



Introduction into the study of internal medicine.  
Subspecialties of internal medicine, their basic diagnosis.  
History of internal medicine.

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# History



# History of internal medicine

- Internal diseases recognized in Old China, India (Ájurvéda), Greeks (Hippocrates, Galenos)
- Separation from surgery 16<sup>th</sup> ct.
- Giovanni Battista Morgagni (1682-1771),
  - Anatomist, 18<sup>th</sup> ct., anatomical pathology, , disease is localized in an organ/tissue
  - „Anatomically found seats and causes of disease in five books“ (1761)



# History of internal medicine

- Laboratory, Bacteriology, biochemistry (R.Koch, P.Ehrlich, L.Pasteur) 19<sup>th</sup> ct.
- Clinico-anatomical medicine in 18-19<sup>th</sup> ct.
- First congress of „internal medicine“ Wiesbaden 1882

## A. Mitglieder und Theilnehmer

des ersten

Congresses für innere Medicin.

### Der Vorstand.

- 1) **Erster Vorsitzender:** Herr Th. Frerichs (Berlin). Geheime Ober-Medicinalrath Professor Dr.
- 2) **Zweiter Vorsitzender:** Herr Geheime Hofrath Prof. Dr. C. Gerhardt (Würzburg).
- 3) **Schriftführer:** Herr Prof. Dr. Ewald (Berlin).  
„ Prof. Dr. Finkler (Bonn).
- 4) **Geschäftscommission:**  
Herr Geheime Hofrath Prof. Dr. C. Gerhardt (Würzburg).  
„ Geheime Medicinalrath Prof. Dr. Kussmaul (Strassburg).  
„ Geheime Medicinalrath Prof. Dr. Landois (Berlin).



# History of physical examination

- J.L. Auenbrugger 1722-1809
  - „Inventum novum ex percussione thoracis humani ut signo abstruso interni pectoris morbos detergendi“
- J.N. Corvisard translates the book into french 50 years later
- His pupil T.R.H. Laennec (1755-1826), indirect auscultation in 1819



# T.R.H.Laennec (1755-1826)





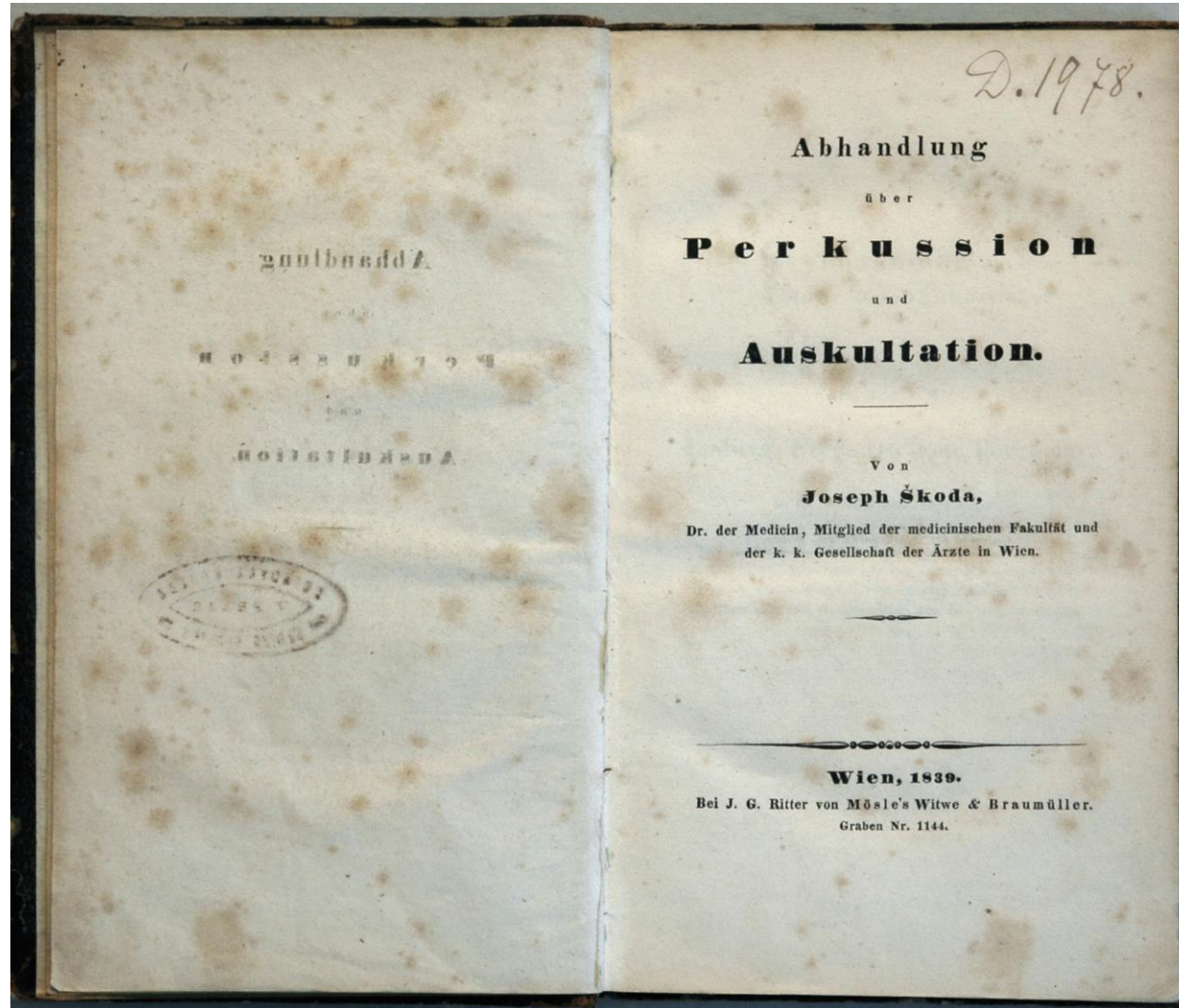


## Viennese school

- Jozef Skoda (1805-1881), percussion, auscultation
- Karl Rokitansky (1804-1878) pathologist, correlation with pathological findings



