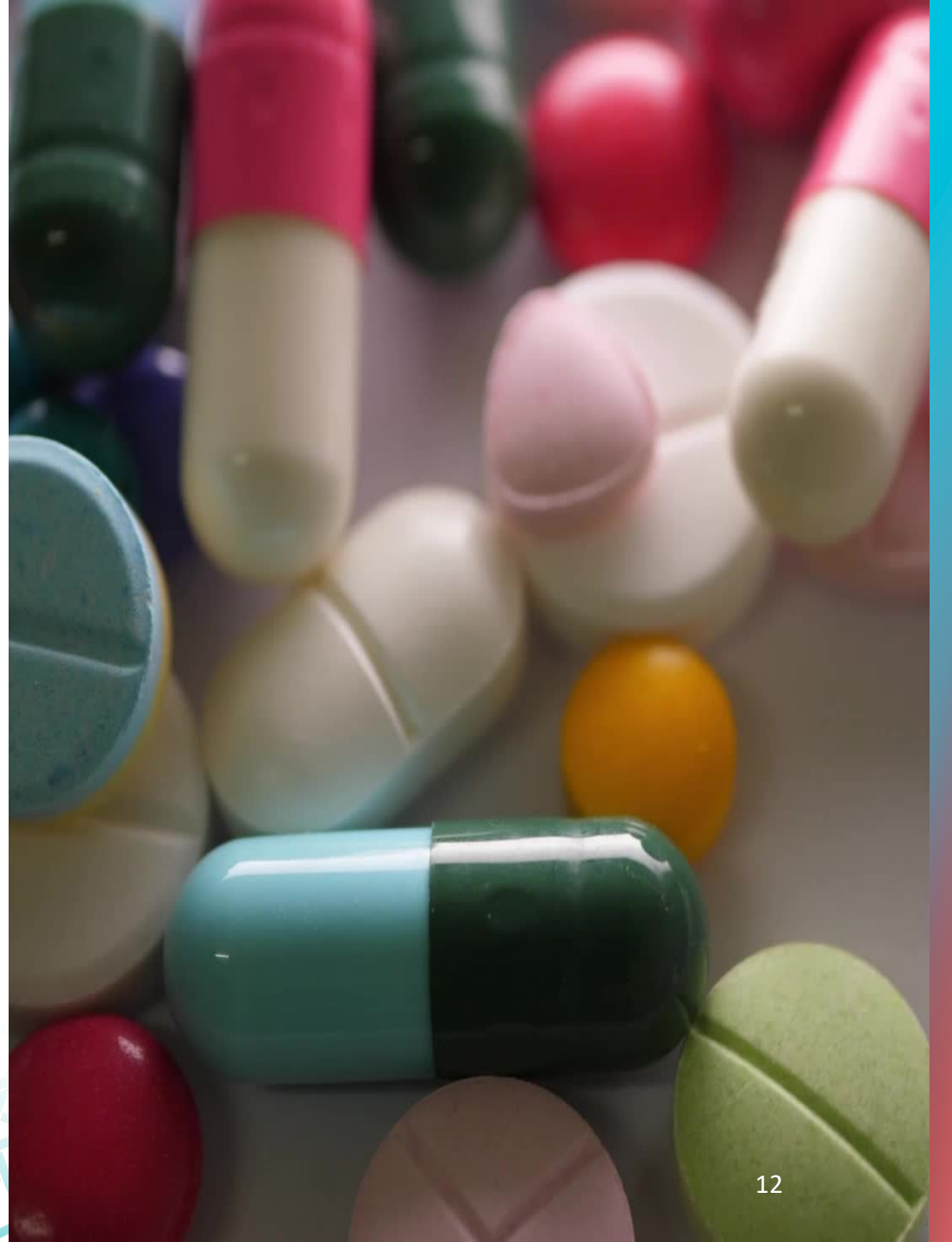


Myth 4 : If I can just get through withdrawal, I will be able to stop using the substance.

