

Персонализированная медицина

«Лечить не болезнь, а больного»

Гиппократ 460-370 до н.э.

Как нельзя приступить к лечению глаза, не думая о голове, или лечить голову, не думая о всем организме, так нельзя лечить тело, не леча душу.

Сократ 470-400 до н.э.

Добросовестный врач, прежде чем назначить больному лечение, должен узнать не только его болезнь, но и привычки его в здоровом состоянии, и свойства тела.

Цицерон 106-43 до н.э.



Доказательная медицина

Evidence based medicine (EBM) is the conscientious, explicit, judicious and reasonable use of modern, best evidence in making decisions about the care of individual patients. EBM integrates clinical experience and patient values with the best available research information. It is a movement which aims to increase the use of high quality clinical research in clinical decision making.

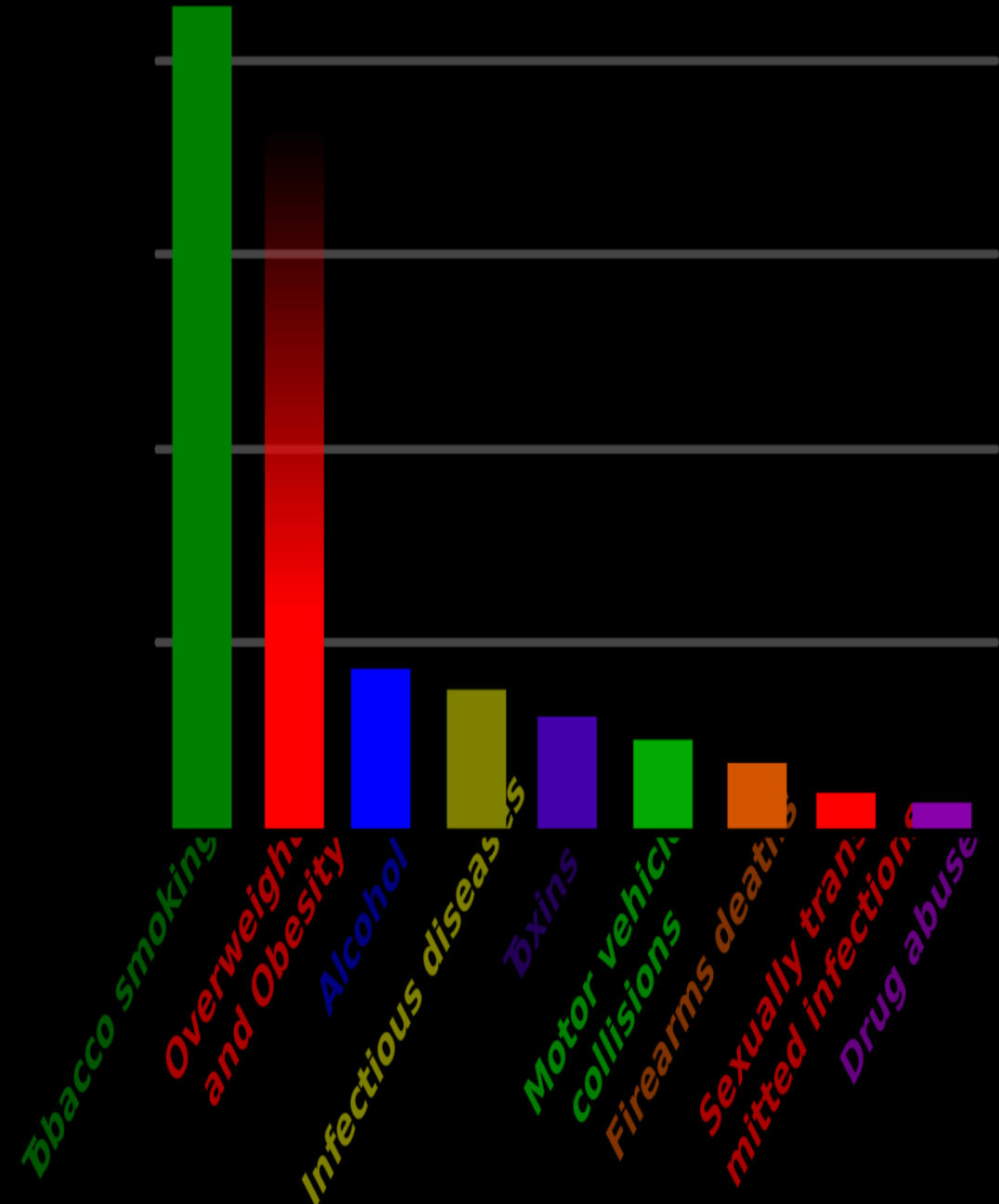
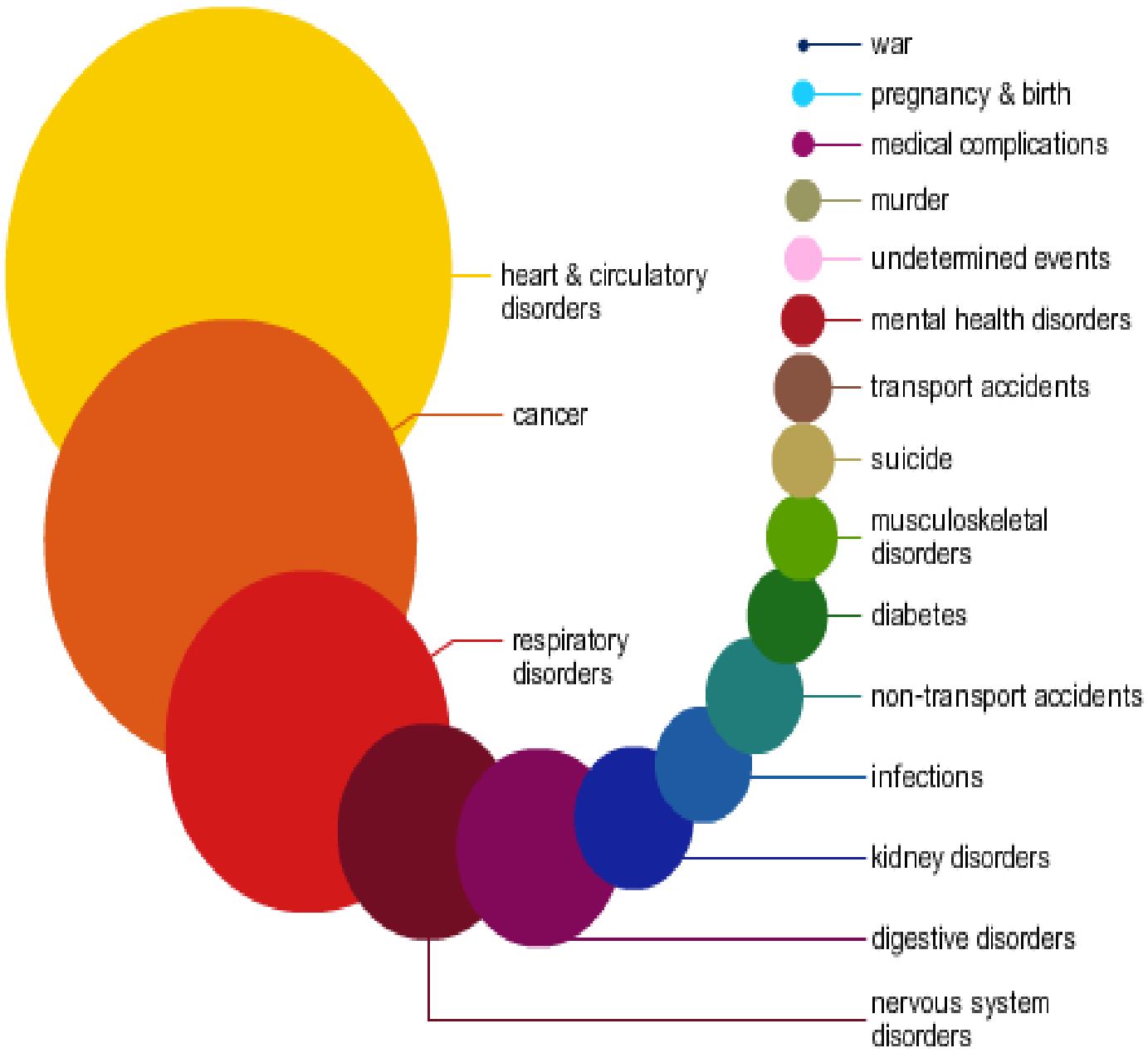
[Acta Inform Med](#). 2008; 16(4): 219–225. Published online 2008 Dec. doi: [10.5455/aim.2008.16.219-225](#) PMCID: PMC3789163 PMID: [24109156](#) Evidence Based Medicine – New Approaches and Challenges [Izet Masic](#), [Milan Miokovic](#), and [Belma Muhamedagic](#)