# Viennese school

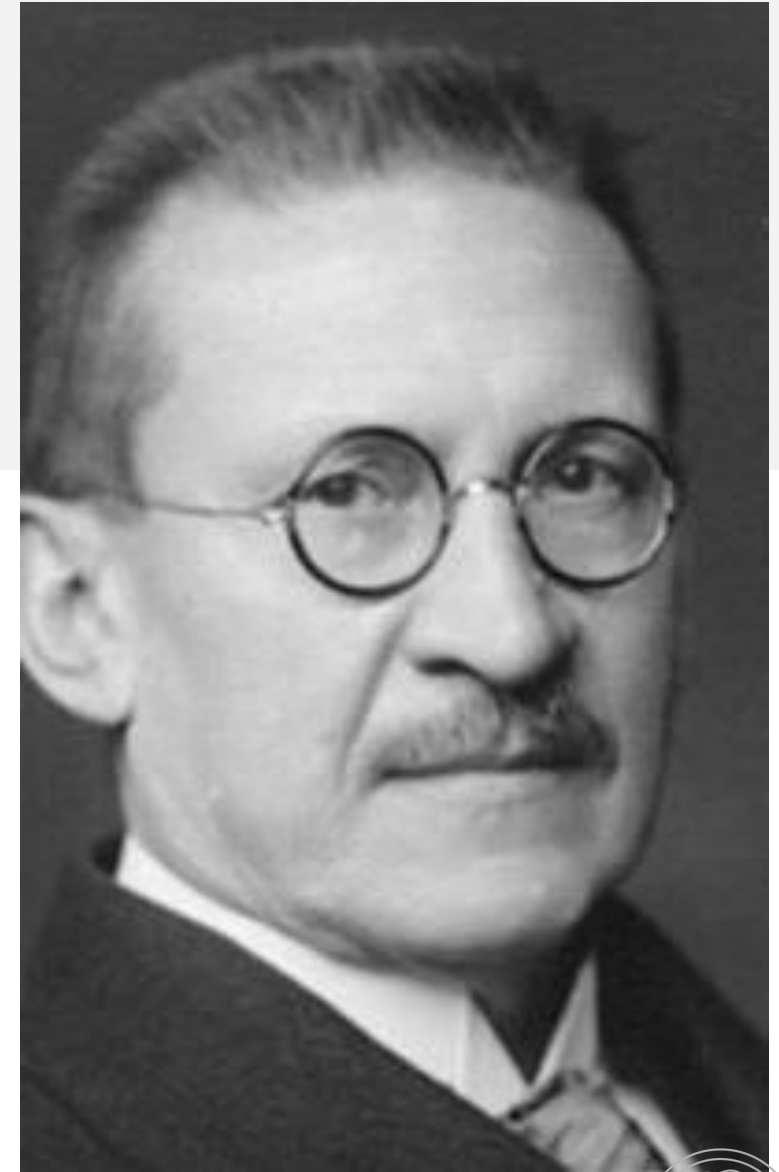




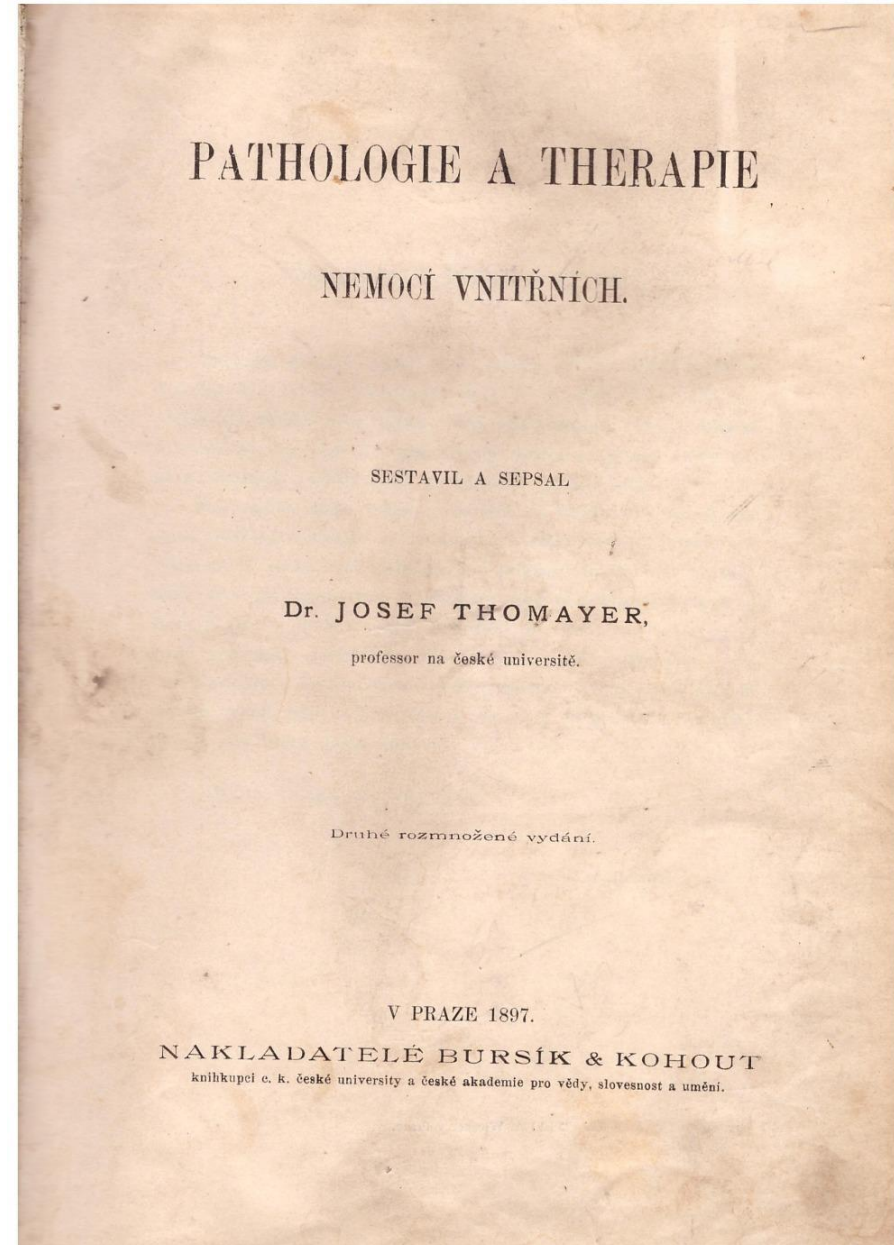


## Czech (Prague) school

- Jozef Thomayer (1853-1927)
- Ladislav Syllaba (1968-1930)
- Jiří Syllaba
- Josef Pelnář
- Bohumil Prusík