- **Fact:**Addiction is a primary, chronic disease of brain that is not resolved when patients go through the phase of acute withdrawal.
- The changes occurring in the brain and body that cause the illness may take months or even years to return to normal.
- In the meantime, people may be triggered by other people, places, objects associated with use, emotions, or other experiences.
- The urges and cravings that drive a person to want to return to using substances may last years despite abstinence.

Myth 5 : There's no need for long-term medication for addiction treatment.

- **Fact:**When it comes to treating substance use disorder, there is no "one size fits all" road to recovery.
- Stopping treatment too soon increases the risk of return to use.
- It is recommended that each person's treatment course be based on their individual needs and with shared decision making with their health care provider.
- Due to the chronic nature of substance use disorders, the need for continued medication treatment should be periodically re-evaluated.
- Just like those with other chronic conditions like hypertension or diabetes, some people with the most severe substance use disorders may require lifelong treatment with medications.

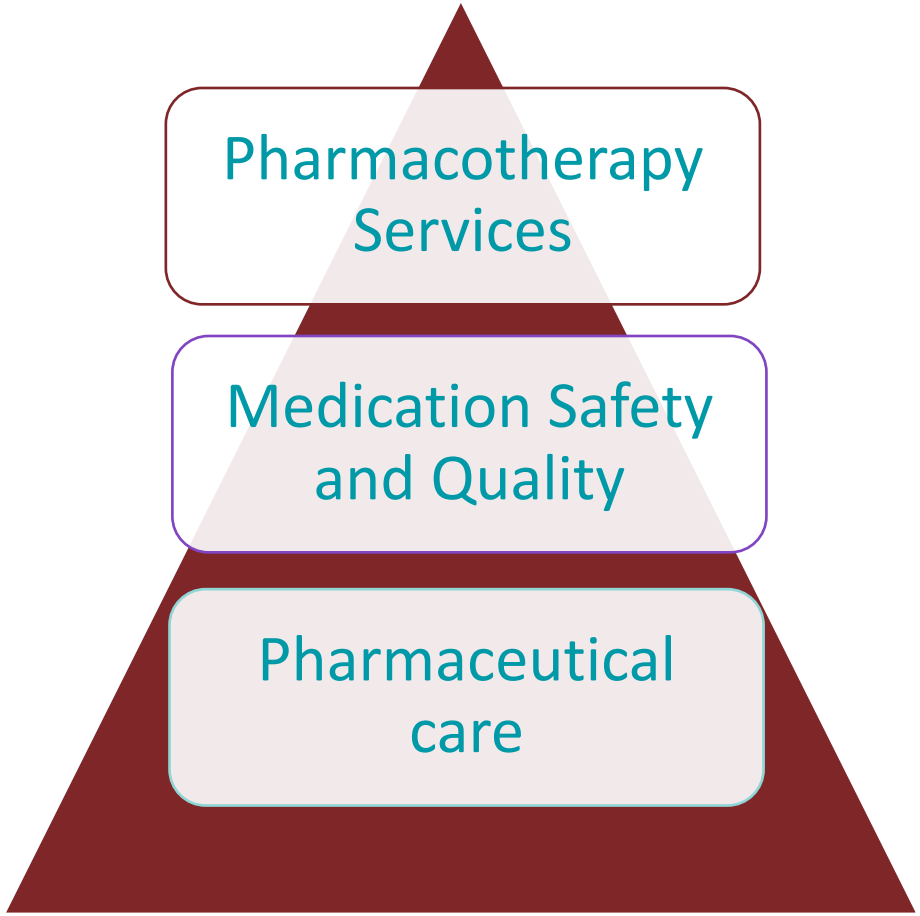


Pharmacotherapy Specialist Main Responsibilities

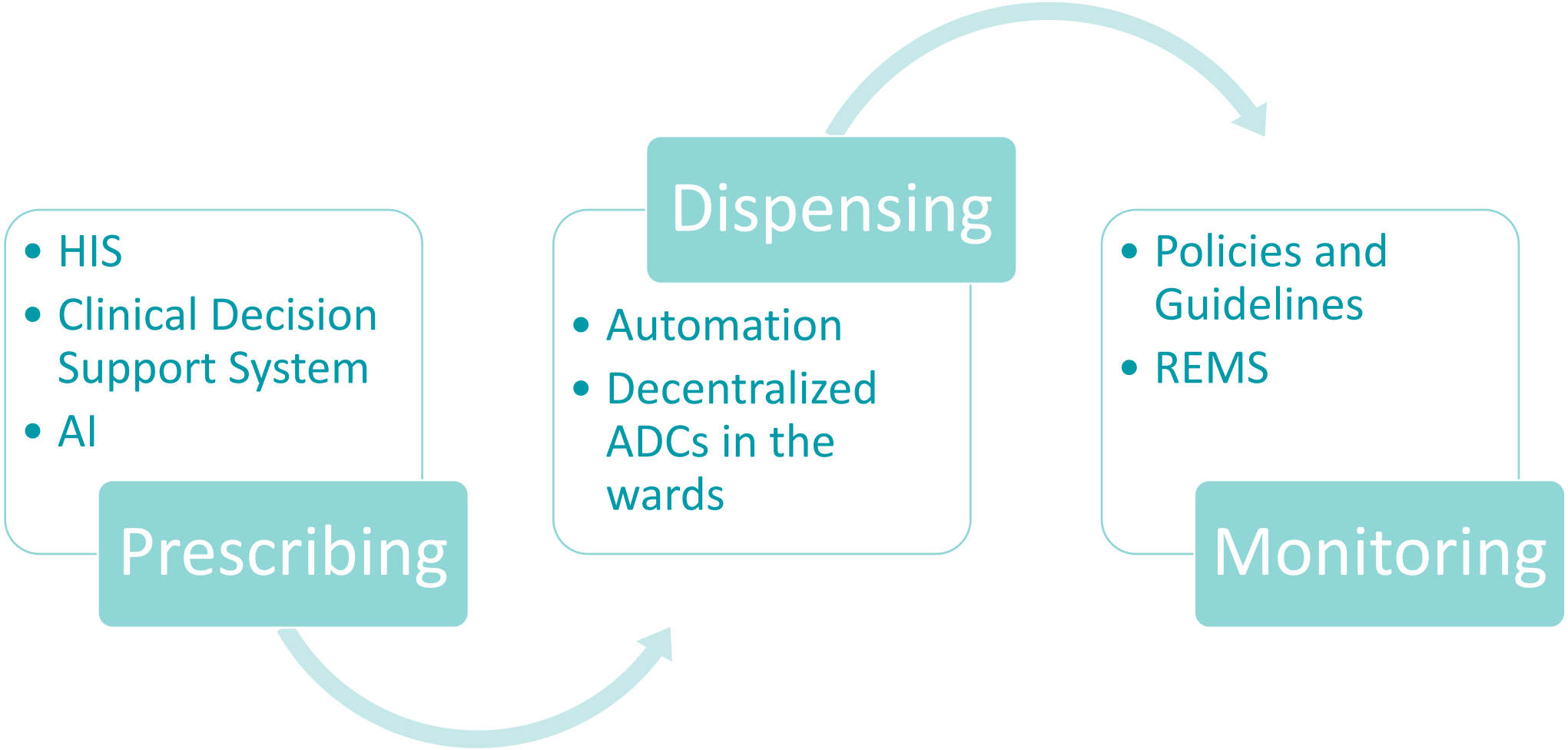
- Pharmacy Automation to streamline the Medication Management process
- Implement and Oversee the Clinical Decision within the hospital HIS
- Participate actively in development of the clinical pathways within the hospital as part of multidisciplinary Team
- Participate actively in Clinical Research