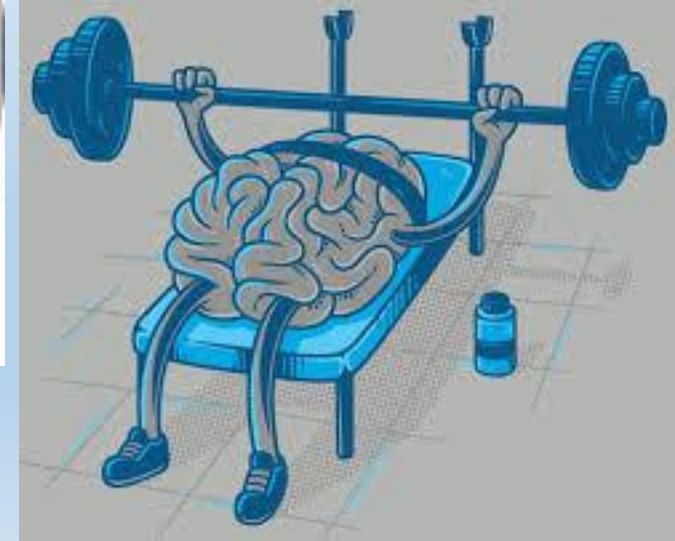
1. Экспериментальные данные
2. Мета-анализ результатов различных двойных слепых исследований
3. Клиническая практика

Процесс в доказательной медицине.

1. Определение проблемы
2. Поиск источников информации
3. Критический анализ информации
4. Использование выводов критического анализа для пациента для выбора диагностических и терапевтических мероприятий
5. Промежуточная оценка результатов (эффективность диагностики и терапии), коррекция при необходимости
6. Окончательная оценка результатов и внесение ее в базу данных