# Czech (Prague) school





# Slovak school

- **Prof. Kristián Hynek (1879-1960)**
  - LF UK founder 1919
  - first rektor UK,
  - First chair of I. internej kliniky
- **Prof. Miloš Netoušek (1889-1968)**
  - Pupil of prof. Syllaba
  - Books: Vnitřní Lékařství, Hematolória
- **Prof. Emanuel Filo**
  - Pupil prof. Syllaba
- **Prof. Ladislav Dérer (1897-1960)**
  - Book: Propedeutika vnútorného lekárstva







# Slovak School

- **Prof. Mikuláš Ondrejička**
  - Book: Vnútorné choroby
- **Prof. Dionýz Dieška (1914-2006)**
  - Postgraduate education
- **Prof. Miroslav Mikulecký**
  - Modern statistical methods
- **Prof. Teofil Rudolf Niederland (1915-2003)**
  - Biochemistry lab.
- **Prof. Ivan Ďuriš (1933-2014)**
  - Book: Princípy internej medicíny



# Internal medicine, Innere Medizin, Medicine interne, Vnútorné lekárstvo, Vnitřní lékařství

## Origin

- Probably from german (Innere Medizin) 19<sup>th</sup> ct.
- Initially characterized by inquiry of internal pathological causes of symptoms and syndrome using clinical reasoning at the bedside and laboratory investigations
- 1st. congress 1882 in Wiesbaden





Internal medicine today





# Internal medicine, Innere Medizin, Medicine interne, Vnútorné lekárstvo, Vnitřní lékařství

## Definition

- Medical specialty dealing with **prevention, diagnosis, and treatment** of internal diseases
- Internal diseases are manifested by:
  - Clinical symptoms and syndromes
  - Involvement of multiple organ systems
  - Changes in laboratory parameters
  - Changes on medical imaging investigations
  - Histological changes
  - And/or synchronous multiple pathologies



# Internal medicine, Innere Medizin, Medicine interne, Vnútorné lekárstvo, Vnitřní lékařství

## Characteristics

- Patients with internal disease are often severely ill, requiring nursing care, complex investigations, thus, internists practice mostly (but not exclusively) in **hospitals**
- Internists play a key role in **medical teaching** and in research for **new diagnostic** and **therapeutic modalities**



# Goals of internal medicine 1.

## **Disease prevention**

- Measures to prevent the occurrence of disease
  - Vaccination
  - Healthy life style
    - Smoking cessation
    - Reducting alcohol consumption
    - Physical activity
    - Normal body weight hmotnosti
    - Mental wellbeing
    - Working enviroment
    - Social wellness
    - .....





# Goals of internal medicine 2.

## Early diagnosis of diseases

Searching for a disease in a population, healthy or at risk = screening

### Preventive checkups

- BMI,
- waist circumference,
- blood pressure,
- glucose, cholesterol, ALT,
- urinalysis
- Tumor screening in the entire population
  - Colorectal cancer > 50 years, occult. bleeding
  - Prostate cancer - PSA >50 years
  - Breast and cervical cancer > 40 years Check marks
- Tumor screening in a population at risk
  - Smokers, alcohol consumers, obese individuals
  - Family history of tumors at a young age



# Goals of internal medicine 3.

## **Diagnosing patients**

- Histories
- Physical examination
- Basic complementary exams
- Other complementary exams



# Diagnosis

## Stage 1.





# Diagnosis Stage 2.

## Physical examination

### Vital functions

- State of consciousness (Glasgow coma scale)
- Blood pressure, pulse, O2 saturation, respiratory rate
- Presence status generalis:
  - consciousness, contact, orientation, position, posture, walking, skeleton, muscles, limbs, skin
  - Height, weight, waist circumference
- Status presens organorum:
  - head, neck, chest, abdomen, limbs
- Physiological functions:
  - Functional status, urine, stool, nutritional status



# Diagnosis Stage 3.

## EKG

- basics

## X-ray

- Description of chest and abdominal X-ray

## Basic labs

- Biochemistry
- Hematology
- **Urinalysis**



# Diagnosis Stage 4.

## Auxiliary examinations

### Non-invasive examinations

- Laboratory tests:
  - Blood, urine, cerebrospinal fluid, effusions...
  - Serology and microbiology
  - Cytology
  - Genetics
  - Imaging examinations – USG, CT, MRI, PET, nuclear medicine

### Invasive examinations

- Endoscopic methods - GIT - upper, lower, + others (ERCP, EUS, cholangio, enteroscopy), laryngo-tracheo-bronchoscopy, tissue biopsies B
- Biopsies of organs – liver, kidney, bone marrow, pancreas, skin, muscle
- Invasive angiography - brain, heart, peripheral. vessels, abdominal vessels



# Goals of internal medicine 4.

## Treatment

1. Improve survival
  - Median (months, years ...)
2. Improve quality of life
  - QALY – quality adjusted life year





# Treatment hierarchy

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## **Causal treatment**

Treating the cause of disease

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## **Curative treatment**

Aiming to cure the disease

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## Paliative treatment

Aiming to improve survival and the quality of life

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## Symptomatic treatment

Aiming to improve the quality of life



# Treatment modalities

## 1.

### Non-pharmacological treatment

- Diet
  - diabetic, with salt, fat, urate restriction, gluten-free, CDED, residue-free, with increased fiber content, with protein restriction...
- Physical activity
  - rehabilitation, resistance, aerobic exercises
- Change of environment
  - eliminate allergens or irritants from the environment, desensitization
- Use of physical methods
  - electrical impulses - defibrillation, cardioversion, stimulation, X-ray radiation - radiotherapy, beta brachytherapy, cryotherapy, physical cooling, heating
- Transfusion



# Treatment modalities 2.

## **Pharmacological therapy**

- Dosing
  - 1-6x/d, once a week, month
- Routes of administration
  - po, sc, iv, im, enema
- Mechanisms of action
  - pharmacodynamic
  - biological
  - cystostatic
  - immunosuppressive
  - ...



# Treatment modalities 3.

## Interventional treatment

### Cardiology and angiology:

- cardiac stimulation, implantation of resynchronization therapy, defibrillator, percutaneous angioplasty, implantation of vascular stents, percutaneous implantation of valves, caval filters, thrombectomy

### Gastroenterology and hepatology

- ERCP, cholangioscopy, lithiasis extraction, stent implantation, endosonographic drainage, anastomosis implantation, intrahepatic shunt implantation (TIPSS), bariatric interventions, gastrostomy
- Radiofrequency ablation of tumors and precancers Vascular interventions for bleeding, tumor embolization .....

