

# Model Core Curriculum for Medical Education in Japan

AY 2016 Revision

Medical Education Model Core Curriculum Coordination Committee

Medical Education Model Core Curriculum Expert Research Committee

The Model Core Curriculum for Medical Education is an abstraction of the "core", within the respective "curriculum" formulated by each university, which should be taught in common by all universities in Japan; it is systematically organized as a "model" of what that core contains.

In AY2016, it was revised in conjunction with the normal revision cycle (six years), as well as the need to respond to changes to various systems, relevant new laws and law revisions, and social circumstances. After that, Ministry of Education, Culture, Sports, Science and Technology (MEXT) translated it into English as a commissioned project of MEXT.

This is an English version of The Model Core Curriculum for Medical Education, translated by the medical education team of the Model Core Curriculum Expert Research Committee established at the contractor The University of Tokyo in AY2017. To consist terms used in translation with an English version of The Model Core Curriculum for Dental Education, the team cooperated with the dental education team of the Model Core Curriculum Expert Research Committee established at Tokyo Medical and Dental University in AY2017, a contractor translated it.

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About notation, etc.

- \* Numbering hierarchy is as follows: ABC, 123, 1)2)3), (1)(2)(3); Objectives are numbered as 1. 2. 3., etc.
- \* The word “explain” in objectives denotes a deeper understanding and ability to describe than “outline.”
- \* Medical terminology is consistent with the contents of AY 2018 the National Medical Practitioners Examination.
- \* Parentheses denote a synonym, explanation, or example of the preceding term. Ex: Proactively participate in scientific research (including clinical research, epidemiological research, and life science research).
- \* When an acronym is used in the first instance, it is preceded by the entire words for which it stands and placed inside arrows. Ex: Subjective, objective, assessment, plan <SOAP>
- \* Group and organization names are abbreviated to exclude portions indicating corporate status.
- \* All goals and objectives detailed in this core curriculum begin with “By the time of graduation all students will be able to.”

# Model Core Curriculum for Medical Education – Revision Background

## 1. Basic Principles and Background

- Catch Phrase: "Cultivate physicians who can serve diverse needs"

This revision was undertaken with the goal of cultivating physicians who can serve diverse needs. The revision considered many changes occurring in international public health and healthcare systems, and is meant to cultivate physicians with practical clinical capability, who can serve the needs of the public in areas such as ethics, medical safety, team-based health care, the community-based integrated care system, and a healthy long-living society.

Physicians should be oriented toward meeting the needs of residents and aspiring to ideal medical care; and even if a physician does not enter clinical practice, their focus should be on contribution to society from a position such as fundamental researchers or administrative officers.

From this same perspective, the two pillars of medical education and medical care administration should support medical students and physicians.

To realize this aim from an educational standpoint, this revision clarifies the practical abilities that a student should acquire by graduation, and how they are to be objectively evaluated, with an eye to the Outcome-based Education (OBE: Education which designs, creates, and documents the overall education toward fulfillment of goals to be achieved by graduation, including curriculum) that has been used previously. Put differently, this means that this revision of the Model Core Curriculum is not merely a listing of knowledge to be acquired, but rather a document now focused on how to cultivate physicians who can integrate their acquired knowledge with skills.

- Serving Needs of a Changing Society

Since the last revision, there have also been comprehensive reform of tax and social security, and various revisions in higher education. Along with this, it is necessary to understand the position of medical care in the society, the relationship between medical expenses and financial resources along with patient movement, and effective use of limited medical resources. Furthermore, as internationalization and informatization progress in society, physicians need to have interaction and exchanges with physicians from other countries prior to graduation, and physicians need to make contributions to and serve the needs of international health, medical practice, and research after graduation. The above revision does not mean that the purpose of medical education is to merely serve emerging needs superficially; rather, they mean that the purpose is to cultivate physicians who can successfully handle various changes likely to occur going forward.

- Consistency Before and After Graduation

Having in this revision, expanded the perspectives to include life stages with future changes -- one example is that a physician should have lifelong awareness of the need to gain further practical ability. Furthermore, based on the future policy of medical education revision by the joint committee of chair persons' committee and medical education committee at Association of Japanese Medical Colleges <AJMC> disclosed by AJMC in September 2016, there is additional remark that we revised Model Core Curriculum under the consideration of seamless education from undergraduate to postgraduate, in the situation that undergraduate education (including Common Achievement Test and international accreditation/medical-education-specific external evaluation), license examination, postgraduate clinical training, and continuing medical education, and career options may include new board certified physician system, and specialist physicians in social medicine area, consistency of education is discussed among related stakeholders, and express gratitude to the related parties. The committees desire that, going forward, relevant organizations including AJMC, Common Achievement Tests Organization (CATO), Ministry of Education, Culture, Sports, Science and Technology (MEXT), Ministry of Health, Labour, and Welfare (MHLW), and Japan Medical Association (JMA), will continue to study what the grand design of medical education should be, and make efforts to further develop it.

- Sharing of the "Basic Qualities and Abilities" Required in Medicine and Dentistry

Going forward, it is anticipated that the formulation and revision of programs such as the Model Core Curriculum will continue in professions other than physicians. From a team-based healthcare perspective, it will be important that the common values all healthcare professionals must share are aligned across disciplines from the stage of undergraduate education onward, as has been attempted in this revision; for example, with the alignment of "Basic Qualities and Abilities Required" with the corresponding dental education curriculum. Such alignment will require coordination by MEXT.

This advancement of horizontal collaboration across healthcare professionals at the undergraduate stage, coupled with the aforementioned vertical collaboration through educational consistency before and after graduation, will serve the expectations of the Japanese public regarding medicine and medical care.

## **2. Positioning in University Education**

- Structure of the Model Core Curriculum

The Model Core Curriculum is an abstraction of the "core," within the respective curriculum formulated by each university, which should be taught in common by all universities; it is systematically organized as a "model" of what that core contains. Therefore, as has been noted previously, the specific medical education of each university will assign approximately 2/3 of learning hours based on the Model Core Curriculum, with the remaining 1/3 devoted to the respective university's own class settings, educational methods, course sequences, and so forth.

On the curriculum setting, it is desired that each university improve its distinctive efforts and curriculum. One example is a university's education to foster a desire in physicians from the undergraduate level to perform medical research, through working in laboratories, etc., or other efforts such as classes where they have opportunities to hear opinions from individuals outside medical practice. In addition, it is desired that universities advance the improvement of faculty's ability for education in order to make such education possible.

To raise the practicability of these efforts, the committees have strived to streamline the Model Core Curriculum. However, we also wish to emphasize that the knowledge and skills required for the advancement of medicine and medical care are not to be gained entirely in undergraduate education; rather, it is necessary to show in detail what is to be gained at the undergraduate level, with the understanding that physicians will continue to learn throughout their lives.

- Development and Sharing of Teaching Materials

The committees ask that the development, formulation, and sharing of specific education methods, teaching materials, and guidelines in academic conferences, societies, etc., and proceed with these advances beyond the walls of each university toward the establishment of more effective and efficient medical education methods. This hope is expressed not to deprive universities of their educational autonomy, but rather to convey the perspective of effectively utilizing limited human and other educational resources.

- Clinical Clerkship

Further enhancement of the Clinical Clerkship is also needed to assure the attainment of international standards going forward. Therefore, it is expected that clinical clerkship and its introductory early exposure and practical sessions are devised more than before with assurance of characteristics and quality of participating students and with sufficient attention of patient safety and privacy protection, and that related organizations including administrative institutions such as medical associations, hospital organizations and regional medical care councils, etc. are collaborated.

- Three Policies

In April 2016, it became obligatory for each university to formulate and make public their Three Policies of diploma, curriculum, and admission with consistency. Therefore, it is strongly required that the finalized curriculum of each university fulfills that obligation. It is strongly demanded that the curriculum each medical school finally develops should be consistent with the medical education evaluation standard of Japan Accreditation Council for Medical Education <JACME>, which aims at the education along with the global standard of World Federation for Medical Education <WFME>.

#### ○ Requirement of Medical Students

To achieve the main object of this revision -- physicians who can serve diverse needs -- students must comprehend the concepts of medicine and medical care from a broad perspective.

For example, preventive medicine is one of the roles required of today's doctors. In other words, when thinking about the whole medical practice, it is necessary to consider not only the diagnosis and treatment of diseases but also the background of diseases, and also to recognize the importance of exercise and nutrition/dietary education. Also, from the viewpoint of having a broad perspective, it is also important that medical students recognize that each patient is engaged in social life and that it is only a scene of the patient's life to see including home care. Students who approach the Clinical Clerkship and other learning with this awareness will obtain more meaningful results.

"Physicians who can serve diverse needs" means that a physician will not only passively respond to the various changes that will occur going forward, but will be able to create their own career path as a physician and meet with a variety of opportunities. In reality, approximately 95% of physicians are currently in clinical practice, but the other 5% have advanced into other areas including research for basic science, legal and social medicine, civil service, including in health departments, and education. Even as a clinical physician one might not only perform clinical practice but also make various social contributions including community education policy reviews, participation in international health and medical care activities, etc. The committees wish to add that such activities are not only selected at the undergraduate stage, but can also be chosen in a variety of ways after graduation as well.

Even after one has selected the path that they wish to pursue from a variety of options, it is important to continually maintain a broad range of interest throughout one's career. For example, even if one might choose a clinician, they need to maintain a research mind and awareness while they practice medicine, or one conversely chooses a research physician, they must always make efforts to keep in mind the current state of clinical settings as they pursue new discoveries in medicine. It is also easy to imagine the importance of remaining aware of people differing positions and situations, and cooperating with physicians who have selected different career paths from ones' own. Furthermore it is indispensable that one not only build relationship among physicians but also with many individuals who work in the fields of medicine and medical care, and with others as an interested member of society at large, to fulfill the purpose of being able to respond to diverse needs.

Finally, the committees desire that newly enrolled students will sense from their very first class that academic achievement stands upon the efforts of those who have gone before them -- that academic knowledge is a noble pursuit. Let each student be aware that since the dawn of time, precious life has underpinned all aspects of our existence, and may they feel the sanctity of life as they approach clinical experience, dissection, and other learning. Medical students must also not forget that the cooperation not only with the university faculty, but also with the public, and others involved outside the university in medical education, are what make their learning environment possible. For this reason, a student should

maintain a sense of gratitude and respect at having obtained the opportunity to learn medicine through the support of others; one should give back to society from what they have learned and assume a leadership role in the community, ever striving for self-improvement throughout life so that medicine and medical care continue to advance into subsequent generations. More than anything, a medical student must maintain the highest ethics and a cultivated mind as a member of society.

○ Request to All Involved in Medical Education

Because medical education, especially clinical clerkship, will become more conscious of regional medical care (regional-based cyclic health care) and the community-based integrated care system than before, the committee would like to request that community healthcare institutions are asked to collaborate with the clinical clerkship of the respective universities. including home care and various types of health care.

Additionally, in postgraduate clinical settings, the perspectives of team-based health care and interprofessional collaboration require wide collaboration not only from medical or healthcare professionals, or licensed professionals, but many others as well. The committees therefore request the kind cooperation of such individuals and institutions from the undergraduate stage, to enable education that reflects these factors.

We ask also for education to be conducted with consideration of the above "Requirements of Medical Students".

3. Request for Cooperation and Communication to the Public

As expressed in the above "Requirements of Medical Students," the understanding of patients from among the public who participate in Clinical Clerkship is indispensable. As for the consent from the patients in the practical training, also mentioned in "Referential examples: clinical clerkship implementation guideline" included in "G. Clinical clerkship" in this booklet, it is hoped for each university to devise to announce the necessity and importance of medical education to request citizens' cooperation with clinical clerkship, e.g. use of the example sentences of "Request for Public Cooperation." Through leaflets, brochures, posters, etc., MEXT and MHLW are also asked to make efforts in gaining the understanding and participation of the public in the Clinical Clerkship.

## "Request for Public Cooperation" Sample

### Request for Public Cooperation

In medical care, the participation of patients and their families is indispensable. Universities and other healthcare professionals are also striving to provide their part of the support necessary to enable health care. Taking this into consideration, the 2014 revision of the Medical Care Act established the responsibility of the public to understand regional medical care, and to select and receive care from appropriate medical/dental institutions. Just as in medical practice, medical education requires the participation and cooperation of the public. Starting with the experience of clinical clerkship, students must have a variety of opportunities to directly interact with patients and individuals who need long-term care. In addition, medical education requires the cooperation of healthy individuals to enable the practice of preventive care.

Currently, every university has undertaken the following efforts toward improvement:

- The Clinical Clerkship is conducted under the careful oversight of a supervisor.
- A systematic medical education is provided based on the Model Core Curriculum\*.
- All students participate in the Clinical Clerkship in the name of "student doctor" only after having taken and passed an objective examination for knowledge based on the national license examination and skill assessment for clinical skills\*\*.

We ask that you take the above into consideration when determining your cooperation.

Your cooperation will also be appreciated through the provision of good medical care to the general public, and in the form of advancement in medicine and medical care. We therefore request your kind assistance to university hospitals and other institutions in educating medical students.

\* A common, national, systematically organized curriculum taught in each medical faculty/university and which accounts for approximately 2/3 of a total learning time.

\*\* As a principle, the Common Achievement Tests Organization (CATO) administers Computer-Based Testing (CBT) to confirm knowledge, and the Objective Structured Clinical Examination (OSCE) to confirm skills and attitudes, with the cooperation of standardized patients.



## **Model Core Curriculum for Medical Education: Overview of the Revision**

In this version the following items were emphasized and other specific revisions were made: (1) Vertical connection: Alignment of the Model Core Curriculum, National Board Examination for Physician standards, postgraduate clinical training achievement objectives, and lifelong learning curriculum; (2) Horizontal connection: Partial sharing of content between the medical and dental model core curricula; (3) Realization of "the Basic Qualities and Abilities Required of a Physician"; (4) Enhancement of clinical clerkship; (5) Education for regional medical care and the community-based integrated care system; (6) Enhancement of "tumor"; (7) Referring to the instructional strategies; (8) Fusion of liberal arts education and preparatory education; (9) Rearrangement of "goals"; (10) Reduction in overall text volume; (11) Rearrangement of medical terminology; and (12) Dissemination to the world.

A more detailed description follows below.

### **I. General Overview**

(1) Vertical connection: Alignment of the Model Core Curriculum, National Board Examination for Physician standards, postgraduate clinical training achievement objectives, and lifelong learning curriculum

We carried out alignment work for each item of "Basic Qualities and Abilities Required of a Physician". This work was cooperated and discussed with the Working Group for reviewing Model Core Competencies upon graduation, Association of Japan Medical Colleges; the Committee for reviewing physician training system, Japanese Association of Private Medical Schools; MHLW research grant for developing and advancing research for basis for regional medical care, and for training program, assessment methods, and training methods in connection with postgraduate clinical training achievement objectives; MHLW Medical Ethics Council; Japan Medical Specialty Board; Committee for medical education consistency, Japan Society for Medical Education; and Japan Medical Association. Such discussion has confirmed the importance of seamless perspectives of education, learning, and training ranging from undergraduate to postgraduate education and as a result, all nine areas of "Basic Qualities and Abilities Required of a Physician" of the Model Core Curriculum was shared with the goals of postgraduate clinical training. Regarding "1 Professionalism," goals of postgraduate clinical training are more specifically described as ethics and multiple behavioral guidelines, and shared with the "Basic Qualities and Abilities Required of a Physician" of the Model Core Curriculum.

Regarding the items of F-1 Approaches from signs and symptoms/pathophysiology and G-2 Clinical reasoning, the committee referred to the standard for the National Board Examination for Physicians, the goals of postgraduate clinical training, the Japan Medical Association Lifelong Education Curriculum Code, and the National Life Basic Research, and adjusted the contents to be able to learn common items. The committee focused on the relationship with the task standard for Post-clinical-clerkship Objective

Structured Clinical Examination <OSCE> held in the near future and selected the contents of the Model Core Curriculum.

(2) Horizontal connection: Partial sharing of content between the medical and dental model core curricula.

The catch phrase is set as "cultivating physicians (or dentists in dental education) who are able to serve diverse needs," thereby making the aim of both the medical and the dental curricula the same. This means that the Revision Background for both revised model core curricula were made to significantly overlap and be shared to the maximum degree possible, with "A. The Basic Qualities and Abilities Required of a Physician (or Dentist in dental education)," while areas from section B onward were in reference to the other discipline.

(3) Realization of "Basic Qualities and Abilities Required of a Physician"

To clarify that it is achievable by learning, we have changed from "Qualities" to "Qualities and Abilities". In addition, this part was integrated with "*A. Basic Items*" of the 2010 revised edition of Model Core Curriculum (hereinafter referred to as "previous edition"), and in this chapter each item of professionalism, medical knowledge and problem-solving ability, practical skills and patient care, communication skills, team-based health care, management of quality of care and patient safety, medical practice in society, scientific inquiry, attitude for life-long and collaborative learning. How to extend or detail the revised nine items is left to the discretion of each university.