Poll 2

Establishing Pharmacotherapy Services



Improving Pharmacy Services Process



Pharmacoeconomics

- The aim of Pharmacoeconomics to ***compare*** the economics of different pharmaceutical products or to ***compare*** drug therapy to other treatments.
- Pharmacoeconomics is about making choices between options weighing the costs and benefits of option 1 with those of option 2
- There are four types of pharmacoeconomic evaluation, all of which can be applied to pharmaceutical products.
- cost-minimisation analysis(CMA)
- cost-effectiveness analysis (CEA)
- cost-benefit analysis (CBA)
- cost-utility analysis (CUA)

Pharmacotherapist & Pharmacoeconomics

- Doing the different types of pharmacoeconomic evaluation .
- Support the PTC committee to have informed decisions.
- Monitor the implementation of the recommendation to avoid loss of resources .
- Example :

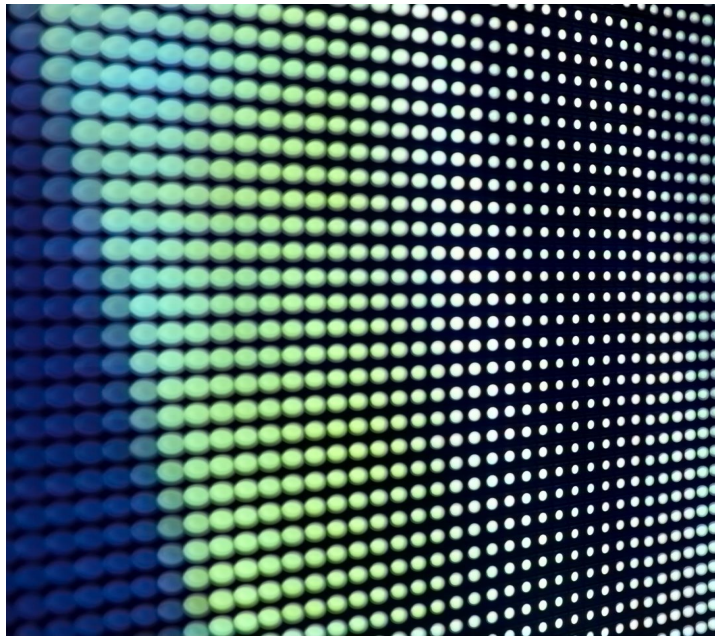
Option 1

LAI Anti-Psychotic monthly

Option 2

LAI Anti-Psychotic every 3 month

15-20 % Cost reduction



- Video
- Discussion

Pharmacogenomics

PHARMACOGENOMICS IS THE STUDY OF EFFECTS OF INHERITED GENETIC VARIATION ON AN INDIVIDUAL'S MEDICATION RESPONSE AND COMBINES PHARMACOLOGY (THE SCIENCE OF DRUG KINETICS AND DYNAMICS OF RESPONSE) AND GENOMICS (THE STUDY OF THE ENTIRE GENOME) TO OPTIMIZE MEDICATION THERAPY.

POLYMORPHISMS IN PHARMACODYNAMIC (PD) GENES CAN AFFECT DRUG ACTION AT ITS TARGET, SUCH AS A RECEPTOR, AND POLYMORPHISMS IN PHARMACOKINETIC (PK) GENES, SUCH AS THE CYTOCHROME P450 (CYP450) FAMILY OF METABOLIC ENZYMES, CAN AFFECT BLOOD AND TISSUE DRUG LEVELS

Genetic Report Interpretation

Report legend

Based on this patient's genetic profile, medications are reported and classified according to the gene-drug interactions described below.

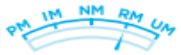
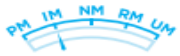
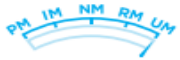
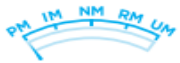
Major gene-drug interaction	Major genotype-drug interaction identified that affects the metabolism of the medication and/or indicates an elevated risk of adverse reaction or loss of efficacy.
Moderate gene-drug interaction	Moderate genotype-drug interaction identified that affects the metabolism of the medication and/or indicates an elevated risk of adverse reaction or loss of efficacy.
Minimal gene-drug interaction	Minimal genotype-drug interaction identified that does not significantly affect medication metabolism nor indicate an elevated risk of adverse reaction or loss of efficacy.
Limited pharmacogenetic impact	No pharmacogenetic variants demonstrate a significant impact on medication response. Other types of genetic tests that may guide prescribing (e.g., tumor marker testing, diagnostic, or indication-establishing testing) are not taken into account.