### Nephrology

- peritoneal dialysis, hemodialysis, hemofiltration

### Rheumatology, hematology

- Plasmapheresis

### Hematology

- Transplantation: bone marrow, stem cells





# Treatment modalities 4.

## **Surgical treatment**

Valve replacement

Vascular bypasses

Resections for tumors or inflammatory conditions

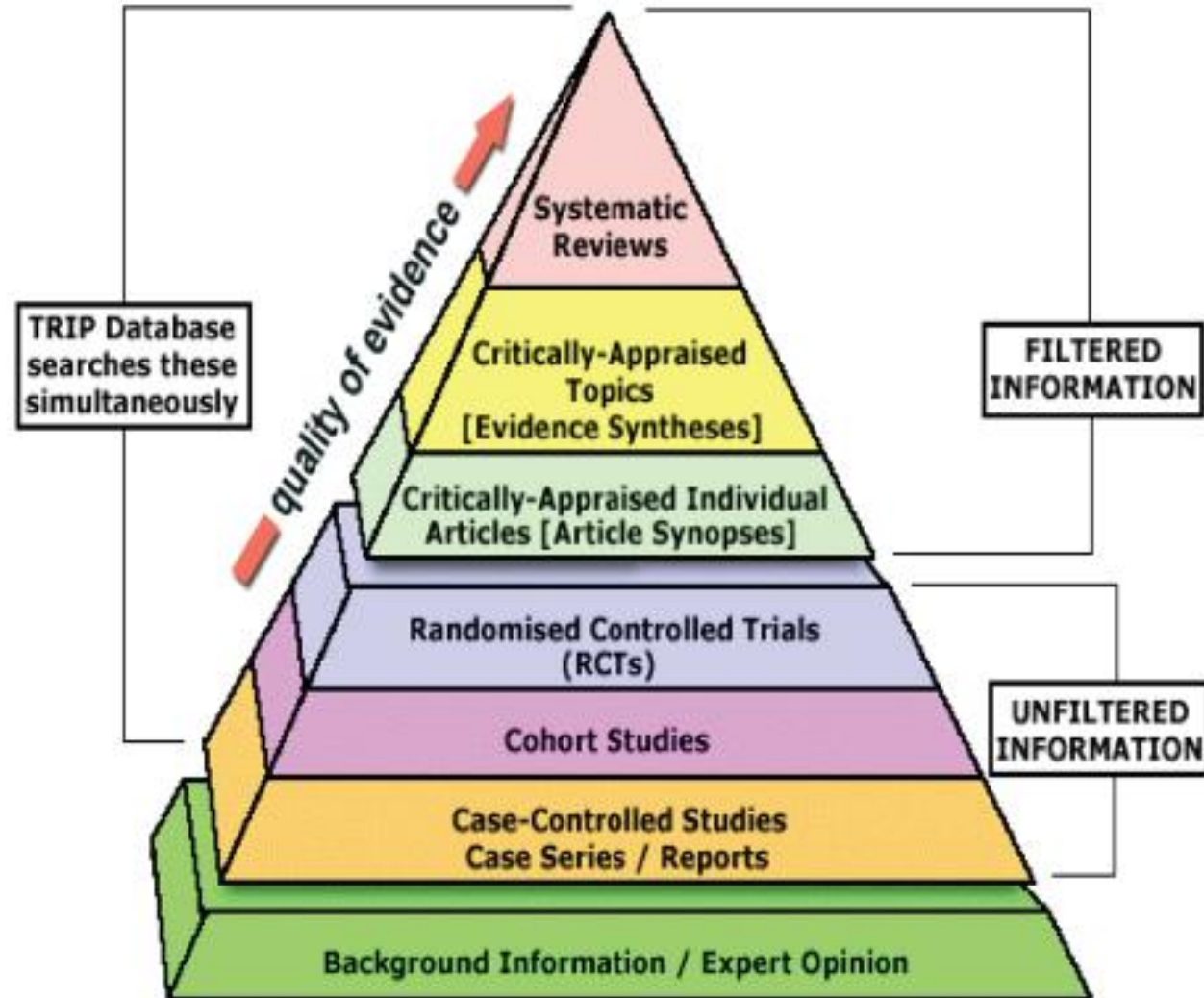
Removal of organs - splenectomy, colectomy, nephrectomy, CHE

Organ transplants: kidney, liver, pancreas, small intestine, lungs Joint replacements

Bariatric operations .....



# Evidence based medicine



Internal  
medicine,  
Innere Medizin,  
Medicine  
interne,  
Vnútorné  
lekárstvo,  
Vnitřní lékařství



### **Scope of internal medicine**

As knowledge increases, the scope of the field is huge, therefore sub-specializations of internal medicine and other sub-sub-specializations are created



Internal  
medicine,  
Innere Medizin,  
Medicine  
interne,  
Vnútorné  
lekárstvo,  
Vnitřní lékařství