(4) Enhancement of clinical clerkship

First, we differentiated description of the contents which should be achieved before clinical clerkship in "F. Basis of medical practice" from those in clinical clerkship (or at the timing of its completion) in "G. Clinical clerkship." We set G-1 as basis of medical practice, repeatedly describing "Basic Qualities and Abilities Required of a Physician" as the basis of clinical practice, and G-2 as Clinical Reasoning, aiming for conducting history taking, physical examination, and basic tests as considering differential diagnoses. We revised the "*Guideline for implementing of clinical clerkship*" which was listed separately in the previous edition, and reorganized it into "G. Clinical clerkship" and emphasized the promotion of clinical clerkship. The guideline exemplified "Record of learning and assessment" that can be referred and utilized at each university.

(5) Education of regional medical care and the community-based integrated care system

As the super-aging society starts, it is necessary that provision of comprehensive and continuous "regional-based cyclic health care" by collaboration with related organizations, such as welfare and long-term care facilities in the community. At the same time, practice of the community-based integrated

care system was also reflected in Medical and Long-term Care Comprehensive Ensure Promotion Law promulgated in June 2014 and the revision of medical and technical service payment in FY 2016. The curriculum that can concretely image interprofessional collaboration and team-based medical care is also demanded in undergraduate education. Not only regional medical care, team-based medical care and communication skills in "the Basic Qualities and Abilities Required of a Physician" are listed up but also each item of A-4-1) Communication, A-4-2) Patient-Doctor Relationship, A-5-1) Patient-centered team-based healthcare, A-7-1) Contribution to regional medical care, B-1-7) Regional medical care/health care (objectives are shared with A-7-1)), F-2-15) Home medical care and long-term care, and G-4-3) Regional medical care are referred. Furthermore, students are required to understand and have practical training not only for medical and long-term care for the elderly, but also for community health including prevention for locking our sight on all ages and understanding and practice of related regional welfare.

#### (6) Enhancement of "tumor" education

Malignant tumors are the leading cause of death in our country and it is a serious problem for the life and health of the people. Cancer Control Act enforced in March 2007 defines that "State and local governments are to implement necessary measures needed to plan human resource development for physicians and other health professionals with specialized knowledge and skills working for surgical operation, radiation therapy, and chemistry and other cancer medical care." In response to these social conditions, we decided to describe "tumor" as an independent item from the previous edition (E-3 tumor in this revision). In this revision, furthermore, C-4-6) Tumor was newly established to understand oncogenic mechanism/pathophysiology, neoplastic diseases are organized in 4) Diseases in each organ-based specific item of "D. Normal structure and function, pathophysiology, diagnosis, and treatment of each organ system of the human body," and neoplastic diseases are again listed in E-3-5) Specifics. In addition, the 3rd Ten-year General Strategy Against Cancer from FY2004 to FY2013 added description based on the policy that emphasized the importance of genome medicine.

#### (7) Reference to instructional strategies

Since many opinions such as "teaching strategy should be included in the Model Core Curriculum," "the concept of curriculum include strategy" were received, learning strategy <LS> was included in the description of F-3 Basic medical care skills and G-4 Clinical clerkship in each department.

In addition, nothing was described regarding nationwide edition of educational materials and textbooks based on the Model Core Curriculum in this revision, but we continue to discuss it because several educators in medical schools claim that they would like to use a common textbook based on the Model Core Curriculum if it is available. Textbooks for medical students issued by the related associations and societies are effective to developmentally learn the content of the Model Core Curriculum, for example, "the genetics model curriculum for undergraduate medical education" issued by

the Japan Medical Association, national genetic health department liaison meeting, the Japan Society for Human Genetics, and the Japanese Society for Genetic Counseling in 2013, and "systematic lecture textbook for geriatric medicine" issued by the Japan Geriatrics Society in the same year.

(8) Fusion of liberal arts education and preparatory education

In 1991 the Standards for Establishment of Universities were deregulated, and relationship between preparatory education including liberal arts and medical education is emphasized recently. "Science of life phenomena," which was listed in a preparatory education model core curriculum in the previous edition, was developmentally blended into C-1 Science of life phenomena and C-2 Structure and function of individuals, "Human behavior and psychology" into B-4 Social science area related to medical practice and C-5 Human behavior and psychology, and "Science of information" into B-1 Population-based medical care and F-2 Basic clinical knowledge, respectively.

(9) Rearrangement of "goals"

In order to clarify the relationship between "*general goals and achievement goals*", we have changed them into "goals and objectives".

The Model Core Curriculum is focusing on presenting the educational contents of requisite minimum core every medical student should learn by graduation, for each university to refer when it autonomously develops six-year curriculum depending on its own mission. In the previous edition, the achievement goal marked with \* (asterisk) indicated the contents of the level to be achieved by the timing of graduation, but it was easily misunderstood that it means that it should be achieved by the time of graduation from the start of clinical clerkship. To emphasize that goals and objectives include the contents to be learned even in pre-clinical years as needed, we decided to delete the \* (asterisk) to seek to shed the image that "the Model Core Curriculum is the standard for Common Achievement Test."

Meanwhile, the way to use the Model Core Curriculum in formulating the standards for Common Achievement Test (Computer Based Testing <CBT> and OSCE) is discussed in Common Achievement Tests Organization <CATO> to mainly implement Common Achievement Test.

(10) Reduction in overall text volume

The committees reviewed or deleted some contents from objectives. With the basic concept of a Model Core Curriculum showing the minimum content to cover in undergraduate education, and with consideration for the criticism that "the Model Core Curriculum is too voluminous despite ideally including only the minimal medical education," the committees undertook a reduction in overall text volume.

First, focus was placed as much as possible on clearly showing for each item how deeply it is to be learned. In addition, although the principle of removing one item for every one added was followed, some

new or important concepts, such as behavioral science or clinical clerkship, were made an exception to the principle.

#### (11) Rearrangement of medical terminology

The medical terminology dictionary Web version was published by the Japan Medical Association in April 2014, to rearrange medical terminology, and the National Board Examination standard the Year 2018 version established in June 2016 also use the terminologies complied with this. This revision also complied and unified the handling of terminologies according to the same dictionary.

#### (12) Dissemination to the world

To publicize Japanese medical education to the world, English translation of this revised edition will be done by the entrusted project of MEXT.

## II. Specifics

### A. Basic qualities and abilities required of a physician

- We added an objective on self-decision support with patient-centered viewpoint in mind to respond to patients and families who cannot decide by themselves to A-1-2) Patient-Centered viewpoint.
- In A-2-2) Learning modality, we specified the goal of "Acquire basic abilities (knowledge, skills, attitudes and behavior) including those of liberal arts to objectively and critically integrate and express various information other than medicine or medical practice in science and society."
- We added A-3-1) Holistic and practical ability to enhance the description containing old version A-1-(4) *Informed consent*, and showed the objectives related to chronic pain and work-family-balance support.
- We added objectives regarding active listening and empathy to patients/families A-4-1) Communication.
- In A-6-1) Securing of safety, we added objectives to emphasize the point of learning from cases and processes of medication-related health disaster and to seriously respond to questions.
- We added A-7-1) Contribution to regional medical care to A-7 Medical practice in society to reflect on the importance of regional medical care.
- We added A-7-2) Contribution to international medical care to A-7 Medical practice in society to reflect on the importance of foreign language education in medicine and medical practice, diverse career choices of physicians, Japan's status quo in international society.
- We enhanced the description of A-9-1) Preparation for life-long learning to consider various needs.

## B. Society and medicine/medical practice

- The title was changed from "*B Medicine/medical practice and society*" of the previous edition to "B. Society and medicine/medical practice".
- In B-1 Population-based medical practice, we indicated the goal of "Understand the usefulness and limitation of statistics / estimation, considering objective and subjective probabilities, to understand healthcare statistics and its application to grasp health and medical care problems." Furthermore, to learn the basics of biostatistics, clinical statistics, and clinical research studies, we added B-1-1) Basic statistics, B-1-2) Application of statistical methods, and B-1-3) Evidence-based medicine <EBM>.
- We added sports medicine to the objective of B-1-6) Society, Environment, and Health.
- We added objectives of the cost-benefit analysis in health care and the current status and systems for welfare for persons with disabilities and medical practice and welfare for mental health problems to B-1-8) Systems of health, medical, welfare, and long-term care.
- In B-1 Population-based medical practice we added B-1-9) International health to reflect on its importance.
- We added B-3 Medical research and ethics, and included a new objective regarding ethical norm and practice ethics in the content of old edition *B-(8) clinical research and medical practice*.
- We added B-4 Social science area related to medical practice, indicated the goal of B-4-1) Social characteristics required of physicians was made as "Learn basic knowledge, ways of thinking, and liberal arts to understand the psychological and social mechanisms in the cultural and social context. Deeply understand viewpoints, methods, and theories of cultural anthropology and sociology (mainly medical anthropology and medical sociology) concerning health, illness, and medical care to be able to use the knowledge of behavioral science and social science for clinical practice" and included objectives regarding basics of behavioral/social science.

## C. General issues in medicine

- We revised objectives of C-1 Science of life phenomena, C-2 Structure and function of individuals, and C-3 Reaction of individuals with whichever addition or deletion in response to the progress in biology (immunology, genetics, microbiology, etc.).
- We added or enhanced objectives regarding basic dietetics, such as energy, trace elements, etc. to C-2-5) Metabolism of biological substances.
- We rearranged C-4-1) Genetic diversity and diseases and added C-4-6) Tumor.
- We added C-5 Human behavior and psychology, C-5-1) Human behavior, C-5-2) Behavioral structure, C-5-3) Motivation, C-5-4) Stress, C-5-5) Life-long development, C-5-6) Individual differences, C-5-7) Interpersonal relations and communication, and C-5-8) Theory and skills in behavioral change.

D. Normal structure and function, pathophysiology, diagnosis, and treatment of each organ system of the human body

- In specifics for each organ 4) Neoplastic diseases were reorganized in Diseases.
- Percentage of descriptive amount of specifics in each organ system was adjusted by referring to the Year 2018 version of Blueprint of National License Examination for Physicians.

E. Systemic physiological change, pathophysiology, diagnosis, and treatment

- We added E-1 Genetic/genomic medicine and indicated the goal as "Understand the characteristics of genetic/genomic information, and learn diagnosis and treatment based on genetic/genomic information, and support for a patient and family including those who have not had pathogenesis."
- We enhanced objectives regarding drug resistance (antimicrobial resistance <AMR>) in E-2 Infection.
- We listed neoplastic diseases again in E-3-5) Specifics, which was already described in "D. Normal structure and function, pathophysiology, diagnosis, and treatment of each organ system of the human body."
- We added E-6 Biological effects of and damage from radiation and indicated the goal as "Understand the actions on and applications for living organisms caused by radiation and electromagnetic waves which are widely applied in medical fields." We transferred *C-3-(3) Living organisms and radiation, electromagnetic wave, and ultrasound* to E-6-1) Living organisms and radiation, itemized E-6-2) Medical radiation and biological effects, E-6-3) Radiation risk communication, and E-6-4) Radiation disaster medical practice, and listed their related objectives.
- We added frailty, sarcopenia, locomotive syndrome, disuse syndrome, end-of-life care, etc. to E-8 Aging.
- We added objectives such as medical-related death, process of mind leading to death, and family care after a patient's death (grief care) to E-9 Death of a person.

F. Basis of medical practice

- We added 4) Weight loss/gain, 6) Cardiac arrest, 31) Anxiety/depression, 32) Amnesia, and 37) Trauma/burn to F-1 Approaches from signs and symptoms/pathophysiology, and deleted *cyanosis, obesity/lean, and bleeding tendency* from the previous edition.
- We added F-2-1) Clinical reasoning and F-2-2) Evidence-based medicine <EBM> to F-2 Basic clinical knowledge and matched objectives between F-2-2) and B-1-3).
- We rearranged from F-2-1) to F-2-15) in F-2 Basic clinical knowledge so as to be in the order of diagnosis, examination, and treatment.
- We added description of specimen preservation method, panic value, drug susceptibility test, etc. to F-2-3) Laboratory test
- We added objectives regarding polypharmacy, contraindications, anti-doping, etc. to F-2-8) Basic

principles of medication

- In the previous edition it was said that contents from *G-1 to G-4* were overlapped, and referred to those pages, yet in this revision, part of *G-1 to G-4* in the previous edition was edited and moved to F-3. In addition, the preamble was added to F-3 and content was presented more specifically.

#### G. Clinical clerkship

- We added G-1 Basis of medical practice and G-2 Clinical reasoning. In G-2, we picked up signs and symptoms/pathophysiology in F-1 Approaches from signs and symptoms/pathophysiology
- We rearranged the order of G-3 Basic clinical procedures from 1) to 3) so as to be in the order of diagnosis, examination and treatment.
- We rearranged G-4 Clinical clerkship in each department into G-4-1) Required clinical departments and G-4-2) Departments other than the above.
- We added G-4-4) Simulation education.
- "Guidelines for implementation of clinical clerkship" was added as a reference.

#### References

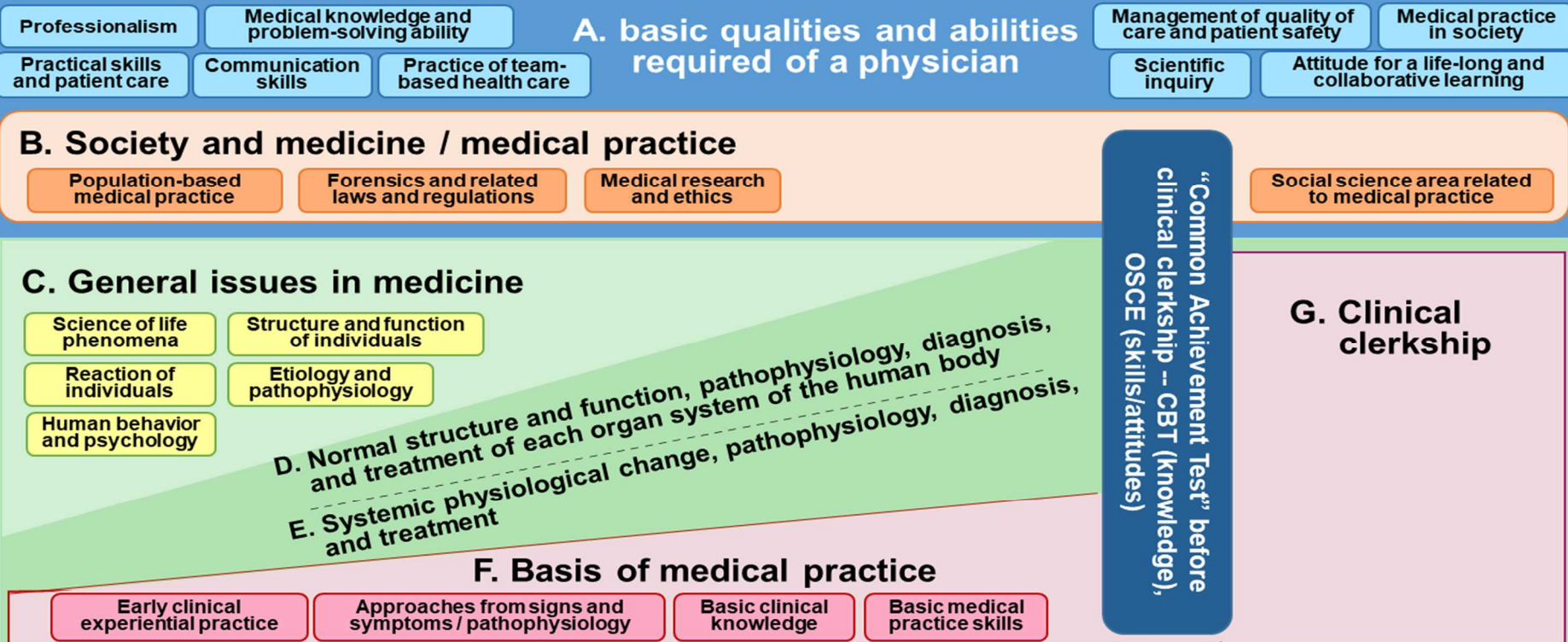
1. List of laws and decrees related to physicians and dentists: In order to clarify laws and decrees related to social medicine field of the Model Core Curriculum, laws that use words corresponding to medical education and physicians are enumerated.
2. Outline of healthcare and welfare occupations and national examination subjects: Bearing in mind about interprofessional collaboration, list healthcare-related professionals with certification which has national license examination system, the subjects blueprint (areas and major items) of each qualification examination, and the number of passers in recent years.
3. The process of revisions of Medical Education Model Core Curriculum until this time: We introduced the history of development and revisions of the Medical Education Model Core Curriculum.



# Overview of the Medical Education Model Core Curriculum (2016 revision)

- Minimum requirement (knowledge, skills, and attitude) for all graduating students is listed as specific goals and objectives
- Two thirds of the curriculum of each medical school should be the contents of Model Core Curriculum.
- Minimum essence items are described as basic qualities and abilities required of a physician.