Leading causes of death in perspective

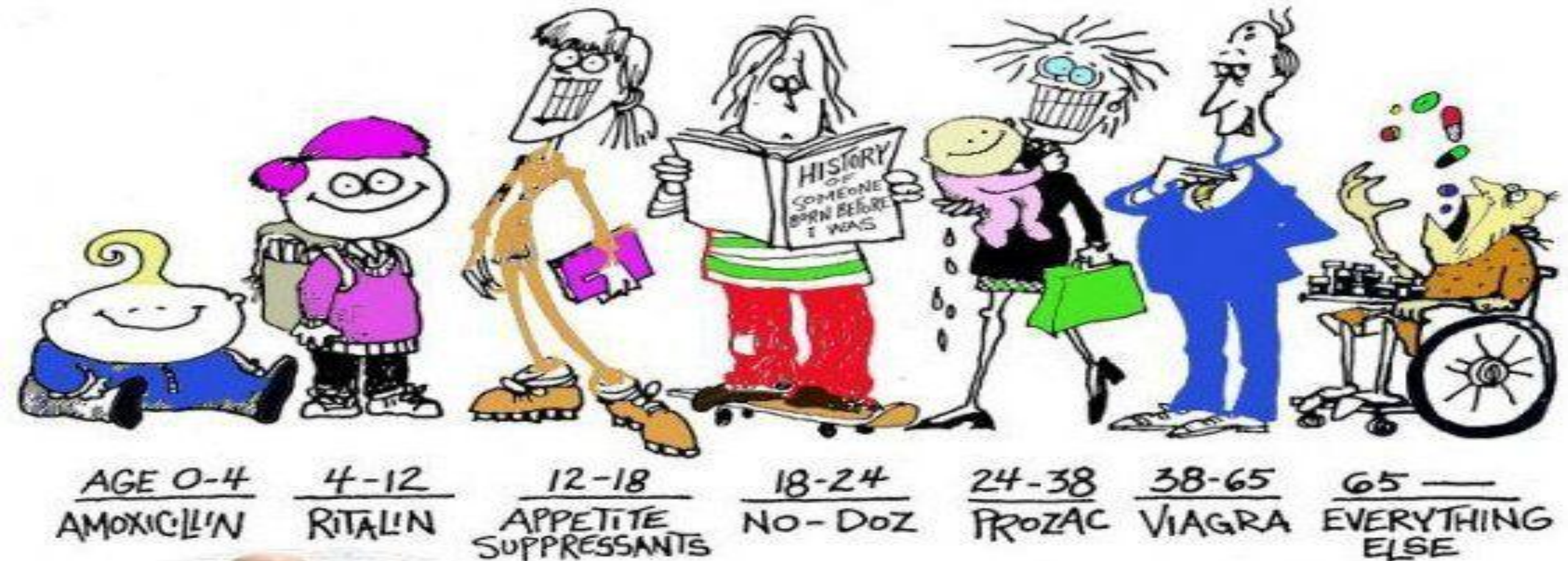




Medication Type	Purpose	Possible Side Effects, Interactions, and Special Instructions
ACE Inhibitors and ARBs	To lower blood pressure and allow blood to flow more easily from the heart	Dizziness, cough, low blood pressure. Kidneys and potassium levels should be monitored with blood tests.
Antiarrhythmics	To control irregular heartbeat	Depends on the class of drugs. Channel blockers can cause headaches, ankle swelling. Amiodarone can increase sensitivity to sunlight and affect eyesight. It may be important to monitor thyroid function and avoid grapefruit.
Antiplatelet Medications	To thin the blood and help prevent and dissolve clots in arteries and stents	Stomach pain, headache, dizziness, and breathing difficulties. Side effects more severe in patients with asthma and allergies. Take with food.
Aspirin	To prevent and dissolve clots in the arteries	Stomach upset, headaches, and drowsiness. An allergic reaction could cause breathing difficulties. Other severe side effects include blood in the stool or coughing blood. Take with food to reduce risk of upset stomach.
Beta-Blockers	To lower blood pressure and heart rate	Dizziness, fatigue, dry mouth, slow heart rate, weight gain, cold hands and feet. May reduce side effects if taken with food.
Clot Busters (Thrombolytics)	To restore blood flow during a heart attack or stroke and to break up blood clots in the legs (deep vein thrombosis)	Bleeding, abnormal heart beat, new clotting.
Coumadin (anticoagulant)	To prevent blood clots from forming in the arteries and heart	Bleeding, vomiting or coughing blood, blood in stool, headaches, and dizziness. Do not take with aspirin unless directed by doctor.
Digoxin	To improve your heart's ability to pump blood and helps to slow down an irregular heartbeat	Side effects are more common if too much is taken and may include nausea, vomiting, diarrhea, stomach pain, loss of appetite, unusual tiredness, and slow heartbeat. Take on an empty stomach, high-fiber foods can decrease its absorption.
Smoking Cessation Medication	To make it easier to stop smoking	See "SecondsCount Guide to Medications That Help you Quit Smoking"
Statins	To lower your cholesterol level and reduce the risk of heart attacks and strokes	Muscle pain, liver damage, memory loss nausea, gas, diarrhea, constipation, rash
Diuretics (Water Pills)	To lower blood pressure	Frequent urination, dehydration, blurred vision, fatigue, rash, loss of appetite. Monitor blood pressure and kidney function.
Vasodilators	To widen the blood vessels to increase the flow of blood and lower blood pressure	Headaches, nausea, and dizziness (especially older people). Do not drink grapefruit juice. May interact negatively with cold medicine.

Клиническая фармакология – перспективный проект для развития ИИ

PHARMACOLOGY



От доказательной медицины к персонализированной

Evidence-based medicine is widely promoted for decision-making in health care and is associated with improved patient outcomes. Critics have suggested that evidence-based medicine focuses primarily on groups of patients rather than individuals, but often fail to consider subgroup analyses, N-of-1 trials, and the incorporation of patient values and preferences. Precision medicine has been promoted as an approach to individualize diagnosis and treatment of diseases through genetic, biomarker, phenotypic, and psychosocial characteristics. However, there are often high costs associated with personalized medicine, and high-quality evidence is lacking for effectiveness in many applications. For the potential of personalized medicine to be realized, it must adhere to the principles of evidence-based medicine: (1) evidence in isolation is not sufficient to make clinical decisions—patient's values and preferences as well as resource implications must be considered, and (2) there is a hierarchy of evidence to guide clinical decision-making and studies at lower risk of bias are likely to provide more trustworthy findings.