## **Sub-specializations**

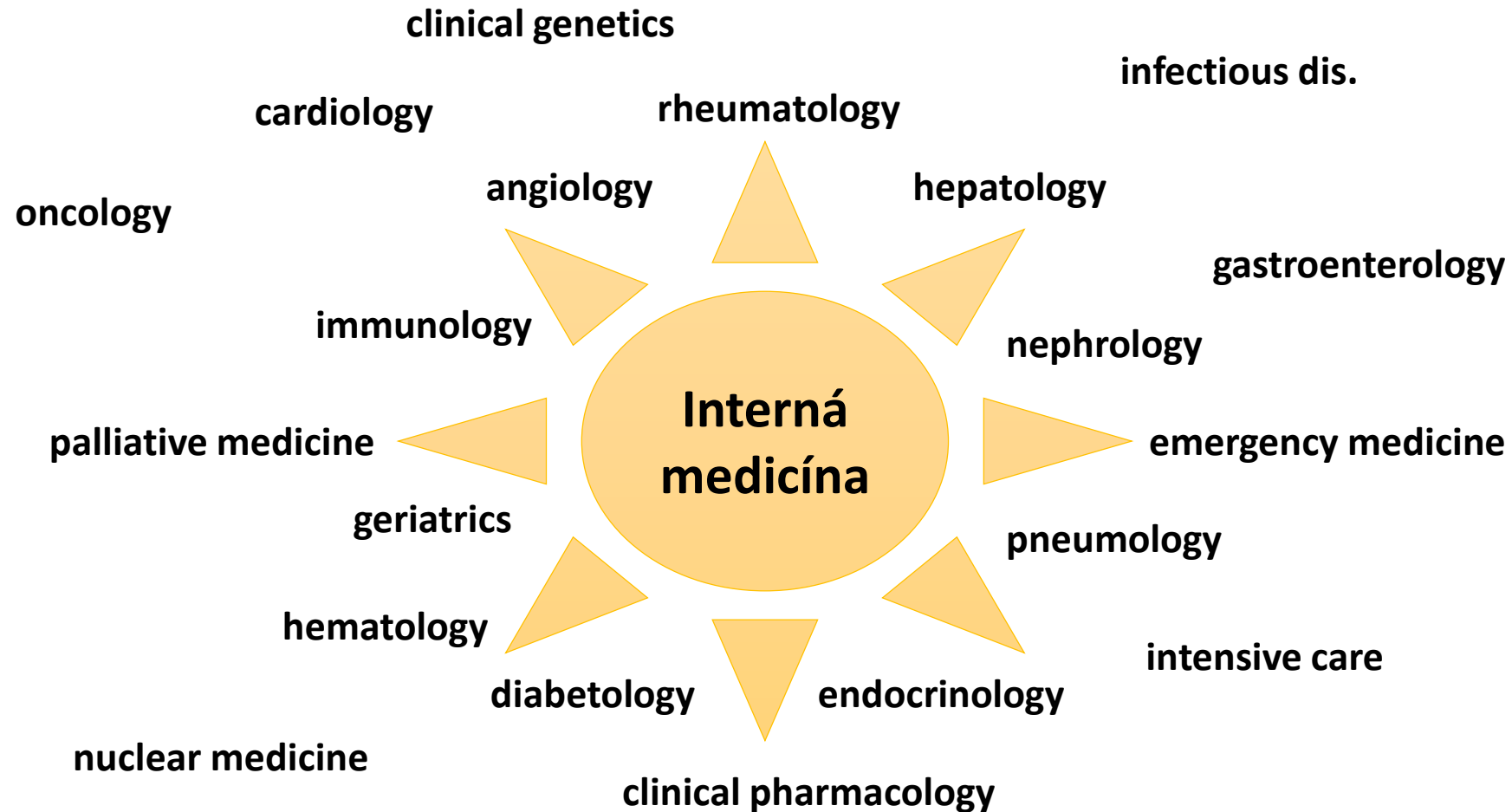
- Sub-fields of internal medicine are based on its principles but study, diagnose and treat diseases of mainly one organ system
- They originate from a common internist trunk (2 years)
- They use the same clinical, laboratory and imaging base that they develop further
- Some also use instrumental diagnostic and therapeutic procedures







# Internal medicine sub-specialties



# Atomization of sub-specialties

## **Cardiology**

- Preventive
- **Angiology**
- Arrhythmias
- Interventional cardiology
- Heart transplant

## **Gastroenterology**

- Interventional luminal
- Interventional pancreato-biliary
- IBD
- **Hepatology**
- Liver transplantation



## Subspecialties v.s internal medicine

- SK: today either Internal Medicine or
  - a common „internist trunk,, and a specialty
  - a second (third) specialization is also possible - internal medicine + XX + XX
- DE:
  - 25% of specialists were also internists, 50% private
- UK:
  - 37% of specialists were also internists, 95% two specialties
- USA:
  - specialists in internal medicine are approaching general practitioners in their practice





# Nobel prize laureates Medicine and physiology

## Vítězi

Ardem Patapoutian  
2021



David Julius  
2021



Michael Houghton  
2020



Charles M. Rice  
2020



Harvey J. Alter  
2020



William G. Kaelin  
2019



Gregg L. Semenza  
2019



Peter J. Ratcliffe  
2019



James P. Allison  
2018



Tasuku Hondžó  
2018



Michael W. Young  
2017



Michael Rosbash  
2017



Jeffrey C. Hall  
2017



Ōsumi Yoshinori  
2016



William C. Campbell  
2015



Satoši Ōmura  
2015



Tchu Jou-jou  
2015



Edvard Moser  
2014



May-Britt Moserová  
2014



John O'Keefe  
2014



John Gurdon  
2012



Jules Hoffmann  
2011



Ralph M. Steinman  
2011



Bruce Beutler  
2011



Robert G. Edwards  
2010



Jack W. Szostak  
2009



Elizabeth Blackburnová  
2009



Carol Greiderová  
2009



Françoise Barré-Sinoussi  
2008



Luc Montagnier  
2008



Harald zur Hausen  
2008



Mario Capecchi  
2007



Martin Evans  
2007



Oliver Smithies  
2007



Craig C. Mello  
2006



Andrew Fire  
2006



Robin Warren  
2005



Barry Marshall  
2005



Linda B. Bucková  
2004



Richard Axel  
2004



Peter Mansfield  
2003



Paul Lauterbur  
2003



John Sulston  
2002



Sydney Brenner  
2002





# Internal medicine curriculum

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# Internal medicine

The development of the professional qualities of a doctor **is lifelong**

1. **Ability to communicate effectively and efficiently with the patient**
  - Get information verbally and non-verbally
  - Friendly conversate, observe and analyze
2. **Ability to perform thorough physical examination according to context**
3. **Ability to communicate and document the acquired clinical findings**
  - Documentation (health records)
  - Communicate (with a patient, with a relative, with a colleague, with a superior)
4. **Ability to evaluate basic auxiliary examinations**
  - Blood count, biochemistry, X-ray, US
5. **Interpret and formulate the obtained information into a dg. hypotheses**
6. **Carefully select and be able to interpret other complementary exams**
  - To limit the suffering of the patient during the examination
  - Shorten the diagnostic process and do not delay effective treatment
  - Streamline the personnel, material and financial resources spent
7. **Ability to establish a treatment plan (patient management)**













# Internal medicine full curriculum

- **Internal propedeutics** 1 semester (exam 3.y)
- **Internal medicine** 4 semesters (exam 5.y)

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- **State exam Internal medicine** 3 months bloc (6.y)
- **Common trunc Internal medicine** 2 years, rounds
- **Specialty Internal medicine or subspeciality** 2.5-4 years







SINCE 1828

GAMES & QUIZZES

THESAURUS

propaedeutics

Dictionary

The

# propaedeutic noun



Save Word

pro·pae·deu·tic | \ ,prō-pi-'dū-tik , -'dyü- \

## Definition of *propaedeutic*


: preparatory study or instruction

# Scope of propaedeutic of internal medicine

1. Symptoms + clinical features
2. Syndromology
3. Formulation of diagnostic hypothesis
4. Differential diagnosis
5. Basic laboratory and imaging methods
  - ECG, X-ray chest and abdomen
6. Basic blood tests (KO, bioch) Urine analysis
7. Causal diagnosis



# symptom

Pronunciation: /'sɪm(p)təm/ 



## NOUN

- 1 A physical or mental feature which is regarded as indicating a condition of disease, particularly such a feature that is apparent to the patient:  
*'dental problems may be a symptom of other illness'*  
Compare with [sign](#) (sense 1 of the noun).