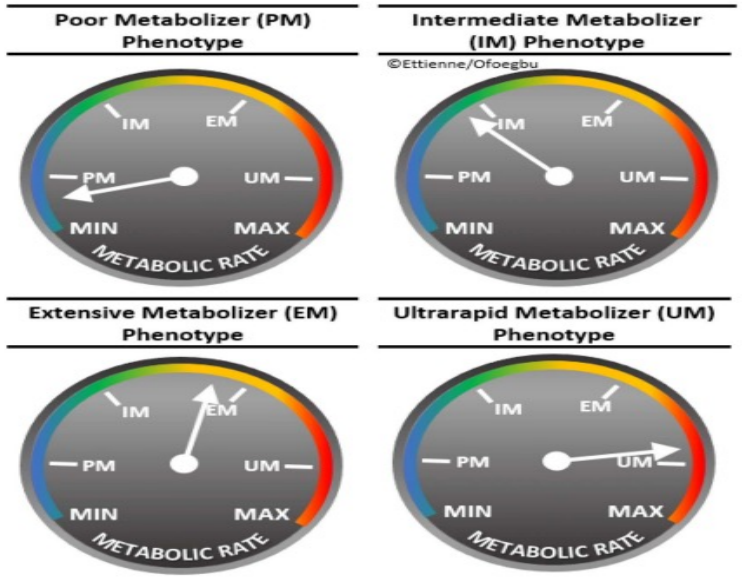
Icon legend

Some medications are reported with icons to indicate that specific clinical annotations and/or dosing guidelines provided by FDA, CPIC, or other professional associations are available in Vantage.

FDA evidence	This medication is listed on the FDA Table of Pharmacogenetic Associations. Not all genetic variants or genetic variant-inferred phenotypes may be accounted for. Further information can be found at: https://www.fda.gov/medical-devices/precision-medicine/table-pharmacogenetic-associations.
Increased exposure	Total exposure to active compound(s) may be increased. Monitor for adverse effects.
Decreased exposure	Total exposure to active compound(s) may be decreased. Monitor for lack of therapeutic response.
Difficult to predict	Total exposure to active compound(s) is difficult to predict. Monitor patient response.
Reduced response	Response to medication may be lowered due to genetic changes impacting mechanisms other than exposure (e.g. receptor function).
Additional testing	According to FDA labeling, additional laboratory testing may be indicated.
Professional guideline	Medication has professional guidelines associated with this patient's genetic test results. Avoidance, dose adjustment, or heightened monitoring may be indicated.

Gene and phenotype summary

Gene	Genotype		Phenotype summary / Metabolic status
CYP1A2	*1A/*1F		**Rapid metabolizer** Increased enzyme activity is likely based on the genotype results. This activity is more than a normal metabolizer, but less than an ultrarapid metabolizer. The metabolism of the medication affected by this gene is predicted to be increased.
CYP2B6	*1/*5		**Normal metabolizer** Fully functional enzyme activity is likely based on the genotype results. Normal metabolism of the medication affected by this gene is predicted.
CYP2C9	*2/*2		**Intermediate metabolizer** Decreased enzyme activity is likely based on the genotype results. Decreased metabolism of the medication affected by this gene is predicted.
CYP2C19	*1/*1		**Normal metabolizer** Fully functional enzyme activity is likely based on the genotype results. Normal metabolism of the medication affected by this gene is predicted.
CYP2C Cluster	rs12777823 GG		**Normal** Normal warfarin clearance associated with CYP2C rs12777823, independent of CYP2C9*2 and *3. CYP2C rs12777823, together with CYP4F2, CYP2C9, and VKORC1, influences response to warfarin therapy.
CYP2D6	*1/*2Ax2		**Ultrarapid metabolizer** Increased enzyme activity is likely based on the genotype results. The metabolism of the medication affected by this gene is predicted to be increased.
CYP3A4	*1/*1		**Normal metabolizer** Fully functional enzyme activity is likely based on the genotype results. Normal metabolism of the medication affected by this gene is predicted.
CYP3A5	*3/*3		**Poor metabolizer** Normal dosing may be required because original dosing guidelines for drugs have been established on patients with poor metabolizer phenotype.