## Development of physicians to respond to diverse needs



Medical License Examination for Physicians (knowledge)  
Post-clinical-clerkship OSCE (skills/attitudes)

## Featured curriculum for each university

- Educational contents in each university based on its mission (including liberal arts and elective programs)
- Approximately one third of all the credit hours

## Basic Qualities and Abilities Required of a Physician

### 1. Professionalism

Understand fully the responsibilities of physicians who are deeply involved in human life and protection of health, and follow the ethics of physicians while practicing patient-centered medicine.

### 2. Medical knowledge and problem-solving ability

Acquire necessary knowledge, based on evidence-based medicine <EBM> and experience, and respond to a wide range of symptoms, pathophysiology, and diseases in the continuously evolving field of medicine.

### 3. Practical skills and patient care

Practice medical treatment, while using and honing clinical skills; taking into consideration patient's pain and anxiety.

### 4. Communication skills

Build good relationships of trust with patients and their families, taking their psychological and social background into consideration.

### 5. Practice of team-based health care

Understand and collaborate roles of all people involved, including patients, in health, medical care, welfare, and long-term care.

### 6. Management of quality of care and patient safety

Provide high-quality and safe medical care for patients as well as health professionals.

### 7. Medical practice in society

Play social roles required as a health professional and contribute to local and international communities.

### 8. Scientific inquiry

Understand fully the necessity of medical research for the development of medicine and medical practice, acquire critical thinking ability, and participate in academic and research activities.

### 9. Attitude for life-long and collaborative learning

Strive throughout life to improve the quality of medical practice through continuous learning and study with other physicians and healthcare professionals.

## A. Basic Qualities and Abilities Required of a Physician

### A-1 Professionalism

Understand fully the responsibilities of physicians deeply involved in human life and protection of health, and follow the ethics of physicians while practicing patient-centered medicine,

#### A-1-1) Medical ethics and bioethics

Goal:

Learn importance of ethics in medical practice and research.

Objectives:

1. Outline the historical flow of medicine and medical care and its meaning.
2. Outline clinical ethics and ethical issues related to life and death.
3. Outline the norm on medical ethics such as Hippocratic Oath, Geneva Declaration, Physician Charter, etc.

#### A-1-2) Patient-centered viewpoint

Goal:

Always have a patient-centered approach, maintaining the privacy of the patients and their family members, complying with the physician's duties and medical ethics, and giving priority to patient safety.

Objectives:

1. Explain fundamental rights of patients indicated such as Lisbon Declaration.
2. Explain the meaning of patient autonomy.
3. Support patient self-determination with proper explanation and understanding of a patient's values, even if the options are diverse.
4. Explain meanings and necessity of informed consent and informed assent.

#### A-1-3) Responsibility and discretionary authority as a physician

Goal:

Have rich humanity, deep recognition of the dignity of life and awareness of the responsibilities as a physician to protect human life and health.

Objectives:

1. Construct a trustful relationship with patients and their families in clinical clerkship.
2. Recognize diversity of the patients' or their families' values and address them in a flexible way.
3. Explain the reason why the physician should recommend medical treatment most appropriate for the patient.
4. Explain that physicians have limitation for diagnosis and treatment depending on ability and environment.
5. List and illustrate physicians' legal obligations.

### A-2 Medical knowledge and problem-solving ability

Acquire necessary knowledge, based on evidence-based medicine <EBM> and experiences, and respond to a wide range of symptoms, pathophysiology, and diseases in the continuously evolving field of medicine.

#### A-2-1) Ability to explore and solve problems

Goal:

Discover tasks on one's own ability and acquire the ability to solve them by self-learning.

Objectives:

1. Discover necessary tasks personally.
2. Rank the tasks you need according to the importance and necessity.
3. Discover concrete methods for problem solving and solve them.
4. On solving problems discover better ways to solve problems in cooperation with other learners and faculty members.
5. Appropriately self-assess and develop specific strategies for improvement.

#### A-2-2) Learning modality

Goal:

Acquire basic abilities (knowledge, skills, attitudes and behavior) including those of liberal arts to objectively and critically select and express various information other than medicine or medical practice in

science and society.

Objectives:

1. Pick up important issues and problems concerning contents of lectures, domestic and international textbooks / papers, searched information, etc.
2. Integrate obtained information, objectively and critically organize ideas and express them in a plain way.
3. Deliver presentations regarding experiments and practicums in documented and oral manner in accordance with a predetermined format.
4. Practically give appropriate guidance to juniors, etc.
5. Participate in elective curriculum along with the interests (research in medical sciences, etc.).

### **A-3 Practical skills and patient care**

Practice medical treatment, while using and honing clinical skills; taking into consideration patient's pain and anxiety.

#### **A-3-1) Holistic and practical ability**

Goal:

Based on integrated knowledge, skills and attitudes, while respecting the position of patients, acquire practical abilities to comprehensively see the whole patient.

Objectives:

1. Appropriately take history (chief complaint, history of present illness, past medical history, family history, social / job history, system review, etc.), build a good relationship with the patient, and carry out patient education as necessary.
2. Comprehensively and systematically perform physical examination in proper order and efficient manner. Recognize and record abnormal findings and suggest relevant differential diagnoses.
3. Understand basic clinical skills (indication, method, complication, precaution) to diagnose a patient and give treatment in an appropriate attitude.
4. Acquire basic knowledge about medical record, draw it up in problem-oriented medical record (POMR) format, and produce medical documents when needed.
5. Deliver presentations regarding the patient's condition (symptoms, physical findings, laboratory findings, etc.), problem list, differential diagnoses, clinical course and points of treatment, and exchange opinions with healthcare team members.
6. Explain emergency situations and basic knowledge of diseases and trauma. Participate in emergency care as a team member.
7. Explain pathophysiology, clinical course and treatment of chronic diseases and pain. Depending on the settings and system to provide medical care, participate in chronic medical care as a team member.
8. Provide sincere and appropriate support to patients and their families considering work-family-balance support such as learning / working and childcare / long-term care as well as patient's psychological pain and anxiety.

### **A-4 Communication skills**

Build good relationships of trust with patients and their families, taking their psychosocial background into consideration.

#### **A-4-1) Communication**

Goal:

Have communication skills to build good relationships through dialogue with patients and their families, such as explaining medical contents in an easy-to-understand manner.

Objectives:

1. Explain communication methods and skills (verbally and non-verbally) and outline their influences to attitudes and behaviors.
2. Build good relationship through communication.
3. Actively listen to the stories of patients and their families and empathize with them.

#### **A-4-2) Patient-physician Relationship**

Goal:

Build a good patient-physician relationship, understand the individual background of the patient and acquire the skills to grasp the problems.

Objectives:

1. Sufficiently consider psychological and physical pain of patients and their families.
2. Explain to patients with descriptive words.
3. Grasp the psychological and social background of the patient and to extract and organize the problem points related to leading an independent lifestyle.
4. Explain that medical practice is based on contractual trust relationship between patient and physician.
5. Explain how to deal with patients' requests (consultation, changing physicians, or referral).
6. Consider patient's privacy.
7. Understand the confidentiality obligation of patient information and the importance of providing information to patients, etc., and be able to handle it appropriately.

## **A-5 Practice of team-based health care**

Understand and collaborate roles of all people involved, including patients, in health, medical care, welfare, and long-term care.

### **A-5-1) Patient-centered team-based health care**

Goal:

Take appropriate actions as a member of the healthcare team with mutual respect, guiding junior members and others.

Objectives:

1. Explain the significance of team-based health care.
2. Explain the composition of the medical team and the roles of each member (physician, dentist, pharmacist, nurse, and other health professionals), cooperation and responsibility system, and participate as a member of the team.
3. Recognize the limit of your ability and ask other healthcare professionals for assistance if necessary.
4. Explain the role of the physician in team collaboration between health, medical care, welfare and long-term care.

## **A-6 Management of quality of care and patient safety**

Provide high-quality and safe medical care for patients and health professionals.

### **A-6-1) Securing of safety**

Goal:

Recognize that medical accidents (including incidents) and medical-related infectious diseases (including nosocomial infections), etc. can occur on a daily basis, learn from past cases, prevent accidents and improve patient safety, and understand the necessity of provision of trustworthy medical care.

Objectives:

1. Concretely explain that different health professionals are involved in multi-step medical practice content in actual medical care.
2. In order to prevent medical accidents, etc., explain the importance of not only individual attention (prevention of human error) but also organizational risk management (system and organizational error prevention).
3. Explain the importance of reporting, communication, consultation and recording at medical sites, and the illegality of tampering with the medical record (medical chart).
4. Share information on medical safety (side effects of drugs, etc., medication-related health disaster, malpractice (Including cases and circumstances), prohibited issues, good practices, etc.) and explain the importance of analysis to reflect on the incident.
5. Explain the necessity of improving ability according to job types / stage to secure medical safety.
6. Outline how to establish a medical safety management system at medical institutions (accident reports, incident reports, medical accident prevention manuals, medical waste disposal, medical safety managers (risk managers), safety management committees, accident investigation committee, medical accident survey system, and obstetric medical compensation system).
7. Outline causes and avoidance methods of medical-related infections (nosocomial infection control committee, nosocomial infection surveillance, infection control team <ICT>, and infection control manual, etc.).
8. Respond to questions seriously.

#### A-6-2) Countermeasures against and prevention for medical accidents, etc.

##### Goal:

Learn how to cope when medical accidents (including incidents) occur.

##### Objectives:

1. Explain the difference between medical accidents (including incidents) and complications.
2. Explain and practice emergency measures, records, and reports when medical accidents (including incidents) occur.
3. Explain administrative penalties based on criminal / civil liability and physician law related to medical malpractice.
4. Outline basic preventive measures (double check, checklist method, refining of drug name, ideas of failsafe / foolproof, etc.) and practice under the guidance of a supervising physician.

#### A-6-3) Health and safety of healthcare professionals

##### Goal:

Learn basic prevention, response, and improvement methods on risks (accidents, infections, etc.) encountered by healthcare professionals.

##### Objectives:

1. Explain the significance of health management for healthcare professionals (including vaccination).
2. Explain and implement the need for standard precautions.
3. Explain the need for patient quarantine.
4. Explain how to cope when getting involved in a needlestick accident (needlestick wound), etc.
5. Explain the necessity of improving the working environment in medical settings.

#### A-7 Medical practice in society

Play social roles as a health professional and contribute to local and international communities.

##### A-7-1) Contribution to regional medical care

###### Goal:

Understand the ideal and current status of regional medical care and health care, and acquire ability to contribute to regional medical care.

###### Objectives:

1. Outline the current medical situation in the community (including remote islands / areas) and the uneven distribution of physicians (region, clinical department and clinical/nonclinical).
2. Explain the medical plan (catchment area, standard number of beds, regional medical care support hospitals, hospital-clinic or hospital-hospital collaboration, hospital-clinic-pharmacy collaboration, etc.) and community medical vision.
3. Understand the concept of the community-based integrated care system and explain necessity of collaboration (including public administration) among professionals in areas of healthcare (maternal and child health, school health, adult / elderly people's health, community health, mental health), medical care, welfare, and long-term care.
4. Understand the role of primary care physicians and the necessity of primary care as the foundation of regional medical care, and acquire necessary skills for practice.
5. Explain the community system of emergency medical care, home care, and medical care in remote islands / remote areas.
6. Explain Disaster Medicine (healthcare and medical care when a disaster happens, medical relief team, Disaster Medical Assistance Team <DMAT>, Disaster Psychiatric Assistance Team <DPAT>, Japan Medical Association Disaster Medical Team (Japan Medical Association Team <JMAT>), disaster hospital, triage, etc.).
7. Actively participate in and contribute to regional medical care.

##### A-7-2) Contribution to international medical care

###### Goal:

Understand the current state and problems of medical care in the international community and acquire fundamental skills for practicing.

###### Objectives:

1. Respect patient's cultural background and respond to different languages including English.

2. Grasp the internationalization in regional medical care and give full considerations to medical practice appreciating diversity of values.
3. Understand and explain international issues on health and medical care.
4. Understand the characteristics of medical practice in Japan and the significance of contribution to the international community.
5. Understand the importance of international cooperation related to medical care and explain the mechanism.

## **A-8 Scientific inquiry**

Understand fully the necessity of medical research for the development of medicine and medical practice, acquire critical thinking ability, and participate in academic and research activities.

### **A-8-1) Cultivation of orientation toward medical research**

Goal:

Have the motivation and basic ability needed to conduct medical research for advancing and improving medicine and medical practice.

Objectives:

1. Explain what research should be done toward the aim of promoting development of medicine and medical practice and patient's interests.
2. Analyze pathophysiology experienced in medical practice based on the knowledge gained in the lecture and practical training of life science.
3. Search and organize the latest information from textbooks, papers, etc., and connect them to understanding and deepening diagnosis and treatment of diseases, based on analyses of patients and diseases.
4. Set new hypotheses from extracted clinical information and participate in scientific research (clinical research, epidemiological research, life science research, etc.) for solution.

## **A-9 Attitude for life-long and collaborative learning**

Strive throughout life to improve the quality of medical practice, learning and studying with other physicians and healthcare professionals.

### **A-9-1) Preparation for life-long learning**

Goal:

Have a willingness and attitude to consider one's career and continue self-directed and life-long learning.

Objectives:

1. Explain the importance of life-long learning.
2. Collect the information necessary for continuous learning over the lifetime.
3. Acquire career development skills.
4. Understand that there are different needs for the capabilities required for the career stage.
5. Reflect on the experience in clinical training and clarify own learning issues.

## B. Society and Medicine / Medical Practice

### B-1 Population-based medical practice

#### B-1-1) Basic statistics

##### Goal:

Understand the usefulness and limitation of statistics / estimation, considering objective and subjective probabilities, to understand healthcare statistics and its application to grasp health and medical care problems..

##### Objectives:

1. Describe and summarize data (including descriptive statistics).
2. Explain common probability distributions.
3. Calculate confidence intervals of a population mean of a normal distribution.
4. Explain the structure of the basic hypothesis test.

#### B-1-2) Application of statistical methods

##### Goal:

Learn the issues arising when applying statistical methods to data often encountered in medicine and biology, and concrete ways to treat them including the use of statistical packages.

##### Objectives:

1. Conduct a statistical test to check the difference between two group means (including within-subject and between-subject data).
2. Explain the difference between parametric and nonparametric test.
3. Conduct Chi-square test.
4. Use one-way analysis of variance (ANOVA).
5. Draw a scatter plot of two variables and explain the difference between the regression and the correlation.
6. Outline linear multiple regression analysis, multiple logistic regression analysis and confounding adjustment.

#### B-1-3) Evidence-based medicine <EBM>

##### Goal:

Acquire a method for appropriate decision making using best available medical knowledge in clinical settings.

##### Objectives:

1. List five steps of evidence-based medicine <EBM>.
2. Formulate the clinical question using patient / population / problem, intervention (exposure), comparison, and outcome <PICO (PECO)>.
3. Outline research designs (observational study [descriptive study, cross-sectional study, case-control study, and cohort study], intervention study (clinical study and randomized controlled trial), systematic review, and meta-analysis).
4. Search evidences from databases or secondary articles, and clinical practice guidelines.
5. Critically appraise the information obtained.
6. List the types of clinical practice guidelines and pitfalls in their use.
7. Describe the difference in grading strength of recommendations in clinical practice guidelines.

#### B-1-4) Epidemiology and preventive medicine

##### Goal:

Learn the significance and current status of health statistics, epidemiology and its application, and disease prevention.

##### Objectives:

1. Explain demographics (static and dynamic populations), classification and statistics of diseases / disabilities (International Classification of Diseases <ICD>, etc.).
2. Explain average and healthy life expectancy.
3. Explain the difference between incident rate and prevalence.
4. Explain epidemiology and its applications (concept of epidemiology, epidemiological indices [risk ratio, risk difference, and odds ratio], and their comparison (age adjustment, standardized mortality ratio <SMR>), bias,



and confounding).

5. Outline the preventive medicine (primary, secondary, and tertiary prevention) and health maintenance promotion (concept and method of health management, health checkup and screening, and post-test education).

#### B-1-5) Lifestyle and risks

Goal:

Learn about lifestyle (including diet) and its risk.

Objectives:

1. Explain the basic concepts (national health promotion campaign, lifestyle-related diseases and risk factors, extension of healthy life expectancy and improvement of quality of life <QOL>, behavioral change, environment improvement for health promotion support, etc.).
2. Explain nutrition, dietary education, and diet.
3. Explain physical activities and exercise.
4. Explain rest and mental health (quality of sleep, insomnia, stress control, overworking measures, and prevention of suicide).
5. Explain smoking (situation, harmfulness, prevention of secondhand smoke, support for smoking cessation) and drinking (situation, harmfulness, recovery support from alcoholism).
6. Explain health management according to the life stage and improvement of environment and lifestyle (environment level, knowledge level, behavior level and behavioral change) according to the life stage.

#### B-1-6) Society, Environment, and Health

Goal:

Understand the relationship between society and health / diseases and learn the impact on health of individuals and social life due to changes in environmental factors surrounding individuals and group of people.