- 1 a change in your body or mind that shows that you are not healthy
- *flu symptoms*
  - *Look out for symptoms of depression.*
  - *Symptoms include a headache and sore throat.*

## Medical Definition of SYMPTOM

: subjective evidence of disease or physical disturbance observed by the patient <headache is a *symptom* of many diseases> <visual disturbances may be a *symptom* of retinal arteriosclerosis>;  
*broadly* : something that indicates the presence of a physical disorder—compare [sign](#) 2

**príznak** -u m.

charakteristický znak, symptóm; rozlišujúca črta: [príznaky choroby, krízy](#); [lingv. slovo s príznakom hovorovosti](#);

slex.sk

# Symptomatology

- Key component of internal medicine
- A science
- An alphabet of medicine and professional communication and documentation



# Standardized nomenclature





ICD-10 Version:2016 X ICD-10 Chapter XVIII: Symp

apps.who.int/classifications/icd10/browse/2016/en#/R50-R69

Presný čas PubMed home Search Livertox CDAI Calculator IBD Le Figaro - Actualités Liverpool HEP ŠÚKL: Vyhľadanie SHMÚ.sk - Textová GastroHep - the Tchnet.cz 13081 BLINDED CSOnline s16

## ICD-10 Version:2016

Search [Advanced Search] ICD-10 Versions - Languages Info

- XII Diseases of the skin and subcutaneous tissue
- XIII Diseases of the musculoskeletal system and connective tissue
- XIV Diseases of the genitourinary system
- XV Pregnancy, childbirth and the puerperium
- XVI Certain conditions originating in the perinatal period
- XVII Congenital malformations, deformations and chromosomal abnormalities
- XVIII Symptoms, signs and abnormal findings, not elsewhere classified
  - R00-R09 Symptoms and signs involving the circulatory and respiratory systems
  - R10-R19 Symptoms and signs involving the digestive system and abdomen
  - R20-R23 Symptoms and signs involving the skin and subcutaneous tissue
  - R25-R29 Symptoms and signs involving the nervous and musculoskeletal systems
  - R30-R39 Symptoms and signs involving the urinary system
  - R40-R46 Symptoms and signs involving cognition, perception, emotional state and behaviour
  - R47-R49 Symptoms and signs involving speech and voice
  - R50-R69 General symptoms and signs
  - R70-R79 Abnormal findings on examination of blood, without diagnosis
  - R80-R82 Abnormal findings on examination of urine, without diagnosis
  - R83-R89 Abnormal findings on examination of other body fluids, substances and tissues, without diagnosis
  - R90-R94 Abnormal findings on diagnostic imaging and in function studies, without diagnosis
  - R95-R99 Ill-defined and unknown causes of mortality
- XIX Injury, poisoning and certain other consequences of external causes

### International Statistical Classification of Diseases and Related Health Problems 10th Revision (ICD-10)-WHO Version for ;2016

**R00-R09** Symptoms and signs involving the circulatory and respiratory systems

**R10-R19** Symptoms and signs involving the digestive system and abdomen

**R20-R23** Symptoms and signs involving the skin and subcutaneous tissue

**R25-R29** Symptoms and signs involving the nervous and musculoskeletal systems

**R30-R39** Symptoms and signs involving the urinary system

**R40-R46** Symptoms and signs involving cognition, perception, emotional state and behaviour

**R47-R49** Symptoms and signs involving speech and voice

**R50-R69** General symptoms and signs

**R70-R79** Abnormal findings on examination of blood, without diagnosis

**R80-R82** Abnormal findings on examination of urine, without diagnosis

**R83-R89** Abnormal findings on examination of other body fluids, substances and tissues, without diagnosis

**R90-R94** Abnormal findings on diagnostic imaging and in function studies, without diagnosis

**R95-R99** Ill-defined and unknown causes of mortality

**R50-R69 General symptoms and signs**

**R50.9** **Fever, unspecified**

Hyperpyrexia NOS

Pyrexia NOS

**Excl.:** malignant hyperthermia due to anaesthesia ([T88.3](#))

**R51** **Headache**

**Incl.:** Facial pain NOS

**Excl.:** atypical facial pain ([G50.1](#))

**R00.0 Tachycardia, unspecified**

Rapid heart beat

Tachycardia:

- sinoauricular NOS
- sinus [sinusal] NOS

**R00.1 Bradycardia, unspecified**

Bradycardia:

- sinoatrial
- sinus
- vagal

Slow heart beat

Use additional external cause code (Chapter XX), if desired, to identify drug, if drug-induced.

**R00.2 Palpitations**

Awareness of heart beat



Medical Dictionary

sign   
noun | \ˈsīn\

- 2 : an objective evidence of disease especially as observed and interpreted by the physician rather than by the patient or lay observer <narrow retinal vessels are a *sign* of arteriosclerosis>—see *brudzinski sign*, *chvostek's sign*, *homans' sign*, *kernig sign*, *physical sign*, *placental sign*, *romberg's sign*, *tinel's sign*, *vital signs*, *von graefe's sign*; compare *symptom*

## Medical Dictionary

syndrome  

*noun* | syn·drome | \ˈsin-ˌdrōm also -drəm\

### Medical Definition of SYNDROME

: a group of signs and symptoms that occur together and characterize a particular abnormality

Syndróm sa skladá minimálne 1 z:

Príznakov

Znakov

(Laboratórny nález)

(Zobrazovací nález)

Syndrome consists of one or more of:

Symptoms

Clinical signs

(Labs)

(Imaging)

# Diagnosis (διαγνωσις)

## diagnosis noun

di·ag·no·sis | \ ,dī-ig-'nō-səs 🔊, -əg-\

plural **diagnoses** \ ,dī-ig-'nō-.sēz 🔊, -əg-\

### Definition of *diagnosis*

- 1 **a** : the art or act of identifying a disease from its signs and symptoms  
**b** : the decision reached by diagnosis  
*// the doctor's diagnosis*
- 2 **a** : investigation or analysis of the cause or nature of a condition, situation, or problem  
*// diagnosis of engine trouble*  
**b** : a statement or conclusion from such an analysis
- 3 *biology* : a concise technical description of a taxon