Evidence-based medicine and precision medicine: Complementary approaches to clinical decision-making
Ngai Chow Lucas Gallo Jason W Busse *Precision Clinical Medicine*, Volume 1, Issue 2, 1 September 2018, Pages 60–64, <https://doi.org/10.1093/pcmedi/pby009>

Персонализированная медицина

Personalised medicine is a move away from a ‘one size fits all’ approach to the treatment and care of patients with a particular condition, to one which uses new approaches to better manage patients’ health and targets therapies to achieve the best outcomes in the management of a patient’s disease or predisposition to disease.

(National Healthcare Service England)

1. Экономическая перспективность подхода относительно метода проб и ошибок
2. Снижение стоимости геномных исследований
3. Расширение показаний вне онкологического поля

Превентивная и профилактическая медицина

- **200**

- The average number of **food decisions** you make per day.

- **3:1**

- Research shows that what you eat is **3X more important** than physical activity.

- **\$1,429**

- People with **diet-related chronic conditions** cost health plans, on average, this much more.

Прецизионная медицина

A form of medicine that uses information about a person's genes, proteins, and environment to prevent, diagnose, and treat disease. In cancer, personalized medicine uses specific information about a person's tumor to help diagnose, plan treatment, find out how well treatment is working, or make a prognosis. Examples of personalized medicine include using targeted therapies to treat specific types of cancer cells, such as HER2-positive breast cancer cells, or using tumor marker testing to help diagnose cancer. Also called precision medicine.

(National Cancer Institute)

[Pharmacogenomics](#) is a part of precision medicine. Pharmacogenomics is the study of how genes affect a person's response to particular drugs. This relatively new field combines pharmacology (the science of drugs) and genomics (the study of genes and their functions) to develop effective, safe medications and doses that are tailored to variations in a person's genes. (NIH guidance)

WITHOUT

PRECISION MEDICINE

PATIENT



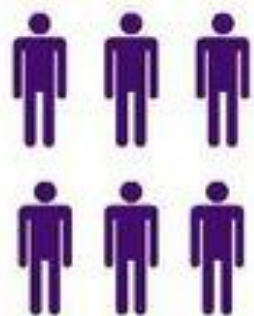
SAME THERAPY



SOME BENEFIT,
OTHERS DO NOT



BENEFIT



NO BENEFIT



ADVERSE EFFECTS



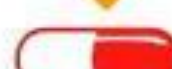
WITH

PRECISION MEDICINE

EACH PATIENT BENEFITS



DNA TESTS



TAILORED
THERAPY

USA
TODAY

Биоэтика и экономика.

1. Ложно положительные результаты тестов и профилактическая хирургия
2. Отсутствие 100% гарантии результата при резком росте стоимости диагностики и терапии
3. Конфиденциальность генетических данных/страховая политика
4. Вовлеченность пациента и готовность к изменениям

Система поддержки принятия решения и человеческий фактор

Почему профессия врача стоит в самом конце списка специальностей под замены роботами и искусственным интеллектом

Application of artificial intelligence to pharmacy and medicine.

Artificial intelligence (AI) is a branch of computer science dealing with solving problems using symbolic programming. It has evolved into a problem solving science with applications in business, engineering, and health care. One application of AI is expert system development. An expert system consists of a knowledge base and inference engine, coupled with a user interface. A crucial aspect of expert system development is knowledge acquisition and implementing computable ways to solve problems. There have been several expert systems developed in medicine to assist physicians with medical diagnosis. Recently, several programs focusing on drug therapy have been described. They provide guidance on drug interactions, drug therapy monitoring, and drug formulary selection. There are many aspects of pharmacy that AI can have an impact on and the reader is challenged to consider these possibilities because they may some day become a reality in pharmacy.

[Hosp Pharm.](#) 1992 Apr;27(4):312-5, 319-22.

Вопросы к зачету:

1. Понятия и отличия доказательной и прецизионной медицины
2. Предотвратимые причин смерти, превентивная и профилактическая медицина
3. Биоэтика в прецизионной медицине

СПАСИБО ЗА ВНИМАНИЕ
И
ДО ВСТРЕЧИ НА ЗАЧЕТЕ