Gene and phenotype summary (cont.)

HLA-B	Negative		**Normal risk** Negative for the presence of the HLA-B*15:02, HLA-B*57:01, and HLA-B*58:01 alleles. Normal risk of severe cutaneous reactions induced by carbamazepine, oxcarbazepine, eslicarbazepine, phenytoin, fosphenytoin, lamotrigine, and allopurinol. Normal risk of abacavir-induced hypersensitivity reaction. No increased risk of pazopanib-induced severe hepatotoxicity related to HLA-B*57:01 genotype. Hypersensitivity, severe cutaneous reactions, and severe hepatotoxicity may occur regardless of the presence of HLA-B*15:02, HLA-B*57:01, or HLA-B*58:01 alleles, in particular the presence of the HLA-A*31:01 allele has been associated with hypersensitivity reactions induced by carbamazepine and possibly other antiepileptic agents.

Genotype-predicted interactions for medications

Psychiatry

Major gene-drug interaction

- Amitriptyline 1, 2, 44, 60, 61, 201 (Elavil®)
- Atomoxetine 1, 2 (Strattera®)
- Clomipramine 1, 44, 60, 190 (Anafranil®)
- Desipramine 1, 60, 190 (Norpramin®)
- Doxepin 1, 60 (Silenor®)
- Fluvoxamine 1, 59, 72, 84, 85, 172, 173, 177, 178, 179, 183, 209 (Luvox®)
- Haloperidol 1, 2, 143, 175, 193 (Haldol®)
- Imipramine 1, 44, 60, 166, 167 (Tofranil®)
- Nortriptyline 1, 44, 61, 140, 194 (Pamelor®)
- Paroxetine 1, 2, 44, 59 (Paxil®)
- Perphenazine 1, 139 (Etrafon®)
- Pimozide 1, 193 (Orap®)
- Risperidone 1, 44, 79, 123, 211 (Risperdal®)
- Thioridazine 1
- Trimipramine 1, 60, 93, 95 (Surmontil®)
- Vortioxetine 1 (Trintellix®)

Moderate gene-drug interaction

- Asenapine 1 (Saphris®)
- Chlorpromazine 1, 145, 180 (Thorazine®)
- Fluoxetine 1, 44, 50, 54, 59, 68, 73, 105, 108, 113, 150, 155, 168, 179, 206 (Prozac®, Sarafem®)
- Mirtazapine 1, 2, 92, 107, 181, 185 (Remeron®)
- Nicotine 29, 35, 78, 130 (Nicoderm C-Q®, Nicorette®, Nicotrol®)
- Venlafaxine 1, 2, 44, 197 (Effexor®)