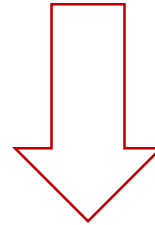
# Concept of an internal disease

**Cause of disease („hidden“)**

symptoms (subjective)

signs (objective)

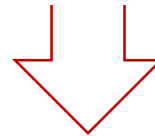
other histories



**Analysis of symptoms and signs, a syndrom**



Intellectual synthesis



**Diagnostic hypothesis**



# Concept of an internal disease

## **Diagnostic hypothesis**

+ labs  
+ imaging  
+ biopsy  
+ culture  
+ genetics



Interpretation in context



**Etiological diagnosis**  
True cause of the disease



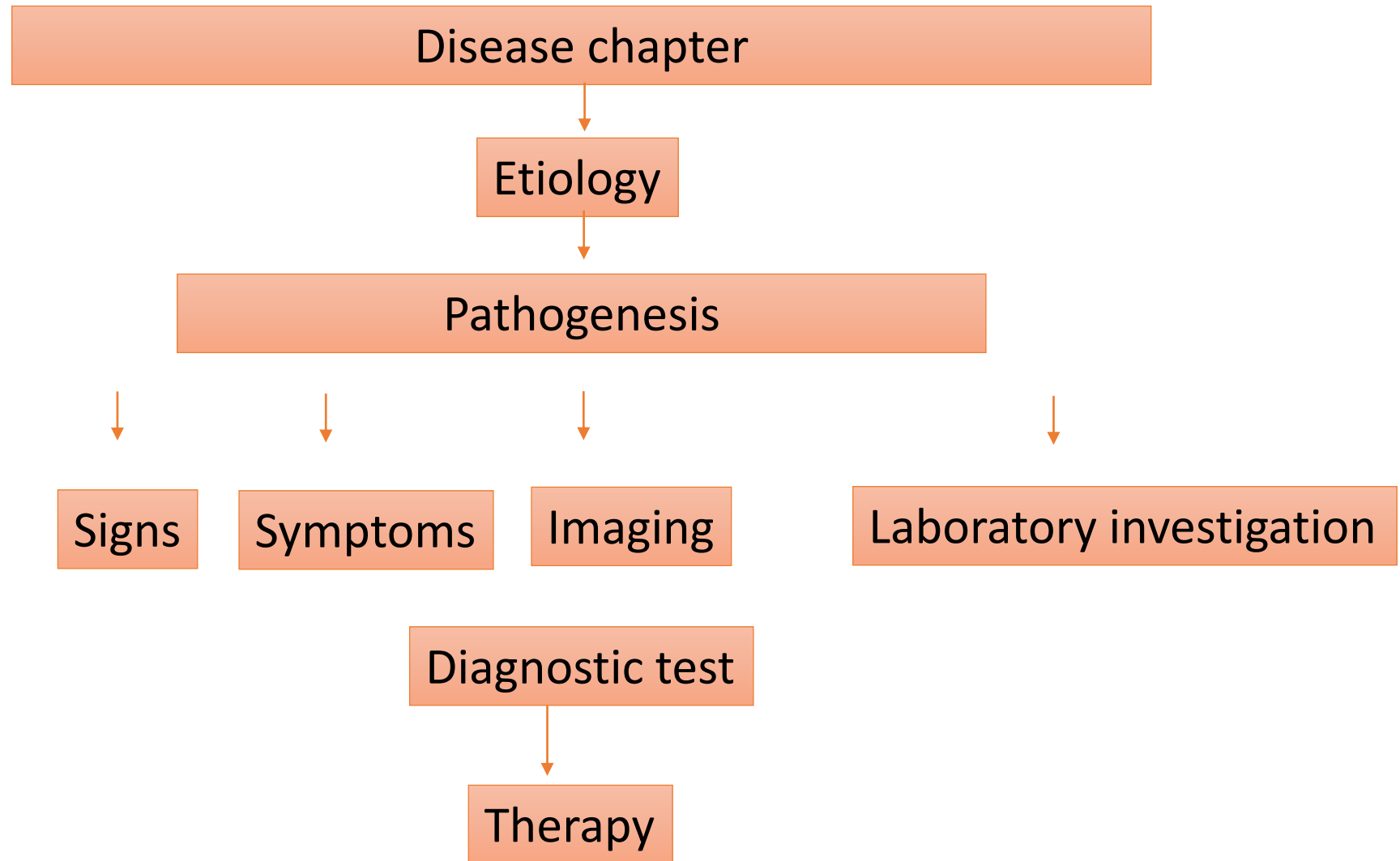
**Differential diagnosis**

Other possible causes



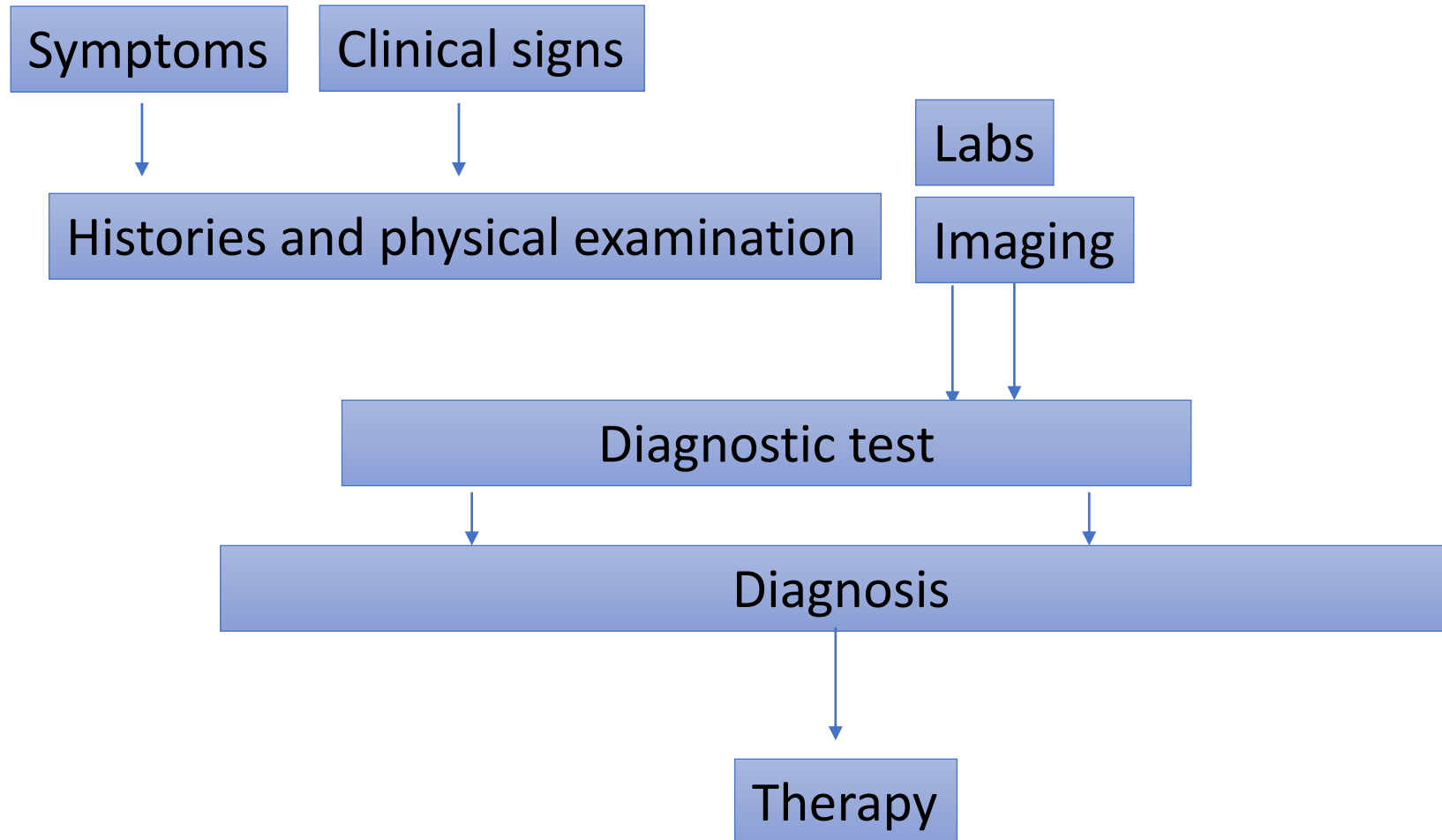
# Internal medicine teaching

Theoretical – lectures, textbook, „textbook picture of disease“



# Internal medicine teaching

Practical, clinical teaching, „unique picture of a disease in an individual“



- “He who studies medicine without books sails an uncharted sea, but he who studies medicine without patients does not go to sea at all”  
— **William Osler** 1849-1919