Objectives:

1. Explain health (definition of health), concept of disability and diseases, and social environment (impairment, activity limitation, participation restriction, quality of life <QOL>, normalization, barrier free, universal design, etc.).
2. Outline the relationship between social structure (family, community, regional society, and globalization) and health / diseases (social determinant of health).
3. Outline the impact on health and life from work and health, environment and adaptation, biological environment system, etiology and health behavior, environmental standards and environmental impact assessment, pollution and environmental conservation.
4. Explain the health problems (maternal and child health, school health, occupational health, adult / elderly health) at each life stage.
5. Explain sports medicine.

#### B-1-7) Regional medical care / community health

Goal:

Understand current status and problems of regional medical care and community health, and acquire the ability to contribute to regional medical care.

Objectives:

1. Outline the medical situation in community and society (including remote areas and remote islands), and uneven distribution of physicians (regional, departmental and clinical / nonclinical).
2. Explain the medical plan (catchment area, standard number of beds, regional medical care support hospitals, hospital-clinic and hospital-hospital collaboration, hospital-clinic-pharmacy collaboration, etc.) and community medical vision.
3. Understand the concept of the community-based integrated care system and explain necessity of interprofessional and inter-departmental (including public administration) collaboration in areas of health care (maternal and child health, school health, adult / elderly people's health, community health, mental health), medical care, welfare, and long-term care.
4. Understand the role of primary care physicians and the necessity of primary care as the foundation of regional medical care, and acquire necessary skills for practice.
5. Explain the community system of emergency medical care, home care, and medical care in remote islands and remote areas.
6. Explain disaster medicine (disaster health care, medical relief team, Disaster Medical Assistance Team

<DMAT>, Disaster Psychiatry Assistance Team <DPAT>, Japan Medical Association Team <JMAT>, disaster hospital, triage, etc.).

7. Participate in and contribute actively to regional medical care.

#### B-1-8) Systems of health care, medical care, welfare, and long-term care

Goal:

Learn the contents of the health care, medical care, welfare, and long-term care systems based on the viewpoint of effective use of limited medical resources.

Objectives:

1. Explain the social security system and health economy in Japan (income and expenditure of national medical expenses and future forecast).
2. Explain medical insurance, long-term care insurance and publicly funded health care
3. Explain the characteristics of welfare and medical care for the elderly.
4. Outline the occupational health (including labor related laws and regulations such as Labor Standards Act).
5. Explain securement of the quality of medical care (hospital function evaluation, International Organization for Standardization <ISO>), evaluation indices on quality of medical care, patient satisfaction, patient explanation document, consent form, consent withdrawal form, clinical pathway, etc.).
6. Outline laws and regulations related with medical services such as Medical Practitioners Act and Medical Service Act.
7. List the physician's obligations stipulated by laws and regulations related with medical services.
8. Explain cost-benefit analysis in medical services.
9. Explain the price formation of medical resources and medical services. Explain the medical fee system and set up a medical treatment plan based on that system.
10. Explain the qualification licenses of health professionals, current situation and scope of work, and interprofessional cooperation.
11. Explain the outline and notification obligation of Infectious Disease Law and Food Sanitation Act.
12. Explain the significance and current status of preventive vaccination.
13. Explain the current status and systems for welfare for persons with disabilities and medical practice and welfare for mental health problems.

#### B-1-9) International health

Goal:

Learn about the importance of international health.

Objectives:

1. Outline global health and medical issues (maternal and child health, infectious diseases, non-communicable diseases [NCD]), UHC (Universal Health Coverage), health system (medical system), and health related SDG (Sustainable Development Goals).
2. List and outline international health and medical cooperation (United Nations <UN>; World Health Organization <WHO>; International Labor Organization <ILO>; The Joint United Nations Programme on HIV/AIDS <UNAIDS>; The Global Fund to Fight AIDS, Tuberculosis and Malaria <GF>; The Global Alliance for Vaccines and Immunization <GAVI>, the Japan International Cooperation Agency <JICA>, Official Development Assistance <ODA>, Non-Governmental Organization <NGO>).

### B-2 Forensic medicine and related laws and regulations

#### B-2-1) Death and law

Goal:

Understand determination of death, how to diagnose causes of death, and external examination of the corpse.

Objectives:

1. Explain vegetative state, brain death, cardiac death and determination of brain death.
2. Explain how to deal with unnatural death / corpse and external examination of the corpse.
3. Document a death certificate and a postmortem certificate.
4. Explain the methods of personal identification.
5. Explain pathological and forensic autopsies (judicial autopsy, administrative autopsy, autopsy based on Act on the survey of the cause of death or the identity of the corpses, and consented autopsy).

## B-2-2) Clinical information and various certificates

### Goal:

Learn how to use clinical information, information management and privacy protection.

### Objectives:

1. Explain basic knowledge regarding medical records (management and preservation of medical records (including electronic medical records); contents of medical records; disclosure of clinical information; privacy protection; information security; problem-oriented medical record <POMR>; subjective, objective, assessment, and plan <SOAP>), and document them actually.
2. Explain various records related to medical practice (prescription, hospital medical care plan, record of laboratory tests / images / operation record and discharge summary).
3. Explain the diagnostic, postmortem, and other certificates (diagnostic certificate, birth certificate, stillbirth certificate, postmortem certificate for stillbirth, death certificate, and postmortem certificate).
4. Develop computerized clinical information and explain how to manage it.

## B-3 Medical research and ethics

### B-3-1) Ethical norm and practice ethics

#### Goal:

Learn about the importance of medical research and ethics in medical development.

#### Objectives:

1. Explain medical research and its ethics (ethical guidelines and laws corresponding to each research).
2. Outline the differences among clinical research, clinical trials, pre-marketing and post-marketing clinical trials.
3. Explain clinical trials, pre-marketing clinical trials and ethics (Helsinki declaration; Phase 1, 2, 3, and 4 clinical trials; Good Clinical Practice <GCP>; Committee for clinical trials; institutional review board <IRB> and ethics committee).
4. Outline the laws related to drugs and list matters relating to proper use of pharmaceuticals.
5. Explain the difference between side effects and adverse events, and the significance of the report (safety information reporting system for pharmaceuticals, medical devices, etc.).

## B-4 Social sciences related to medical practice

### B-4-1) Social characteristics required of a physician

#### Goal:

Learn basic knowledge, ways of thinking, and liberal arts to understand the human mind and social mechanisms in the cultural and social context. Deeply understand viewpoints, methods, and theories of cultural anthropology and sociology (mainly medical anthropology and medical sociology) concerning health, illness, and medical care to apply the knowledge of behavioral science and social science in clinical practice.

#### Objectives:

1. Outline the basic viewpoints, methods, and theories of behavioral science and social science such as medical anthropology and medical sociology.
2. Explain the cultural diversity of disease, health, medical care, and death.
3. Relativize one's own culture to which the one belongs.
4. Explain how diseases and health are regarded in people's everyday life settings.
5. Explain the meaning of a person's words and actions in the context of the person's life history or social relations.
6. Think about the relationship between culture / gender and medical care.
7. Set the agenda and suggest solutions according to the context regarding cultural friction in the field of international health and medical cooperation.
8. Regard society as a system.
9. Outline the sick role.
10. Outline the difficulty of interpersonal service workers (burnout risk).
11. Evaluate the medical practice in actual settings based on economic and system aspects.
12. Overview comprehensively the relationship between home care and hospitalization or long-term care in a facility.
13. Understand that various members such as medical / health / welfare professionals, patients / clients, their families, local people, etc. are involved in the health care from different perspectives.

14. Find cultural and social issues in actual clinical cases.

## C. General Issues in Medicine

### C-1 Science of life phenomena

#### C-1-1) Minimal units of life - cells

##### Goal:

Learn the cell structure, its various functions, and the life phenomenon based on the flow from gene to protein, and understand genetic engineering methods and applications, and the analysis of the human genome.

##### C-1-1) - (1) Cell structure and function

###### Objectives:

1. Explain cell observation methods.
2. Illustrate the whole picture of the cell.
3. Explain the structure and function of the cell nucleus and ribosomes.
4. Explain the structure and function of the intracellular membrane system that includes endoplasmic reticulum, Golgi apparatus, lysosome, etc.
5. Explain the structure and function of mitochondria and chloroplasts.
6. Outline the types of cytoskeletal components and their structure and function.
7. Explain the structure and function of the cell membrane, and the adhesion and bonding mode between cells.
8. Explain the characteristics of prokaryotic and eukaryotic cells.

##### C-1-1) - (2) Genome / chromosome / gene

###### Objectives:

1. Explain Mendelian laws, mitochondrial inheritance, genomic imprinting and multifactorial inheritance.
2. Explain the relationship between genotype and phenotype.
3. Outline the structure of chromosome and explain the structure and relation of genome, chromosome, and gene, and chromosome behavior in somatic cell division and meiosis.
4. Outline the replication and repair of deoxyribonucleic acid <DNA>.
5. Explain the expression and regulation of genetic information including transcription from deoxyribonucleic acid <DNA> to ribonucleic acid (RNA) and translation into protein synthesis (central dogma).
6. Outline genomic analysis technology including chromosome analysis and DNA sequencing.

#### C-1-2) Evolution of living things

##### Goal:

Know the evolution of living things, and learn the body structure and mechanisms of animals from the comparative biological viewpoint.

##### C-1-2) - (1) Evolution of living things

###### Objectives:

1. Explain the basic idea of evolution.
2. Outline the species of living things and their lineage relationship.
3. Outline the molecular phylogenetic tree by comparing amino acid nucleotide sequences.

### C-2 Structure and function of individuals

#### C-2-1) Cell structure and function

##### Goal:

Understand the microstructure and function of the cell.

##### C-2-1) - (1) Cell membrane

###### Objectives:

1. Explain the ionic composition of intracellular and extracellular fluids, osmotic pressure, and resting membrane potential.
2. Outline the functions of ion channels, pumps, receptors and enzymes of cell membrane.
3. Explain the active and passive transport processes of substances via cell membranes.
4. Explain the process of secretion and absorption through the cell membrane.

##### C-2-1) - (2) Cytoskeleton and cell motility

###### Objectives:

1. Outline proteins that constitute the cytoskeleton and their functions.
2. Explain cell motility by actin filament system.
3. Explain the intracellular transport system.
4. Explain the role and function of microtubules.

#### C-2-2) Structure and function of tissues and organs, and organ position relationship

##### Goal:

Understand the structure and functional differentiation of tissues and organs as aggregation of cells, and terminologies of the anatomical position.

#### C-2-2) - (1) Structure and function of tissues and each organ

##### Objectives:

1. Explain structure and function of epithelial tissue and glands.
2. Explain cells and intercellular substance (fibers and ground substance) in supporting tissues.
3. Explain the microstructure and function of blood vessels and lymph vessels.
4. Explain the microstructure of nerve tissue.
5. Explain structure and function of skeletal, cardiac and smooth muscle tissues in a comparison.
6. Explain the mechanism of tissue regeneration.

#### C-2-2)-(2) Organ position relationship

##### Objectives:

1. Explain relative positions with directional terms (superior-inferior, anterior-posterior, medial-lateral, superficial-deep, cranial-caudal, and dorsal-ventral).

#### C-2-3) Regulation mechanisms and homeostasis of organisms

##### Goal:

Understand the mechanism of cell communication and biological defense to maintain biological homeostasis.

#### C-2-3) - (1) Basics of signaling

##### Objectives:

1. Explain the types and function of signaling.
2. Explain the mechanism of signaling by receptors.
3. Explain intracellular signal transduction process.

#### C-2-3) - (2) Basics of signaling by the nerve

##### Objectives:

1. Explain the generation mechanism and conduction of action potentials.
2. Explain the morphology of synapses (including neuromuscular junction), synaptic transmission functions (excitability, inhibitory) and plasticity.
3. Explain axonal transport, and degeneration and regeneration of axons.
4. Explain the types and mechanism of sensory transduction of stimuli.
5. Explain reflex.

#### C-2-3) - (3) Mechanism of host defense

##### Objectives:

1. Explain innate immune system of living body.
2. Explain the role of the adaptive immune system as a specific defense mechanism.
3. Explain humoral and cellular immune responses.

#### C-2-3) - (4) Homeostasis

##### Objectives:

1. Explain the homeostatic maintenance and adaptation of a living body.
2. Explain the regulatory mechanism of homeostasis (negative feedback regulation).
3. Explain rhythmic change of biological function and internal environment.
4. Explain the importance of interaction between normal flora including enterobacteria and host in maintaining the homeostasis of the living body.
5. Explain changes in nerve / skeletal muscle, cardiovascular system, and metabolic system during physical activity such as exercise physiology.

## C-2-4) Ontogenesis

### Goal:

Understand the process of ontogenesis and organ development.

### Objectives:

1. Explain the sequential processes from gamete formation to birth and the overall picture of embryogenesis.
2. Explain the formation and differentiation of somites.
3. Outline the skeleton and muscle formation processes of the trunk and limbs.
4. Outline the formation process of gastrointestinal and respiratory organs.
5. Explain the formation process of the cardiovascular system.
6. Outline the formation process of each organ of urogenital system.
7. Outline the formation process of intraembryonic coelom.
8. Outline differentiation of the branchial arches and pouches and the formation process of the head / neck and face / oral cavity.
9. Outline the differentiation of neural tube and the formation processes of the brain, spinal cord, visual organs, vestibulocochlear organ, and autonomic nerve system.

## C-2-5) Metabolism of biological substances

### Goal:

Understand metabolic dynamics of biological substances.

### Objectives:

1. Explain the function and regulation of the enzymes.
2. Explain the glycolytic pathway and the regulatory mechanism.
3. Explain the citric acid cycle.
4. Explain the electron transfer system and oxidative phosphorylation.
5. Explain the pathway and regulatory mechanism of gluconeogenesis.
6. Explain the pathway of glycogen synthesis and degradation.
7. Explain the significance of the pentose phosphate cycle.
8. Explain lipid synthesis and degradation.
9. Explain the structure and metabolism of lipoproteins.
10. Explain protein synthesis and degradation.
11. Outline the pathway of amino acid catabolism and urea synthesis.
12. Explain the metabolism of heme and porphyrins.
13. Explain the pathway of nucleotide synthesis, catabolism, and recycling.
14. Explain the generation and action of oxidative stress (free radical and radical oxygen).
15. Explain types and functions of vitamins and trace elements.
16. Understand energy metabolism (definition of energy, energy value in food, energy consumption, estimated energy requirement), and explain metabolism during fasting (starvation), after meal (overeating) and during exercise.

## C-3 Reaction of individuals

### C-3-1) Host and microorganisms

#### Goal:

Understand the basic characteristics and pathogenicity of microorganisms, and diseases caused by them.

#### C-3-1) - (1) Basic characteristics and pathogenicity of virus

##### Objectives:

1. Illustrate viral structure and explain the function of each part.
2. Classify viruses according to structure and characteristics.
3. Generalize and explain the replication and transcription process of deoxyribonucleic acid <DNA> and ribonucleic acid <RNA> genomes.
4. Explain each process of viral adsorption, invasion, replication, maturation, and release.
5. Explain changes occurring in virus-infected cells.
6. Explain species specificity, tissue specificity, and pathogenicity of virus infection.
7. Explain specific examples of major mode of transmission.

#### C-3-1) - (2) Host response to and prevention from virus infection

##### Objectives:

1. Explain neutralizing reaction and cellular immunity against virus.
2. Explain the preventive principle of vaccines from viral infection.
3. Explain the types and problems of the vaccines.

#### C-3-1) - (3) Characteristics and pathogenicity of viruses

##### Objectives:

1. List diseases caused by common deoxyribonucleic acid <DNA> viruses (cytomegalovirus <CMV>, Epstein-Barr <EB> virus, adenovirus, parvovirus B19, human herpes virus, hepatitis B virus, human papilloma virus).
2. List diseases caused by common ribonucleic acid <RNA> viruses (influenza virus, measles virus, mumps virus, rubella virus, poliovirus, coxsackie virus, enteric cytopathic human orphan (ECHO) virus, rhinovirus, hepatitis A virus, type C Hepatitis virus).
3. Explain and classify the characteristics of retrovirus (human immunodeficiency virus <HIV>) and general genome structure.

#### C-3-1) - (4) Bacteria / fungi

##### Objectives:

1. Illustrate the structure of bacteria and classify them according to their morphology and staining properties.
2. Classify and explain the routes of bacterial transmission.
3. Explain mechanisms of the diseases caused by bacterial infection.
4. List bacteriological features of Gram-positive cocci (*Staphylococcus* sp. and *Streptococcus* sp.) and diseases caused by them.
5. List bacteriological features of Gram-negative cocci (*Neisseria gonorrhoeae*, *Neisseria meningitidis*) and the diseases caused by them.
6. List bacteriological features of Gram-positive bacilli (*Clostridium tetani*, *Clostridium botulinum*, *Clostridium perfringens*, *Corynebacterium diphtheriae*) and the diseases caused by them.
7. List bacteriological features of Gram-negative bacilli (*Escherichia coli*, *Salmonella enterica*, *Salmonella Typhi*, *Yersinia pestis*, *Vibrio cholerae*, *Bordetella pertussis*, *Vibrio parahaemolyticus*, *Pseudomonas aeruginosa*, *Brucella* sp., *Legionella* sp., and *Haemophilus influenza*) and the diseases caused by them.
8. List bacteriological features of and the diseases caused by the Gram-negative spirillum pathogen (*Helicobacter pylori*).
9. List bacteriological features of acid-fast bacterium (tubercle bacillus, non-tuberculous acid-fast bacterium) and diseases caused by them.
10. List microbiological features of fungi (*Aspergillus* sp., *Cryptococcus* sp., *Candida* sp., *Mucor* sp.) and the diseases caused by them.
11. List microbiological features of Spirochetes, Mycoplasma, Rickettsiae, and Chlamydia, and diseases caused by them.