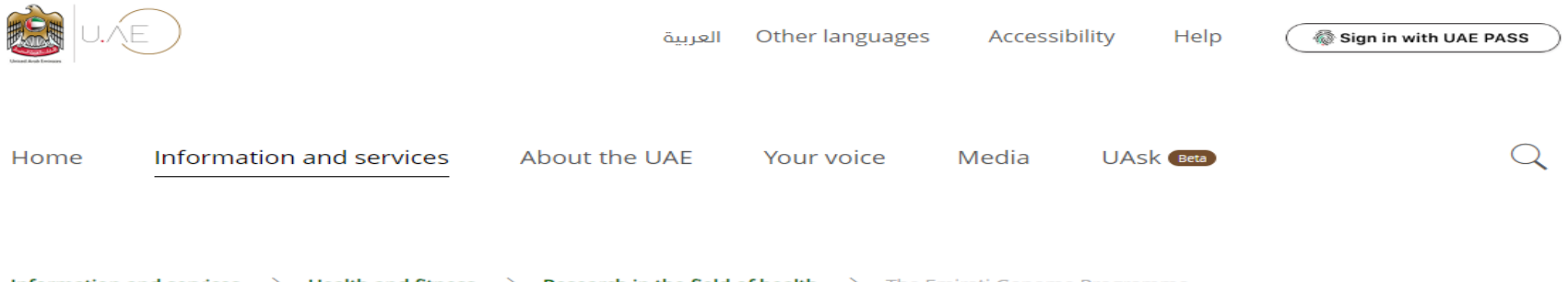
Minimal gene-drug interaction

- Alprazolam 1, 188 (Xanax®)
- Amphetamine/Dextroamphetamine mixed salts 1, 56, 67, 119 (Adderall®)
- Aripiprazole 1, 2, 79, 123 (Abilify®)
- Brexpiprazole 1, 71 (Rexulti®)
- Bupropion 1, 187, 212 (Wellbutrin®)
- Buspirone 1, 188, 213 (Buspar®)
- Carbamazepine 1, 6, 8, 25, 26, 65, 103, 112, 121, 124, 135, 146, 152, 154, 171, 208 (Carbatrol®, Tegretol®)
- Cariprazine 1, 4, 20, 27, 132 (Vraylar®)
- Citalopram 1, 2, 9, 42, 44, 59, 62, 63, 68, 86, 87, 99, 100, 104, 120, 128, 142, 151, 153, 162 (Celexa®)
- Clozapine 1, 44, 98, 190 (Clozaril®)
- Dextroamphetamine 1, 56, 67, 119 (Dexedrine®)
- Diazepam 1, 70 (Valium®)
- Escitalopram 1, 18, 42, 44, 59, 64, 68, 114, 134, 204 (Lexapro®)
- Flibanserin 1, 190 (Addyi®)
- Guanfacine 1, 117 (Intuniv®, Tenex®)
- Iloperidone 1 (Fanapt®)
- Lamotrigine 1, 8, 112, 152 (Lamictal®)
- Levomilnacipran 1 (Fetzima®)
- Lisdexamfetamine 1, 56, 67, 119 (Vyvanse®)
- Lurasidone 1 (Latuda®)

Limited pharmacogenetic impact

- Desvenlafaxine (Pristiq®)
- Lithium (Lithobid®)
- Milnacipran (Savella®)
- Naloxone (Evzio®, Narcan®)
- Paliperidone (Invega®)
- Temazepam (Restoril®)
- Varenicline (Chantix®)