## Note

Pathophysiology of the disease and its knowledge is important for understanding the course of the disease, but its detailed knowledge is not the only content of internal medicine and **serves only as an aid**.

The main goal of teaching internal medicine is prevention, and **especially knowledge of practically applicable diagnostics and treatment** of internal diseases.



# Symptoms v.s prevention

## 1. **Asymptomatic - without symptoms**

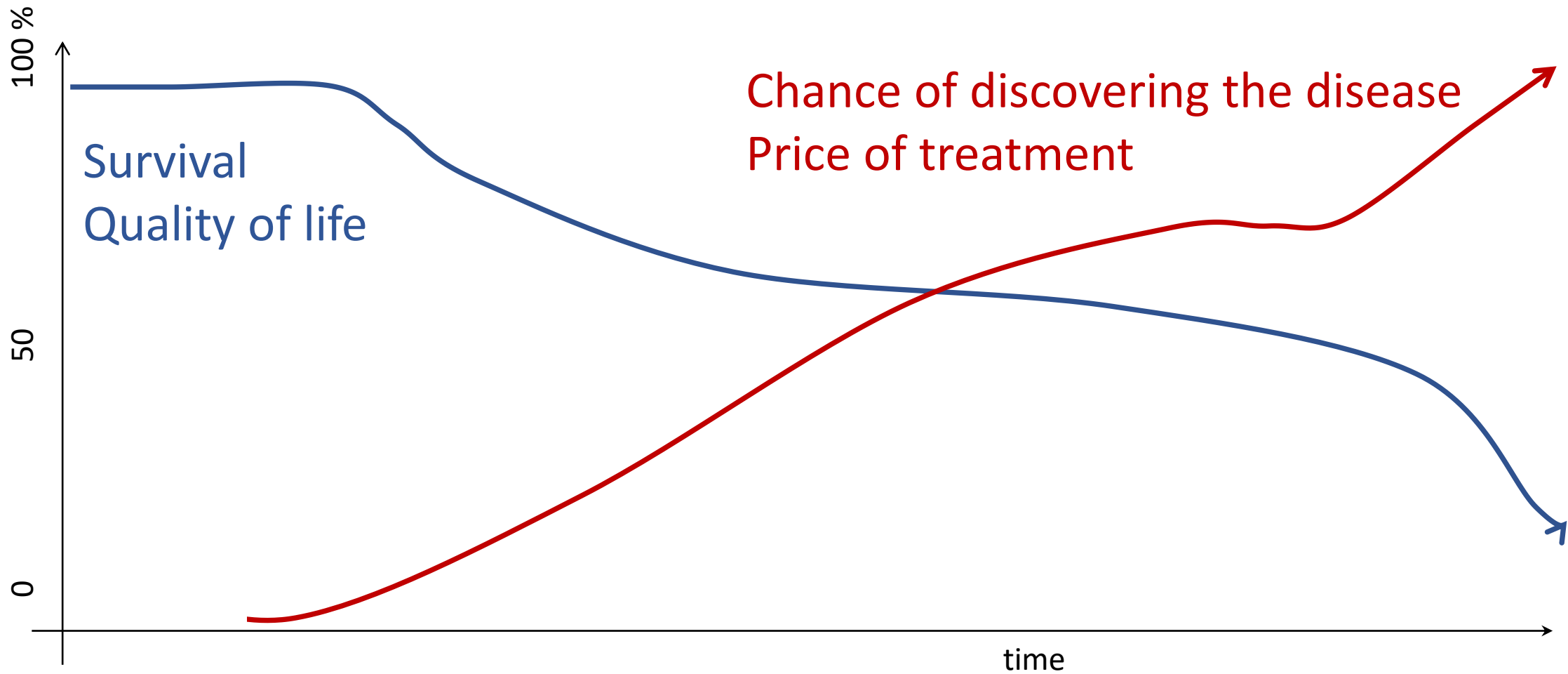
- Almost every disease has an asymptomatic phase
- The domain is preventive medicine Screening Cancers Diabetes Hypertension Kidney diseases Chronic liver disease

## 2. **Symptomatic**

- They are manifested by symptoms and clinical signs that are perceived by the patient
- The medicine of the past was based on symptoms, only patients who had symptoms went to the doctor



# Concept of an internal disease



Disease cause

Asymptomatic course

Disruption of organ structure or function

Symptoms and signs

Disease complications



Thank you