#### C-3-1) - (5) Parasites

##### Objectives:

1. Explain the classification and morphological characteristics of protozoa and helminths.
2. Explain the life cycle, infection routes, and epidemiological significance of parasites.
3. Explain the characteristics of the defense mechanisms in parasite-infected hosts.
4. Explain major parasitic diseases in each organ.
5. Explain the diagnosis, treatment, and prevention of parasitic diseases.

#### C-3-2) Immunity and host defense

##### Goal:

Understand the mechanism of the immune system at the molecular level, immune response to pathogens, major autoimmune diseases, congenital or acquired immune deficiency syndrome (AIDS) and the response of the immune system to cancer cells.

#### C-3-2) - (1) General characteristics of the immune system

##### Objectives:

1. Explain the characteristics of immune system in the host defense mechanism (specificity, diversity, tolerance, and memory).
2. Explain the tissues and cells involved in the immune response.
3. Explain the establishment and failure of immunological self discrimination.
4. Explain the difference between innate and acquired immunity.



### C-3-2) - (2) Molecules involved in self / non-self discrimination and their roles

#### Objectives:

1. Explain basic structure of Class 1 and 2 major histocompatibility complex (MHC) and difference in their antigen presentation pathways.
2. Explain the structure and reaction pattern of immunoglobulin and T cell antigen receptor.
3. Explain the mechanism of diversity acquisition based on the structure and reconstitution of immunoglobulin and T cell antigen receptor genes.
4. Outline the establishment of the identification mechanism of self / non-self and immunological tolerance.

### C-3-2) - (3) Regulatory mechanism of immune response

#### Objectives:

1. Outline the regulatory mechanisms to enhance or attenuate the signal from the antigen receptor.
2. Explain the characteristics of typical cytokines and chemokines.
3. Explain the host defense responses that the helper T cells (Th1 cell, Th2 cell, Th17 cell), cytotoxic T cells (cytotoxic T lymphocyte <CTL>) and regulatory T cells (regulatory T cell <Treg>) cooperatively work.

### C-3-2) - (4) Disease and immunity

#### Objectives:

1. Explain the characteristics of the immune response to viruses, bacteria, fungi, and parasites.
2. Outline of congenital and acquired immunodeficiency syndrome <AIDS>.
3. Outline the maintenance mechanism of immune tolerance and the onset of autoimmune diseases due to its failure.
4. Outline the mechanism of allergy development (Coombs classification).
5. Outline the cellular mechanisms involved in cancer immunity.

### C-3-3) Drug and host response

#### Goal:

Understand the action of drugs and poisons on living body, mechanisms of action at individual, cellular, and molecular levels, and interaction between living body and drug molecules, and learn basic concepts necessary for appropriate drug therapy.

### C-3-3) - (1) Basis of pharmacological action

#### Objectives:

1. Draw drug / poison concentration-response curves and explain the determinants.
2. Explain the quantitative relationship between receptor binding and drug action, and active drugs / antagonists / molecular targeted drugs.
3. Draw drug / poison dose-response curves and explain the relationship among the effective dose, toxic dose, and lethal dose.

### C-3-3) - (2) Pharmacokinetics of drugs

#### Objectives:

1. Explain absorption, distribution, metabolism, and excretion of drugs and poisons.
2. Explain factors that affect the biological membrane passage of drugs.
3. List the drug administration method (oral, sublingual, skin, mucosa, rectum, injection, inhalation, eye drops, nasal drop, etc.) and explain pharmacokinetics of each.

### C-3-3) - (3) Drug evaluation

#### Objectives:

1. Explain the significance of the placebo effect on drug evaluation.

## C-4 Etiology and pathophysiology

### C-4-1) Genetic diversity and diseases

#### Goal:

Understand the relationship between diseases and genomes / chromosomes / genetic diversity.

#### Objectives:

1. Explain the diversity of individuals based on genomic diversity.
2. Explain the inheritance pattern of single-gene disorders and list typical diseases.
3. List and outline major diseases caused by chromosomal abnormality.

4. List and outline diseases caused by mutations in the mitochondrial genes.
5. Outline the epigenomic mechanism and related diseases.
6. Outline the relationship between genetic factors and environmental factors in multifactorial diseases.
7. Outline the relationship between drug effectiveness / safety and genomic diversity.

#### C-4-2) Cell injury / degeneration and cell death

##### Goal:

Understand the causes of cell injury / degeneration and cell death and morphological changes of cells and tissues.

##### Objectives:

1. Explain the diversity, causes, and significance of cell injury, degeneration, and cell death.
2. Explain morphological changes of cells and tissues in cell injury, degeneration, and cell death.
3. Explain the difference between necrosis and apoptosis.

#### C-4-3) Metabolic disorders

##### Goal:

Understand various diseases caused by metabolic abnormalities such as carbohydrate, protein, lipid, etc.

##### Objectives:

1. Explain the pathophysiology of carbohydrate metabolism abnormality.
2. Explain the pathophysiology of protein / amino acid metabolism abnormality.
3. Explain the pathophysiology of lipid metabolism abnormality.
4. Explain the pathophysiology of abnormal metabolism of nucleic acid and nucleotide.
5. Explain the pathophysiology of abnormal metabolism of vitamins and trace elements.
6. Explain the pathophysiology of abnormal metabolism caused by the obesity.

#### C-4-4) Circulatory disorders, organ failure

##### Goal:

Understand the etiology and pathophysiology of circulatory disorders and organ failure.

##### Objectives:

1. Explain the difference of blood flow disorders (avascularity, ischemia, hyperemia, congestion, and bleeding) and etiology and pathophysiology of each.
2. Explain the types and pathophysiology of infarction (thrombus and embolus).
3. Explain shock (distributive shock [anaphylactic, infectious (septic), neurogenic], circulating hypovolemic shock [hemorrhagic, fluid loss], cardiogenic shock [myocardial, mechanical, arrhythmia], and occlusive shock [cardiac tamponade, pulmonary embolism, tension pneumothorax]).
4. Explain abnormal blood pressure (hypertension and hypotension).
5. Explain organ failure (multiple organ failure, multiple organ dysfunction syndrome <MODS>).

#### C-4-5) Inflammation and wound healing

##### Goal:

Understand the concept of inflammation, its relationship to infection, and the healing process.

##### Objectives:

1. Explain the definition of inflammation.
2. Explain the classification of inflammation, histomorphological change and temporal change (local and systemic change).
3. Explain inflammatory changes due to infection.
4. Outline the wound healing process.

#### C-4-6) Tumor

##### Goal:

Understand the mechanisms and pathology of carcinogenesis.

##### Objectives:

1. Explain the difference among autonomous proliferation, benign tumor, and malignant tumor.
2. Explain the causes and genetic changes of cancers.
3. Outline classification, degree of differentiation, grade, and stage of the tumor.

4. Explain the terms (dysplasia, carcinoma in situ, advanced cancer, early stage cancer, atypicality, pleomorphism, etc.).
5. Outline the diagnosis and treatment of cancer.
6. Explain the metastasis of cancer.

## C-5 Human behavior and psychology

Goal:

Learn the basic knowledge and way of thinking to understand human behavior and psychology.

### C-5-1) Human behavior

Objectives:

1. Outline the relationship of behavior with perception, learning, memory, cognition, language, thought, and personality.
2. Explain the basic cognitive process of behavior.
3. Outline the relationship of behavior with human internal factors, social and cultural environment.

### C-5-2) Mechanisms of behaviors

Objectives:

1. Explain instinctive and learning behavior (adaptive or non-adaptive learning).
2. Explain the respondent conditioning (learning the relationship between different events) and the operant conditioning (learning the relationship between the reaction and the result).
3. Outline social learning (modeling, observatory learning, and imitation learning).

### C-5-3) Motivation

Objectives:

1. Outline physiological motivation (self-preservation, tribal conservation), intrinsic motivation (activity, sensitivity, curiosity, operation, etc.) and social motivation (accomplishment, affinity, attachment, domination, etc.).
2. Illustrate examples of motivation.
3. Outline the relationship among desire and frustration / conflict.
4. Outline the mechanisms of adaptation (defense).

### C-5-4) Stress

Objectives:

1. Outline the major stress theories.
2. Illustrate the stressors and their impact on the health in the whole life, daily life and at work.
3. Explain the psychosocial factors related to the stress-coping process.
4. Outline methods to cope with stress.

### C-5-5) Mental development

Objectives:

1. Outline the principles of mental development.
2. Outline mental development and developmental issues at each stage of the life cycle.
3. Outline genetic and environmental factors related to mental development.

### C-5-6) Individual differences

Objectives:

1. Outline the types and characteristics of personality.
2. Outline the development of personality.
3. Outline intellectual development and changes over time.
4. Outline the role theory.
5. Explain gender formation, sexual orientation, and ways of consideration for gender identification.

### C-5-7) Interpersonal relations and communication

Objectives:

1. Outline psychological factors related to interpersonal relationships.
2. Outline the relationship between desire and behavior in human relationship.
3. Outline the major interpersonal behaviors (aid, attack, etc.).
4. Outline human relations in the group (competition and cooperation, conformity, obedience and resistance,

- leadership).
5. Explain effective interpersonal communication.
  6. Explain the roles of the speaker and listener, and apply appropriate communication skills.
  7. Illustrate cultural influences on individuals and groups.
  8. Illustrate that the communication manner is different depending on culture and custom.

#### C-5-8) Theories and skills in behavioral change

##### Objectives:

1. Outline the motivation for health behavior and behavioral change.
2. Explain behavioral therapy.
3. Explain cognitive behavioral therapy.
4. Explain psychological education.
5. Outline patient support (autonomy support) and health guidance in lifestyle-related diseases.

## D. Normal Structure and Function, Pathophysiology, Diagnosis, and Treatment of Each Organ System of the Human Body

Objectives of signs and symptoms are basically extracted and quoted from F-1 approach from signs and symptoms / pathophysiology or G-2 clinical reasoning.

### D-1 Blood, hematopoietic organs, lymphatic system

Goal:

Understand the structure and function of the blood, hematopoietic and lymphatic systems, and learn the etiology, pathophysiology, signs and symptoms, diagnosis and treatment of the major diseases.

#### D-1-1) Structure and function

Objectives:

1. Explain the structure of bone marrow.
2. Explain the process of differentiation and maturation from hematopoietic stem cells to each blood cell.
3. Explain the major hematopoietic factors (erythropoietin, granulocyte-colony stimulating factor, and thrombopoietin).
4. Explain the structure and function of the spleen, thymus, lymph node, tonsils and Peyer's patch.
5. Explain the types and function of plasma proteins.
6. Explain the structure and function of erythrocytes and hemoglobin.
7. Explain the types and function of leucocytes.
8. Explain the function of thrombocytes and the mechanisms of hemostasis and coagulation / fibrinolysis.

#### D-1-2) Basics of diagnoses and tests

Objectives:

1. Explain the reference values of the peripheral blood count and the significance of their change.
2. Explain bone marrow examination (bone marrow aspiration, bone marrow biopsy).
3. Explain the reference value of plasma proteins and the significance of their change.

#### D-1-3) Signs and symptoms

Objectives:

1. Fever
2. General fatigue
3. Jaundice
4. Anemia
5. Bleeding tendency
6. Lymphadenopathy
7. Abdominal distension (including ascites) or mass

#### D-1-4) Diseases

##### D-1-4) - (1) Anemia

Objectives:

1. Classify anemia, and list laboratory tests useful for their differential diagnoses.
2. Explain the etiology, pathophysiology, diagnosis and treatment of iron deficiency anemia and secondary anemia.
3. Explain the etiology, pathophysiology, diagnosis, treatment, and prognosis of aplastic anemia and paroxysmal nocturnal hemoglobinuria (PNH)
4. Explain the etiology, pathophysiology, diagnosis and treatment of hemolytic anemia.
5. Explain the etiology, pathophysiology, diagnosis and treatment of megaloblastic anemia.

##### D-1-4) - (2) Bleeding tendency, purpura, etc.

Objectives:

1. Explain the etiology, pathophysiology, signs and symptoms, and diagnosis of bleeding tendency.
2. Explain the pathophysiology, signs and symptoms, diagnosis, and treatment of immune thrombocytopenic purpura (ITP).
3. Explain the pathophysiology, signs and symptoms, diagnosis, treatment and inheritance pattern of hemophilia.

4. Explain the underlying disease, pathophysiology, diagnosis and treatment of disseminated intravascular coagulation (DIC).
5. Explain the underlying disease, pathophysiology, diagnosis, and treatment of hemolytic-uremic syndrome (HUS).
6. Outline IgA vasculitis (Schönlein-Henoch purpura).
7. Outline thrombotic thrombocytopenic purpura (TTP).

#### D-1-4) - (3) Splenic diseases

##### Objectives:

1. List diseases that cause splenomegaly, and explain the points for differential diagnoses.

#### D-1-4) - (4) Neoplastic diseases

##### Objectives:

1. Explain the pathophysiology, signs and symptoms, pathological findings, treatment and prognosis of acute leukemia.
2. Outline the classification of French-American-British <FAB> and World Health Organization <WHO> of acute leukemia.
3. Explain the pathophysiology, signs and symptoms, pathological findings, treatment and prognosis of chronic myelogenous leukemia.
4. Explain the clinical feature and pathological findings of myelodysplastic syndromes (MDS).
5. Explain the etiology, epidemiology, clinical findings, pathological findings of adult T cell leukemia.
6. Explain the difference between pediatric and adult leukemia.
7. Explain the etiology, pathophysiology, diagnosis, and treatment of true polycythemia, essential thrombocythemia, and myelofibrosis.
8. Outline the classification of malignant lymphoma and explain its pathology, signs and symptoms, pathological findings, treatment and prognosis.
9. Explain the pathology, signs and symptoms, diagnosis, treatment and prognosis of multiple myeloma.

## D-2 Nervous system

### Goal:

Understand the normal structure and function of the nervous system and learn the etiology, pathophysiology, signs and symptoms, diagnosis, and treatment of the major diseases of the nervous system.

#### D-2-1) Structure and function

##### D-2-1) - (1) General characteristics of nervous system

##### Objectives:

1. Outline the organization of the central and peripheral nervous system.
2. Explain the blood supply of the brain and the blood brain barrier.
3. Explain the characteristics of energy metabolism in the brain.
4. Explain major neurotransmitters (acetylcholine, dopamine, and noradrenaline) and their actions.
5. Explain the structure of meninges and cerebral ventricular system, and production and circulation of cerebrospinal fluid.

##### D-2-1) - (2) Spinal cord and spinal nerve

##### Objectives:

1. Explain the structure, functional localization, and neural pathways of the spinal cord.
2. Explain spinal reflex (extensor and flexor) and reciprocal innervation of skeletal muscles.
3. Outline the organization of the spinal nerves and the plexuses (cervical, brachial, lumbar, and sacral plexuses), and the neural supply for major skeletal muscles and skin distribution (dermatome).

##### D-2-1) - (3) Brain stem and cranial nerves

##### Objectives:

1. Explain the structure and neural pathway of the brain stem.
2. Outline names, localization of nucleus, tract, distribution, and function of the cranial nerves.
3. Outline the function of the brain stem.

##### D-2-1) - (4) Cerebrum and its higher-order functions

##### Objectives:

1. Explain the structure of the cerebrum.

2. Explain the functional localization of the cerebral cortex (motor, sensory, and language areas).
3. Outline the mechanism of memory and learning in reference to the organization of the limbic system.

#### D-2-1) - (5) Motor system

##### Objectives:

1. Outline the neural mechanism of voluntary movement, mainly regarding the pyramidal tract.
2. Outline the structure and function of the cerebellum.
3. Outline the neural connection and function of basal ganglia (corpus striatum, globus pallidus, and substantia nigra).

#### D-2-1) - (6) Sensory system

##### Objectives:

1. Explain the neural mechanism and pathways for pain, temperature, tactile sensation and deep sensation.
2. Outline the neural mechanism and pathways for vision, hearing / equilibrium, olfaction, and gustation.

#### D-2-1) - (7) Autonomic function and instinctive behavior

##### Objectives:

1. Outline the central and peripheral distribution, function, and neurotransmitters of the sympathetic and parasympathetic nervous system.
2. Outline the structure and function of the hypothalamus in relation to endocrine and autonomic function.
3. Outline the neural mechanisms of the stress response and instinctive / emotional behaviors.

#### D-2-2) Basics of diagnoses and tests

##### Objectives:

1. Explain indications and abnormal findings of computed tomography (CT) and magnetic resonance imaging (MRI) of the brain / spinal cord and interpret the results.
2. Explain information obtained by electrophysiological examination of the nervous system (electroencephalogram, electromyogram, and nerve conduction study).