UAE Genome Project



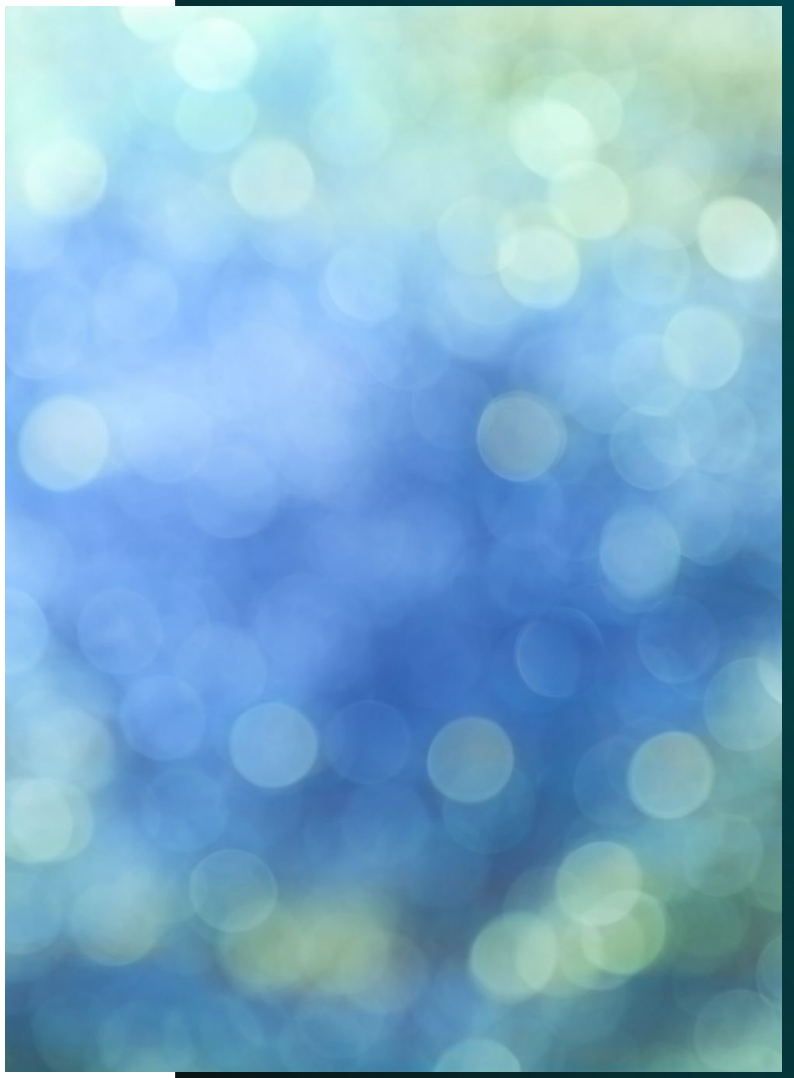
Case Scenario

- Opioid agonist treatment is an integral component of OUD management
- buprenorphine is often utilized in OUD management due to strong clinical evidence for efficacy. However, interindividual genetic differences in buprenorphine metabolism may result in variable treatment response, leaving some patients undertreated and at increased risk for relapse.
- Clinical pharmacogenomics studies the effect that inherited genetic variations have on drug response.
- patient who reported discomfort at daily buprenorphine dose of 24 mg, which was a mandated daily maximum dose .
- Regular urine screenings were conducted to detect the presence of unauthorized substances, and pharmacogenetic testing was used to determine the appropriate dose of buprenorphine for OUD management
- At the 24 mg buprenorphine daily dose, the patient had multiple relapses with unauthorized substances.
- Pharmacogenetic testing revealed that the patient exhibited a cytochrome P450 3A4 ultrarapid metabolizer phenotype, which necessitated a higher than recommended daily dose of buprenorphine (32 mg) for adequate OUD management.
- The patient exhibited a reduction in the number of relapses on the pharmacogenetic-based dose recommendation compared to standard dosing

Ettienne EB, Chapman E, Maneno M, Ofoegbu A, Wilson B, Settles-Reaves B, Clarke M, Dunston G, Rosenblatt K. Pharmacogenomics-guided policy in opioid use disorder (OUD) management: An ethnically-diverse case-based approach. Addict Behav Rep. 2017 May 8;6:8-14. doi: 10.1016/j.abrep.2017.05.001. PMID: 29450233; PMCID: PMC5800559.

Conclusion

- Pharmacogenomic testing as clinical decision support helped to individualize OUD management.
- Establishing genetic polymorphisms databases with a greater proportion of underrepresented populations to improve health equity in pharmacogenomic testing algorithms
- Developing clinical pathways for the use of pharmacogenomics at the bedside by using aggregated pharmacogenomic data to predict the appropriateness of testing.
- It is reasonable to conduct pharmacogenomic testing prior to the initiation of buprenorphine/naloxone therapy in order to determine an appropriate starting and maintenance dose.
- The use of clinical pathways can help with cost containment by limiting the use of pharmacogenomics testing to instances in which it is deemed medically necessary
- Redefining pharmacoeconomic analyses for opioid dependence costs by taking into account the use of pharmacogenomic testing and the savings associated with the prevention of downstream cost that can be ameliorated with customized medicine.



THANK YOU