#### D-2-3) Signs and symptoms

##### Objectives:

1. Convulsion
2. Consciousness disorder / syncope
3. Dizziness
4. Headache
5. Motor paralysis / muscle weakness

#### D-2-3) - (1) Ataxic disorders and involuntary movements

##### Objectives:

1. Differentiate and explain cerebellar / vestibular / sensory ataxia disorders.
2. Outline tremors.
3. Outline other involuntary movements (myoclonus, chorea, dystonia, asterixis, athetosis, and tic).

#### D-2-3) - (2) Gait disturbance

##### Objectives:

1. Classify gait disorders based on the pathophysiology.

#### D-2-3) - (3) Speech disorders

##### Objectives:

1. Explain the difference between aphasia and dysarthria.

#### D-2-3) - (4) Increased intracranial pressure

##### Objectives:

1. Explain the pathophysiology of cerebral edema.
2. Explain signs and symptoms of acute and chronic intracranial hypertension.
3. Explain the types and symptoms of cerebral hernia.

#### D-2-4) Diseases

#### D-2-4) - (1) Brain / spinal cord vascular disorders

Objectives:

1. Explain the pathophysiology, signs and symptoms, and diagnosis of cerebrovascular disorders (cerebral hemorrhage, subarachnoid hemorrhage, intracranial hematoma, cerebral infarction, transient ischemic attack).
2. Outline treatment and rehabilitation in acute, convalescent, and chronic phase of cerebrovascular disorders.

D-2-4) - (2) Dementia and degenerative diseases

Objectives:

1. List etiology of dementia.
2. Explain signs and symptoms and diagnosis of the major pathological conditions that cause dementia (Alzheimer's disease, Lewy body dementia, vascular dementia).
3. Explain the pathophysiology, signs and symptoms, and diagnosis of Parkinson's disease.
4. Outline amyotrophic lateral sclerosis.
5. Outline multiple system atrophy.

D-2-4) - (3) Infectious, inflammatory, demyelinating diseases

Objectives:

1. Explain etiology, signs and symptoms, and diagnosis of encephalitis / meningitis and encephalopathy.
2. Explain the pathophysiology, signs and symptoms, and diagnosis of multiple sclerosis.

D-2-4) - (4) Head trauma

Objectives:

1. Explain the classification of traumatic brain injury.
2. Explain signs and symptoms and diagnosis of acute epidural / subdural and chronic subdural hematoma.
3. Explain higher brain dysfunction after traumatic brain injury.

D-2-4) - (5) Peripheral neuropathy

Objectives:

1. Classify the etiology (malnutritional, intoxicated, and hereditary) and pathophysiology of peripheral neuropathy.
2. Explain signs and symptoms and diagnosis of Guillain-Barré syndrome.
3. Explain signs and symptoms and diagnosis of Bell's palsy.
4. Outline the major neuropathic pain (trigeminal and sciatic neuralgia).

D-2-4) - (6) Muscle diseases

Objectives:

1. Explain the pathophysiology, signs and symptoms, and diagnosis of myasthenia gravis.
2. Explain etiology, classification, signs and symptoms, and diagnosis of progressive muscular dystrophy.
3. Outline periodic paralysis.

D-2-4) - (7) Seizure disorders

Objectives:

1. Explain the classification, diagnosis and treatment of epilepsy.

D-2-4) - (8) Headache

Objectives:

1. Explain the classification, diagnosis and treatment of headache (migraine, tension-type headache, etc.).

D-2-4) - (9) Congenital and perinatal brain disorders

Objectives:

1. Explain etiology, types, signs and symptoms, and rehabilitation of cerebral palsy.
2. Explain signs and symptoms and treatment of hydrocephalus.

D-2-4) - (10) Neoplastic disease

Objectives:

1. Explain the classification and common sites, and outline pathophysiology of major cerebral and spinal cord tumors.

## D-3 Skin

Goal:



Understand the structure and function of the skin, and learn etiology, pathophysiology, signs and symptoms, diagnosis, and treatment of major skin diseases.

#### D-3-1) Structure and function

Objectives:

1. Illustrate and explain histological structure of the skin.
2. Explain the metabolism of skin cells and keratinization mechanisms.
3. Explain the immune defense capacity of the skin.

#### D-3-2) Basics of diagnoses and tests

Objectives:

1. Outline skin test method (glass pressure method, skin stroking method (Darier's sign), Nikolsky phenomenon, Tzanck test, photo test).
2. Explain the skin allergy test method (prick test, intradermal test, patch test).
3. Outline microbial test method (sample collection method, caustic potash <KOH> direct microscopy method).

#### D-3-3) Signs and symptoms

Objectives:

1. Rash

#### D-3-4) Diseases

##### D-3-4) - (1) Eczema / dermatitis

Objectives:

1. Explain the eczema response.
2. List and outline the diseases of eczema / dermatitis (contact dermatitis, atopic dermatitis, seborrheic dermatitis, nummular eczema, asteatotic eczema, autosensitizing dermatitis).

##### D-3-4) - (2) Urticaria, erythema, erythroderma and cutaneous pruritis

Objectives:

1. Explain pathophysiology, diagnosis, and treatment of urticaria.
2. Explain the etiology and pathophysiology of erythema exsudativum multiforme, annular erythema and erythroderma.
3. Explain the etiology and pathology of cutaneous pruritus.

##### D-3-4) - (3) Purpura / impaired blood flow and vasculitis

Objectives:

1. Explain etiology, signs and symptoms, and pathophysiology of circulation disorders and vasculitis of the skin.

##### D-3-4) - (4) Drug eruption and drug-induced disorders

Objectives:

1. Explain mechanisms, signs and symptoms, and treatment of drug eruptions and drug-induced diseases.
2. List major drugs prone to skin eruptions.

##### D-3-4) - (5) Bullous diseases and pustulosis

Objectives:

1. Explain etiology, pathophysiology, and classification of autoimmune bullous diseases.
2. Explain the types and pathophysiology of pustulosis.
3. Explain the test method for differentiating bullous diseases.

##### D-3-4) - (6) Psoriasis and keratosis

Objectives:

1. Explain pathophysiology, signs and symptoms, and treatment of psoriasis vulgaris, lichen planus, and pityriasis rosea (Gibert).
2. Explain the pathophysiology, signs and symptoms, and treatment of ichthyosis.

##### D-3-4) - (7) Skin infection

Objectives:

1. List and outline cutaneous bacterial infections (impetigo, furuncle, carbuncle, folliculitis, erysipelas, and staphylococcal scalded skin syndrome).
2. Explain signs and symptoms, and types of dermatomycosis (superficial or deep).
3. Explain signs and symptoms, types, and pathogenic bacteria of skin tuberculosis.
4. Explain signs and symptoms, stages, and complications of syphilis.
5. List and outline skin viral infections (herpes simplex, herpes zoster, molluscum contagiosum, measles, rubella, and varicella).
6. List and outline the skin symptoms associated with acquired immunodeficiency syndrome <AIDS> (syphilis, refractory herpes, molluscum contagiosum, Kaposi's sarcoma, etc.).

#### D-3-4) - (8) Nevi / skin tumors

##### Objectives:

1. List types of nevi and phacomatosis.
2. Explain types and differential diagnoses of benign, precancerous, and malignant skin tumors.
3. Explain skin malignant lymphoma and angiosarcoma.
4. Explain the definition, pathophysiology, signs and symptoms, findings of eruption and dermoscopy, pathological findings, diagnosis, and treatment method of basal cell carcinoma (epithelioma).
5. Explain the definition, pathophysiology, signs and symptoms, findings of eruption and dermoscopy, pathological findings, diagnosis, and treatment method of squamous cell carcinoma.
6. Explain the definition, pathophysiology, signs and symptoms, findings of eruption and dermoscopy, pathological findings, diagnosis, and treatment methods of malignant melanoma.

#### D-3-4) - (9) Other skin-related diseases

##### Objectives:

1. Explain the pathophysiology, symptoms, and treatment of hair diseases.
2. Explain the pathophysiology, symptoms, and treatment of nail diseases.

## D-4 Motor (musculoskeletal) system

### Goal:

Understand the normal structure and function of the musculoskeletal system and learn the etiology, pathophysiology, signs and symptoms, diagnosis, and treatment of major diseases of the motor system.

#### D-4-1) Structure and function

##### Objectives:

1. Explain the structure and function of bone / cartilage / joint / ligament.
2. Explain the structure of the head and neck.
3. Explain the structure and function of the spinal column.
4. Explain the limb skeleton, action and innervation of the major muscles.
5. Explain the structure and sex difference of the pelvis.
6. Explain the mechanisms of development, formation, and resorption of bones.
7. Outline muscles involved in posture and trunk movement.
8. Explain anti-gravity muscles.

#### D-4-2) Basics of diagnoses and tests

##### Objectives:

1. Explain manual examination (range of motion test for extremities / spinal column, neurological examination, etc.) according to musculoskeletal pathophysiology.
2. Outline the indication of musculoskeletal image diagnosis (X-ray imaging, computed tomography <CT>, magnetic resonance imaging <MRI>, bone mineral quantification, ultrasonography, and bone mineral quantification).

#### D-4-3) Signs and symptoms

##### Objectives:

1. Motor paralysis / muscle weakness
2. Arthralgia / joint swelling
3. Back pain / low back pain

#### D-4-4) Diseases

##### D-4-4) - (1) Common diseases of the motor system

#### Objectives:

1. Explain the diagnosis and initial treatment of trauma of extremities / spinal column.
2. Explain the definition, severity classification, diagnosis, and treatment of joint dislocation and ligament injury.
3. Explain the classification, signs and symptoms, diagnosis, treatment, and complications of fracture.
4. Explain the pathophysiology, signs and symptoms, diagnosis, and treatment of compartment syndrome.
5. Explain the etiology and pathophysiology of osteoporosis and list the common anatomical locations of fracture.
6. Explain the pathophysiology, diagnosis, and treatment of arthritis and tenosynovitis.
7. Explain signs and symptoms, diagnosis, and treatment of osteoarthritis.
8. List entrapment neuropathy (carpal tunnel syndrome, cubital tunnel syndrome, etc.) and explain its signs and symptoms.
9. Explain neurological signs and symptoms of cervical spondylotic myelopathy (including spinal ligament ossification) and radiculopathy.
10. Explain the diagnosis and treatment of spinal cord injury.
11. Explain signs and symptoms, diagnosis, and treatment of lumbar disc herniation.
12. Explain the pathophysiology, signs and symptoms, diagnosis, and treatment of lumbar spinal canal stenosis.
13. Explain signs and symptoms, diagnosis, and treatment of lumbar spondylolysis / spondylolisthesis.
14. Explain the pathophysiology, diagnosis, and treatment of musculoskeletal chronic pain (low back pain, neck pain, and stiff neck).
15. Outline the rehabilitation of musculoskeletal diseases.

#### D-4-4) - (2) Infectious diseases

1. Explain signs and symptoms, diagnosis, and treatment of purulent arthritis.
2. Explain signs and symptoms, diagnosis, and treatment of discitis, purulent spondylitis, and spinal caries.

#### D-4-4) - (3) Neoplastic diseases

1. Explain clinical findings, image findings, pathological findings, and initial treatment of primary bone tumor (osteosarcoma and Ewing sarcoma).
2. Explain the clinical findings, image findings, and laboratory findings of metastatic bone tumors.
3. Outline the diagnosis, pathology findings, and treatment of malignant soft tissue tumor (liposarcoma).

### D-5 Cardiovascular system

#### Goal:

Understand the structure and function of cardiovascular system and learn prevention, etiology, pathophysiology, signs and symptoms, diagnosis and treatment focusing on initial management for common cardiovascular diseases as the basis of daily practice in every specialty.

#### D-5-1) Structure and function

##### Objectives:

1. Explain the structure of the heart and its vessels / nerves, and features and distribution of coronary arteries.
2. Explain the ultrastructure and function of cardiac myocytes.
3. Explain the electrophysiology of cardiac myocytes and the electrical conduction system of the heart.
4. Outline excitation-contraction coupling.
5. Explain the systemic, pulmonary, and fetal / placental circulation.
6. Illustrate the aorta and its major branches (head and neck, upper limb, chest, abdomen, lower limb) and outline the distribution area.
7. Illustrate the major veins and explain the system of the portal vein, and superior and inferior vena cava.
8. Explain the substance / water exchange in the capillaries.
9. Outline the lymph flow via the thoracic duct.
10. Explain the hemodynamics associated with the cardiac cycle.
11. Explain the regulation mechanism of cardiac function curve and cardiac output.
12. Outline the regulation of circulation in the major organs (brain, heart, lung, and kidney)
13. Explain the mechanism of blood pressure regulation.
14. Explain circulation reactions and their mechanisms associated with body posture and exercise.

#### D-5-2) Basics of diagnoses and tests

##### Objectives:

1. Explain the major findings of chest X-ray and electrocardiogram.
2. Explain the major findings of echocardiography.

3. Explain exercise electrocardiogram and Holter electrocardiogram.
4. Explain the cardiac scintigraphy.
5. Explain the major findings of coronary angiography, coronary computed tomography <CT> and cardiac magnetic resonance imaging <MRI>.
6. Explain cardiac catheterization (intracardiac pressure, cardiac function, and shunt ratio measurement) and its interpretation of results.

#### D-5-3) Signs and symptoms

##### Objectives:

1. Fever
2. General fatigue
3. Anorexia
4. Weight loss / gain
5. Shock
6. Consciousness disorder / syncope
7. Convulsion
8. Vertigo / dizziness
9. Edema
10. Cough / sputum
11. Dyspnea
12. Chest pain
13. Palpitations
14. Pleural effusion
15. Dysphagia
16. Abdominal pain
17. Nausea / vomiting
18. Headache
19. Back pain
20. Cardiac arrest

#### D-5-4) Diseases

##### D-5-4) - (1) Heart failure

##### Objectives:

1. Explain the definition, causes, and pathophysiology (systolic and diastolic failure) of heart failure.
2. Explain the signs, pathophysiology, diagnosis, and treatment of left and right heart failure.
3. Explain the diagnosis, drug therapy, and non-drug therapy (including cardiac rehabilitation) of acute and chronic heart failure.
4. Outline the disease management program by interprofessional collaboration (team-based health care) for heart failure.
5. Explain the characteristics of heart failure in the elderly.

##### D-5-4) - (2) Ischemic heart disease

##### Objectives:

1. Explain pathophysiology, signs and symptoms, diagnosis, and treatment of stable effort angina.
2. Explain the pathophysiology, signs and symptoms, diagnosis, and treatment of vasospastic angina.
3. Explain the pathophysiology, signs and symptoms, diagnosis, and treatment of acute coronary syndrome (unstable angina / non-ST elevation and ST elevation myocardial infarction).
4. Explain the primary and secondary prevention of ischemic heart disease.
5. Explain the pathophysiology, signs and symptoms, diagnosis, and treatment of old myocardial infarction.
6. Explain drug therapy, non-drug therapy (revascularization: percutaneous transluminal coronary angioplasty, stent placement, and coronary artery bypass grafting), and cardiac rehabilitation for ischemic heart disease.

##### D-5-4) - (3) Arrhythmia

##### Objectives:

1. Explain the causes, signs and symptoms, characteristics of electrocardiogram, and treatment of major bradyarrhythmia (sick sinus syndrome and atrioventricular block).
2. Explain causes, signs and symptoms, characteristics of electrocardiogram, and treatment of major supraventricular tachyarrhythmias (sinus tachycardia, supraventricular extrasystole, atrial fibrillation, atrial flutter, and paroxysmal supraventricular tachycardia).

3. Explain causes, signs and symptoms, characteristics of electrocardiogram, and treatment of major ventricular tachyarrhythmias (ventricular extrasystole, ventricular tachycardia, multi-source ventricular tachycardia (torsades de pointes), and ventricular fibrillation).
4. Explain diseases and pathophysiology causing arrhythmia (electrolyte abnormality, long QT syndrome, drugs, hyperthyroidism, Wolff-Parkinson-White syndrome, Brugada syndrome, Parkinson-White <WPW> syndrome, Brugada syndrome, etc.).
5. Outline drug and non-drug therapy for arrhythmia (catheter ablation, electrical defibrillation, pacemaker implantation, and implantable defibrillators).
6. Explain the diagnosis, initial management, and treatment of lethal arrhythmia.

#### D-5-4) - (4) Valvular heart disease

##### Objectives:

1. Explain the etiology, pathophysiology, signs and symptoms, diagnosis, and treatment of major valvular heart diseases (mitral and aortic valve diseases).

#### D-5-4) - (5) Myocardial / pericardial diseases

##### Objectives:

1. Explain pathophysiology and remodeling mechanisms of cardiac hypertrophy.
2. Explain the definition / concept and pathophysiology of idiopathic cardiomyopathy (hypertrophic, dilated and restrictive cardiomyopathy) and secondary myocardial diseases.
3. Explain the pathophysiology, signs and symptoms, diagnosis, and treatment of acute myocarditis.
4. Explain the pathophysiology, signs and symptoms, diagnosis, and treatment of infectious endocarditis.
5. Explain the pathophysiology, signs and symptoms, diagnosis, and treatment of acute or constrictive pericarditis.
6. Explain the pathophysiology, signs and symptoms, diagnosis, and treatment of cardiac tamponade.
7. Explain the pathophysiology, signs and symptoms, diagnosis, and treatment of major cardiac tumor (myxoma, etc.).

#### D-5-4) - (6) Congenital heart diseases

##### Objectives:

1. Explain the pathophysiology, signs and symptoms, and diagnosis of major congenital heart diseases (atrial septal defect, ventricular septal defect, patent ductus arteriosus, and tetralogy of Fallot), and outline their treatment.

#### D-5-4) - (7) Arterial diseases

##### Objectives:

1. Explain the risk factors, pathophysiology, and noninvasive examination methods of arteriosclerosis.
2. Explain the pathophysiology, signs and symptoms, diagnosis, and treatment of acute aortic dissection.
3. Explain the pathophysiology, signs and symptoms, diagnosis, and treatment of aortic aneurysm (rupture).
4. Explain the pathophysiology, signs and symptoms, diagnosis, and treatment of obstructive arteriosclerosis and Buerger's disease.
5. Outline Takayasu's arteritis (aortitis syndrome).

#### D-5-4) - (8) Venous and lymphatic vessel diseases

##### Objectives:

1. Explain the etiology, signs and symptoms, complications, and treatment of deep vein thrombosis (DVT) and thrombophlebitis.
2. Explain the etiology and signs and symptoms of superior vena cava syndrome.
3. Explain the varicose veins of the legs.
4. List the etiology of lymphedema.

#### D-5-4) - (9) Hypertension

##### Objectives:

1. Explain the epidemiology, diagnosis, complications, prognosis, and treatment of essential hypertension.
2. Explain the etiology (endocrine, renovascular, and drug-induced), signs and symptoms, diagnosis, and treatment of secondary hypertension.
3. Explain the action mechanisms, indication, contraindications, and side effects of various antihypertensive drugs.
4. Explain the pathophysiology and management of hypertensive crisis.
5. Explain blood pressure management when the patient is complicated with other diseases (cerebrovascular

disease, heart disease, renal disease, and diabetes mellitus).

6. Explain the characteristics and points of treatment of hypertension in the elderly.

#### D-5-4) - (10) Hypotension

Objectives:

1. Explain causative disorders, pathophysiology, signs and symptoms, diagnosis, prognosis, and treatment of hypotension.
2. Explain the diagnosis, prognosis, and treatment of orthostatic hypotension and neuroregulatory syncope.

#### D-5-4) - (11) Neoplastic diseases

Objectives:

1. Explain definition, pathophysiology, signs and symptoms, laboratory findings, image findings, pathological findings, diagnosis, and treatment methods of myxoma.

### D-6 Respiratory system

Goal:

Understand the structure and function of the respiratory system, and learn the etiology, pathophysiology, signs and symptoms, diagnosis, and treatment of major respiratory diseases.

#### D-6-1) Structure and function

Objectives:

1. Explain the structure of the airways, lobes / segments, and hilum of the lungs.
2. Explain the difference between pulmonary and systemic circulation.
3. Explain the structure of mediastinum and pleural cavity.
4. Explain respiratory muscles and the mechanism of respiratory movement.
5. Explain the lung volume fraction, ventilation, and dead space (ventilatory mechanics (intrathoracic pressure, lung compliance, resistance, and closing volume)).
6. Explain the relationship between gas exchange and blood flow in the alveoli.
7. Explain the influence of pulmonary ventilation and perfusion (ventilation-perfusion ratio) on arterial blood gas (alveolar-arterial oxygen difference  $\langle A-aDO_2 \rangle$ ).
8. Explain the mechanism of respiratory control via the respiratory center.
9. Explain the mechanism of oxygen and carbon dioxide transport by blood.
10. Explain the defense mechanisms (immunological and non-immunological) and the metabolism of the airway and the lung.

#### D-6-2) Basics of diagnoses and tests

Objectives:

1. Explain the significance of imaging such as X-ray, computed tomography  $\langle CT \rangle$ , magnetic resonance imaging  $\langle MRI \rangle$ , nuclear medicine imaging (including positron emission tomography  $\langle PET \rangle$  scan), etc.
2. Explain the significance of bronchoscopy.
3. Explain the significance of sputum test (sputum cytology and culture).

#### D-6-3) Signs and symptoms

##### D-6-3) - (1) Wheeze and stridor

Objectives:

1. Explain the etiology and diseases of wheeze and stridor.

##### D-6-3) - (2) Other signs and symptoms

Objectives:

1. Pleural effusion
2. Chest pain / oppression
3. Dyspnea / shortness of breath
4. Cough / sputum
5. Bloody sputum / hemoptysis

#### D-6-4) Diseases

##### D-6-4) - (1) Respiratory failure, hypoxemia, and hypercapnia

Objectives:

1. Explain the definition, classification, pathophysiology, and major etiology of respiratory failure.
2. Explain the etiology, classification, and diagnosis of hypoxemia and hypercapnia, and outline their treatment.

#### D-6-4) - (2) Respiratory infection

##### Objectives:

1. Explain the etiology, diagnosis, and treatment of acute upper respiratory tract infection (common cold syndrome) and tonsillitis.
2. List the major pathogens of bronchitis / bronchiolitis / pneumonia (typical and atypical pneumonia) and explain their signs and symptoms, diagnosis, and treatment.
3. Explain signs and symptoms, diagnosis, treatment and notification procedures of pulmonary tuberculosis and mycosis.
4. Outline non-tuberculous mycobacteriosis.
5. Explain the mechanism and its prevention method of aspiration pneumonia.
6. Explain the etiology, diagnosis, and treatment of croup syndrome and acute epiglottitis.
7. Outline pulmonary abscess and empyema.

#### D-6-4) - (3) Lung diseases causing obstructive and restrictive ventilatory impairment

##### Objectives:

1. List the etiology of chronic obstructive pulmonary disease <COPD>.
2. Explain etiology, diagnosis, treatment, and respiratory rehabilitation of chronic obstructive pulmonary disease <COPD>.
3. Explain the pathophysiology, diagnosis, and treatment of bronchial asthma (including pediatric asthma).
4. Explain the pathophysiology, diagnosis, and treatment of interstitial pneumonia (idiopathic, collagen diseases, and vasculitis related).
5. Outline diffuse panbronchiolitis.
6. Outline radiation pneumonia.
7. Outline pneumoconiosis (silicosis and asbestosis).

#### D-6-4) - (4) Pulmonary circulation disorders

##### Objectives:

1. Explain the etiology, diagnosis, and treatment of cor pulmonale.
2. Explain the etiology, signs and symptoms, and treatment of acute respiratory distress syndrome (ARDS).
3. Explain the etiology, diagnosis, and treatment of pulmonary thromboembolism.
4. Outline pulmonary hypertension.

#### D-6-4) - (5) Lung diseases due to immunological mechanism

##### Objectives:

1. Explain the etiology, signs and symptoms, and diagnosis of hypersensitivity pneumonia.
2. Explain signs and symptoms, diagnosis, and treatment of sarcoidosis.
3. Outline eosinophilic pneumonia.
4. Outline drug-induced pneumonitis.

#### D-6-4) - (6) Abnormal respiration

##### Objectives:

1. Outline hyperventilation syndrome.
2. Outline sleep apnea syndrome.
3. Outline alveolar hypoventilation syndrome.

#### D-6-4) - (7) Bronchiectasis and other lung diseases

##### Objectives:

1. Explain signs and symptoms, diagnosis, and treatment of bronchiectasis.
2. Explain the etiology and diagnosis of atelectasis.
3. Explain signs and symptoms, pathophysiology, diagnosis, and treatment of infantile respiratory distress syndrome.
4. Outline pulmonary lymphatic angiomyomatosis.
5. Outline alveolar proteinosis.

#### D-6-4) - (8) Pleural and mediastinal disease

##### Objectives:

1. Explain the etiology, signs and symptoms, diagnosis, and treatment of pleuritis.

2. Explain the etiology, signs and symptoms, diagnosis, and treatment of pneumothorax (spontaneous, tension, and traumatic pneumothorax).
3. Explain the etiology, signs and symptoms, and diagnosis of mediastinal emphysema.
4. Explain the indication for pleural biopsy.

#### D-6-4) - (9) Neoplastic diseases

##### Objectives:

1. Explain the histological types, stage classification, pathology findings, diagnosis, and treatment of lung cancer.
2. Explain diagnosis and treatment of metastatic lung tumor.
3. List the types of mediastinal tumors and explain their diagnosis and treatment.
4. Outline the etiology, diagnosis, and treatment of pleural mesothelioma.

### D-7 Digestive system

#### Goal:

Understand the normal structure and function and learn the etiology, pathophysiology, signs and symptoms, diagnosis, and treatment of the major diseases of the digestive system.

#### D-7-1) Structure and function

##### Objectives:

1. Illustrate each digestive organ with its position, morphology, and blood supply.
2. Explain the relationship between peritoneum and organs.
3. Explain the basic structure and local anatomical differences of the esophagus, stomach, small intestine, and colorectum.
4. Explain the mechanism of gastrointestinal motility.
5. Explain the effects of autonomic nervous system on digestive tract.
6. Explain the structure and function of the liver.
7. Explain the action and secretory mechanism of gastric juice.
8. Explain the function of bile and regulatory mechanism of gallbladder contraction.
9. Explain the structure of pancreatic exocrine system and the action of pancreatic juice.
10. Explain the mechanism of digestion and absorption in the small intestine.
11. Explain the mechanism of fecal formation in the colorectum and defecation.
12. Explain the effects of major gut hormones.
13. Explain the structure and function of the teeth, tongue, and salivary glands.
14. Explain the mechanism of chewing and swallowing.
15. Explain the role of the normal bacterial flora (enteric flora) of the digestive tract.

#### D-7-2) Basics of diagnoses and tests

##### Objectives:

1. List major test items for hepatitis virus and explain their significance.
2. Explain significance of representative tumor markers related to digestive system ( $\alpha$ -fetoprotein <AFP>, carcinoembryonic antigen <CEA>, carbohydrate antigen <CA> 19-9, protein induced by vitamin K absence or antagonists <PIVKA> -II).
3. List imaging of digestive diseases, explain its indication and abnormal findings, and interpret the result.
4. Explain information obtained from gastrointestinal endoscopy.
5. Explain the significance and indication of biopsy and cytology.

#### D-7-3) Signs and symptoms

##### D-7-3) - (1) Hepatomegaly

##### Objectives:

1. List causes of hepatomegaly and explain its pathophysiology.
2. Explain points in the interview, physical examination, and diagnosis in patients with hepatomegaly.

##### D-7-3) - (2) Other signs and symptoms

##### Objectives:

1. Jaundice
2. Abdominal pain
3. Nausea / vomiting
4. Anorexia



5. Constipation / diarrhea / hematochezia
6. Hematemesis / melena
7. Abdominal prominence (including ascites) / distention / mass

#### D-7-4) Diseases

##### D-7-4) - (1) Esophageal diseases

###### Objectives:

1. Explain pathophysiology, endoscopic classification, and treatment of esophageal / gastric varices.
2. Explain the pathophysiology, signs and symptoms, and diagnosis of gastroesophageal reflux disease <GERD> and reflux esophagitis.
3. Outline Mallory-Weiss syndrome.

##### D-7-4) - (2) Stomach / duodenal diseases

###### Objectives:

1. Explain the etiology, signs and symptoms, progressive classification, diagnosis, and treatment of gastric and duodenal (peptic) ulcer.
2. Explain the diagnosis and treatment of *Helicobacter pylori* infection.
3. Explain the pathology and macroscopic classification of gastric polyps.
4. Explain the concept, diagnosis, and treatment of acute gastric mucosal lesions.
5. Outline acute gastroenteritis and chronic gastritis.
6. Explain the pathophysiology of postgastrectomy syndrome.
7. Explain functional gastrointestinal disorders (functional dyspepsia <FD>).
8. Outline hypertrophic pyloric stenosis.

##### D-7-4) - (3) Small intestine / colorectal diseases

###### Objectives:

1. Explain signs and symptoms, diagnosis, and treatment of acute appendicitis.
2. Explain the etiology, signs and symptoms, diagnosis, and treatment of intestinal obstruction and ileus.
3. Explain the pathophysiology, signs and symptoms, diagnosis, and treatment of inflammatory bowel disease (ulcerative colitis / Crohn's disease).
4. Explain the pathophysiology, signs and symptoms, and diagnosis of hemorrhoids and anal fistula.
5. Outline functional gastrointestinal disorders (irritable bowel syndrome).
6. Outline intestinal diverticulosis (colon diverticulitis and colon diverticular bleeding).
7. Outline drug-induced enteritis.
8. Outline the digestive tract polyposis.
9. Outline the major congenital diseases of the colorectum and anus (atresia ani and Hirschsprung disease).
10. Outline intussusception.
11. Explain constipation and infant diarrhea.
12. Outline infectious enteritis.
13. Outline ischemic colitis.
14. Outline acute hemorrhagic rectal ulcers.
15. Outline superior mesenteric artery occlusion.
16. Outline the gastrointestinal neuroendocrine tumor <NET>.
17. Outline gastrointestinal stromal tumor <GIST>.

##### D-7-4) - (4) Biliary tract disease

###### Objectives:

1. Explain the etiology, signs and symptoms, diagnosis, and treatment of cholelithiasis.
2. Explain the etiology, pathophysiology, signs and symptoms, diagnosis, complications, and treatment of cholecystitis and cholangitis.
3. Outline the gall bladder polyp.
4. Outline congenital bile duct dilatation and pancreaticobiliary maljunction.

##### D-7-4) - (5) Liver diseases

###### Objectives:

1. Explain the epidemiology, signs and symptoms, diagnosis, treatment, progress, and prognosis of hepatitis A, B, C, D, and E.
2. Explain the definitions of acute and chronic hepatitis.
3. Explain the concept and diagnosis of acute liver failure.

4. Explain the etiology, pathology, signs and symptoms, diagnosis, and treatment of liver cirrhosis.
5. Outline complications of liver cirrhosis (portal hypertension, hepatic encephalopathy, and liver cancer).
6. Outline alcohol liver disease.
7. Outline drug-induced liver injury.
8. Explain signs and symptoms, diagnosis, and treatment of hepatic abscess.
9. Explain signs and symptoms, diagnosis, treatment, course, and prognosis of primary biliary cholangitis (primary biliary cirrhosis) and primary sclerosing cholangitis.
10. Outline autoimmune hepatitis.
11. Outline fatty liver disease.

#### D-7-4) - (6) Pancreatic diseases

##### Objectives:

1. Explain the pathophysiology, signs and symptoms, diagnosis, and treatment of acute pancreatitis (alcoholic, gallstone-related, and idiopathic).
2. Explain the pathophysiology, signs and symptoms, diagnosis, complications, and treatment of chronic pancreatitis (alcoholic and idiopathic).
3. Outline autoimmune pancreatitis.

#### D-7-4) - (7) Peritoneal / abdominal wall / diaphragmatic disease

##### Objectives:

1. Explain the etiology, signs and symptoms, diagnosis, and treatment of peritonitis.
2. Explain concept and pathophysiology (sliding, incarceration, and strangulation) of and frequent sites for gastrointestinal hernia.
3. Explain the etiology, pathophysiology, diagnosis and treatment of inguinal hernia.

#### D-7-4) - (8) Neoplastic diseases

##### Objectives:

1. Explain pathological findings, macroscopic classification, and progress classification of esophageal cancer.
2. Explain signs and symptoms, diagnosis, treatment, and prognosis of esophageal cancer
3. Explain epidemiology, pathological findings, signs and symptoms, macroscopic classification and progressive classification of gastric cancer.
4. List the diagnostic methods of gastric cancer and explain the findings and its significance.
5. Outline the treatment according to the progressive stage of gastric cancer.
6. Explain pathological findings, diagnosis, macroscopic classification and progress classification of colorectal cancer.
7. Explain signs and symptoms, diagnosis, and treatment of colorectal cancer.
8. Explain the pathological findings, signs and symptoms, diagnosis, and treatment of gall bladder / bile duct cancer / papillary cancer.
9. Explain the etiology, pathological findings, signs and symptoms, diagnosis, and treatment of primary and metastatic liver cancer.
10. Explain the pathological findings, signs and symptoms, diagnosis, and treatment of pancreatic cancer.
11. Explain the classification and pathological findings of cystic pancreatic tumor.
12. Outline peritoneal mesothelioma, gastrointestinal stromal tumor <GIST>, gastrointestinal carcinoid.

### D-8 Renal / urinary tract system (including body fluid and electrolyte balance)

#### Goal:

Understand the structure and function of the renal / urinary tract system and learn the etiology, pathophysiology, signs and symptoms, diagnosis, and treatment of major renal / urinary tract system diseases.

#### D-8-1) Structure and function

##### Objectives:

1. Explain the fluid volume and composition / osmotic pressure of the children and adults separately.
2. Explain the location / morphology and vascularity / innervation of the renal / urinary tract system.
3. Outline a general overview of the renal function and the structure and function of each part of the nephron.
4. Explain the mechanism of filtration in renal glomeruli.
5. Explain the mechanism of resorption / secretion in renal tubules and the mechanism of urinary concentration.
6. Outline the regulation mechanism of water-electrolyte equilibrium and acid-base equilibrium.
7. Explain the effects of hormones / vasoactive substances produced by the kidneys or acting on the kidneys (erythropoietin, vitamin D, renin, angiotensin II, and aldosterone).
8. Explain the mechanism of accumulation and drainage of urine.

## D-8-2) Basics of diagnoses and tests

### Objectives:

1. Outline indication and abnormal findings of diagnostic imaging of the kidney and urinary tract system.
2. Outline the renal function test method including glomerular filtration rate (actual measurement and estimation).
3. Explain indications and contraindications of renal biopsy.
4. Explain the urodynamics test.

## D-8-3) Signs and symptoms

### D-8-3) - (1) Electrolyte abnormality

#### Objectives:

1. Outline hyper- / hyponatremia (causative diseases, signs and symptoms, and treatment).
2. Outline hyper- / hypokalemia (causative diseases, signs and symptoms, and treatment).
3. Outline hyper- / hypocalcemia (causative diseases, signs and symptoms, and treatment).
4. Outline hyper- / hypophosphatemia, hyper- / hypochloremia, and hyper- / hypomagnesemia.

### D-8-3) - (2) Acidosis / alkalosis

#### Objectives:

1. Explain the definition, pathophysiology, and diagnosis of acidosis / alkalosis (metabolic / respiratory).
2. Outline the treatment of acidosis / alkalosis (metabolic / respiratory).

### D-8-3) - (3) Other signs and symptoms

#### Objectives:

1. Dehydration
2. Edema
3. Hematuria / proteinuria
4. Abnormal urine volume / urination

## D-8-4) Diseases

### D-8-4) - (1) Renal failure

#### Objectives:

1. Explain the etiology, signs and symptoms, diagnosis, and treatment of acute renal failure (acute renal impairment).
2. Explain the etiology, signs and symptoms, diagnosis, and treatment of chronic renal failure (chronic kidney disease <CKD>).
3. Explain the severity classification of chronic kidney disease <CKD>.
4. Outline renal anemia and abnormal mineral bone metabolism as complications of chronic renal failure.
5. Explain dialysis indication criteria (chronic renal failure).
6. Explain the treatment of renal failure (hemodialysis, peritoneal dialysis, and kidney transplantation).

### D-8-4) - (2) Primary glomerular diseases

#### Objectives:

1. Explain the etiology, signs and symptoms, diagnosis, and treatment of acute glomerulonephritis syndrome.
2. Explain signs and symptoms, diagnosis, and treatment of chronic glomerulonephritis syndrome (including IgA nephropathy).
3. Explain the classification, signs and symptoms, diagnosis, and treatment of nephrotic syndrome.
4. Outline rapidly progressive glomerulonephritis.
5. Outline clinical symptom classification (acute nephritic syndrome, chronic nephritic syndrome, nephrotic syndrome, rapidly progressive nephritic syndrome, recurrent or persistent hematuria syndrome).

### D-8-4) - (3) Hypertension and renovascular disorders

#### Objectives:

1. Outline renal impairment due to hypertension (nephrosclerosis).
2. Outline renovascular hypertension.

### D-8-4) - (4) Abnormal renal tubule function

#### Objectives:

1. Explain the classification, pathophysiology, diagnosis, and treatment of renal tubular acidosis.
2. Explain the concept, signs and symptoms, and diagnosis of Fanconi syndrome (including renal glycosuria).

#### D-8-4) - (5) Renal tubule / interstitial disease

##### Objectives:

1. Explain the etiology, signs and symptoms, diagnosis, and treatment of acute / chronic pyelonephritis.
2. Explain the etiology, signs and symptoms, diagnosis, and treatment of acute / chronic tubulointerstitial nephritis.

#### D-8-4) - (6) Renal disorders due to systemic diseases

##### Objectives:

1. Explain signs and symptoms, diagnosis, and treatment of diabetic nephropathy.
2. Explain signs and symptoms, diagnosis, and treatment of lupus nephritis.
3. Explain signs and symptoms, diagnosis, and treatment of renal amyloidosis.
4. Explain renal lesions related to collagen diseases (vasculitis syndrome, anti-glomerular basement membrane antibody disease (Goodpasture syndrome)).
5. Outline IgA vasculitis (purpura nephritis).

#### D-8-4) - (7) Congenital abnormalities and trauma

##### Objectives:

1. Outline the major congenital anomalies of the kidney and urinary tract (polycystic kidney and vesicoureteral reflux).
2. Explain signs and symptoms, diagnosis, and treatment of renal injury.

#### D-8-4) - (8) Urinary tract disease

##### Objectives:

1. Explain the etiology, signs and symptoms, diagnosis, and treatment of urinary calculus.
2. Explain the etiology, diagnosis, and treatment of urinary inflammatory disorders (cystitis, prostatitis, and urethritis).
3. Outline neurogenic bladder.

#### D-8-4) - (9) Neoplastic diseases

##### Objectives:

1. Explain signs and symptoms, pathological findings, diagnosis, and treatment of kidney cancer.
2. Explain signs and symptoms, diagnosis, and treatment of urothelial cancer including bladder cancer.

## D-9 Reproductive function

### Goal:

Understand the structure and function of the reproductive system and learn the diagnosis and treatment in patients with genital disorders.

#### D-9-1) Structure and function

##### Objectives:

1. Explain the processes of gonadal development and sexual differentiation.
2. Explain the development process of male reproductive organs.
3. Explain the structure and function of the male reproductive organs.
4. Explain the tissue structure of testis and the process of spermatogenesis.
5. Explain the tissue structure of penis and the mechanisms of erection and ejaculation.
6. Explain the development of female reproductive organs.
7. Explain the morphology and function of female reproductive organs.
8. Explain the expression of menstrual cycle and the mechanism of ovulation.
9. Explain the process and pathological circumstances of menopause.

#### D-9-2) Basics of diagnoses and tests

##### D-9-2) - (1) Male reproductive organs

##### Objectives:

1. Explain indication and abnormal findings of the testis and prostate examination (urography, ultrasound examination, computed tomography <CT>, magnetic resonance imaging <MRI>) and interpret the results.

#### D-9-2) - (2) Female reproductive organs

##### Objectives:

1. Assess the measured value of the blood hormone (follicle-stimulating hormone <FSH>, luteinizing hormone <LH>, prolactin, human chorionic gonadotropin <hCG>, estrogen, and progesterone).
2. Outline the findings of diagnostic imaging (ultrasound, computed tomography <CT>, magnetic resonance imaging <MRI>, hysterosalpingography <HSG>) of pelvic organs and their tumors.
3. Explain the findings of basal body temperature.
4. Explain findings of vaginal secretions.

#### D-9-3) Signs and symptoms

##### D-9-3) - (1) Major signs and symptoms of male reproductive organs

##### Objectives:

1. Outline erectile dysfunction and ejaculation disorders.
2. Outline testicular dysfunction.

##### D-9-3) - (2) Other symptoms of male reproductive organs

##### Objectives:

1. Abdominal pain
2. Abdominal distention (including ascites) / distention / mass
3. Hematuria / proteinuria
4. Abnormal urine volume / urination

##### D-9-3) - (3) Major symptoms of female reproductive organs

##### Objectives:

1. List diseases causing irregular vaginal bleeding, increased vaginal secretions (discharge), vaginal dryness, dyspareunia, and milk leaks, and explain their pathophysiology.

##### D-9-3) - (4) Other symptoms of female reproductive organs

##### Objectives:

1. Anemia
2. Abdominal pain
3. Abdominal distention (including ascites) / distention / mass
4. Abnormal urine volume / urination
5. Menstrual abnormality / Amenorrhea

#### D-9-4) Diseases

##### D-9-4) - (1) Male reproductive organs diseases

##### Objectives:

1. Outline male infertility.
2. Explain the diagnosis and treatment of benign prostatic hyperplasia.
3. Outline the cryptorchidism and scrotal mass.

##### D-9-4) - (2) Female reproductive organ diseases

##### Objectives:

1. Explain congenital anomalies of internal and external reproductive organs.
2. Outline ovarian dysfunction and climacteric disturbance.
3. Explain the systematic diagnosis and treatment of infertility.
4. Outline signs and symptoms, diagnosis, and treatment of myoma uteri and adenomyosis uteri.
5. Explain signs and symptoms, diagnosis, and treatment of endometriosis.
6. Explain signs and symptoms, diagnosis, and treatment of infections of the vulva and vagina, and pelvic inflammatory disease (PID).

##### D-9-4) - (3) Neoplastic disease

##### Objectives:

1. Explain signs and symptoms, pathological findings, diagnosis, and treatment of prostate cancer.
2. Explain signs and symptoms, diagnosis, and treatment of testicular tumor.
3. Explain the prevention, signs and symptoms, pathological findings, diagnosis, and treatment of uterine cervical cancer / endometrial cancer.

4. Explain signs and symptoms, pathological findings, diagnosis, and treatment of ovarian tumor (ovarian cancer and cystoma).
5. Explain signs and symptoms, diagnosis, and treatment of gestational trophoblastic disease (hydatidiform mole and choriocarcinoma).

#### D-10 Pregnancy and delivery

##### Goal:

Learn fundamental knowledge required for management of pregnancy, delivery, and postpartum as well as future maternity health and reproductive medical care.

##### D-10-1) Basics of diagnoses and tests

###### Objectives:

1. Explain the diagnostic method of pregnancy.
2. Outline the physical changes associated with pregnancy.
3. Explain the significance of the fetal / placental examination (by ultrasound and cardiotocography).
4. Explain the significance and abnormal findings of the amniotic fluid test method.

##### D-10-2) Signs and symptoms

###### Objectives:

1. Abdominal pain
2. Nausea / vomiting
3. Abdominal bulge (including ascites) / distention / mass

##### D-10-3) Normal pregnancy / delivery / postpartum

###### Objectives:

1. Explain the anatomical and physiological changes of the maternal body in pregnancy, delivery, and postpartum.
2. Explain the functional and morphological changes in the process of development of the fetal / placental system.
3. Explain the course of normal pregnancy.
4. Explain the course of normal delivery.
5. Explain the process of postpartum.
6. Explain the structural and physiological change, and mental problems of the mother's body associated with childcare.
7. Explain medically the significance of maternal and child health.
8. Explain points on drug therapy during pregnancy.

##### D-10-4) Diseases

###### Objectives:

1. Explain the pathophysiology of major abnormal pregnancy (abortion, threatened abortion, ectopic pregnancy, hypertensive disorders of pregnancy, multiple pregnancy, and fetal growth restriction).
2. Explain the pathophysiology of major abnormal labor (preterm labor, weak labor, prolonged labor, abnormalities of rotation, placenta previa, placenta accreta, abruptio placentae, atonic bleeding, and birth injury).
3. Explain the pathophysiology of major abnormal postpartum (involution of the uterus, puerperal fever, and mastitis).
4. Explain the pathophysiology and treatment of obstetric emergency (obstetric bleeding and disseminated intravascular coagulation <DIC>).
5. Explain the pathophysiology of pregnancy with major complications (impaired glucose tolerance; thyroid disease; blood type incompatibility pregnancy; toxoplasmosis, other agents, rubella, cytomegalovirus, and herpes simplex <TORCH> syndrome).

##### D-10-5) Obstetric surgery

###### Objectives:

1. Explain indications for artificial abortion.
2. Explain the indication of Caesarean section.

#### D-11 Breast

##### Goal:

Understand the structure and the endocrine dependent function of breast, and learn the signs and symptoms,

diagnosis, and treatment of major breast diseases.

#### D-11-1) Structure and function

Objectives:

1. Explain the structure and function of breast.
2. Explain growth and development of breast.
3. Explain the effects of hormones on lactation.

#### D-11-2) Basics of diagnoses and tests

Objectives:

1. Outline of diagnostic imaging (mammography, ultrasonography, and magnetic resonance imaging <MRI>) of breast mass.
2. Outline cytological and histological diagnosis of breast tumor.

#### D-11-3) Signs and symptoms

Objectives:

1. List the main etiologies leading to breast masses, abnormal lactation secretion (blood papilla secretion), and swelling, pain and deformity of the breast.

#### D-11-4) Diseases

##### D-11-4) - (1) Benign mammary gland diseases

Objectives:

1. List the types of benign breast diseases.
2. Outline gynecomastia.

##### D-11-4) - (2) Neoplastic disease

Objectives:

1. Explain the risk factors, signs and symptoms, diagnosis, treatment, and prognosis of breast cancer.

### D-12 Endocrine / nutritional / metabolic system

Goal:

Understand the structure and function of the endocrine and metabolic systems, and learn the etiology, pathophysiology, signs and symptoms, diagnosis, and treatment of major endocrine / metabolic diseases.

#### D-12-1) Structure and function

Objectives:

1. Classify hormones by their structure and explain mechanisms of action and secretory regulation.
2. Illustrate the location of each endocrine organ and list their hormones.
3. Explain the names, effect of hypothalamic / pituitary hormones, and their interaction.
4. Explain the effect and regulatory mechanism of secretion of the thyroid / parathyroid hormones.
5. Explain the structure of the adrenal glands and effects and regulatory mechanism of secretion of its hormones.
6. Explain the effects of hormones secreted from pancreatic islets.
7. Explain the synthetic / metabolic pathways and effects of male / female hormone.
8. Explain the digestive absorption of three major nutrients, vitamins, and trace elements and the bioavailability of nutrients.
9. Explain the metabolic pathways and interactions of carbohydrates, proteins and lipids.

#### D-12-2) Basics of diagnoses and tests

Objectives:

1. Explain the physical symptoms caused by hormonal excess or deficiency.
2. List factors affecting blood hormone level.
3. Explain daily fluctuation of hormones with examples.
4. Explain the principles and reaction types of hormone secretion stimulation test and suppression test.
5. Explain the physical symptoms caused by excessive or deficient energy intake.

#### D-12-3) Signs and symptoms

D-12-3) - (1) Short stature

Objectives:

1. List diseases causing short height and explain their pathophysiology.

D-12-3) - (2) Goiter

Objectives:

1. Classify goiters and list related diseases.
2. Palpate the thyroid gland.

D-12-3) - (3) Other signs and symptoms

Objectives:

1. Obesity / leptosome
2. Menstrual disorders

D-12-4) Diseases

D-12-4) - (1) Hypothalamic-pituitary disease

Objectives:

1. Explain the pathophysiology and diagnosis of Cushing's disease.
2. Outline the acromegaly.
3. Outline generalized pituitary hypofunction.
4. Outline diabetes insipidus.
5. Outline short height from growth hormone secretion insufficiency.
6. Outline hyperprolactinemia.
7. Outline syndrome of inappropriate secretion of antidiuretic hormone <SIADH>.

D-12-4) - (2) Thyroid disease

Objectives:

1. Explain the pathophysiology, signs and symptoms, diagnosis, and treatment of Graves' (Basedow's) disease.
2. Outline thyroiditis (chronic and subacute).
3. Explain signs and symptoms, diagnosis, and treatment of hypothyroidism.

D-12-4) - (3) Parathyroid diseases and calcium metabolism abnormality

Objectives:

1. Explain calcium metabolism abnormality in relation to diseases.
2. Explain the etiology, pathophysiology, signs and symptoms, and diagnosis of hyperparathyroidism and hypoparathyroidism.
3. Outline hypercalcemia associated with malignant tumors.
4. Outline pseudohypoparathyroidism.

D-12-4) - (4) Adrenal cortex / medullary diseases

Objectives:

1. Explain the pathophysiology, signs and symptoms, and diagnosis of Cushing's syndrome.
2. Outline hyperaldosteronism and primary aldosteronism.
3. Explain the etiology, pathophysiology, signs and symptoms, diagnosis, and treatment of adrenal insufficiency (acute / chronic (Addison's disease)).
4. Outline congenital adrenal (cortex) hyperplasia.

D-12-4) - (5) Abnormal glucose metabolism

Objectives:

1. Explain the etiology, pathophysiology, classification, signs symptoms, and diagnosis of diabetes mellitus.
2. Explain acute complications of diabetes mellitus.
3. List and outline the chronic complications of diabetes mellitus.
4. Outline the treatment of diabetes mellitus (diet therapy, exercise therapy, and drug therapy).
5. Outline hypoglycemia.

D-12-4) - (6) Abnormal lipid metabolism

Objectives:

1. Explain the classification, the etiology, and pathology of the dyslipidemia (hyperlipidemia).
2. Explain prevention and treatment of dyslipidemia (hyperlipidemia).



#### D-12-4) - (7) Protein and nucleic acid metabolism abnormality

##### Objectives:

1. Outline abnormalities of serum proteins.
2. Explain the etiology and pathophysiology of hyperuricemia and gout.

#### D-12-4) - (8) Vitamin / trace element deficiency and excess

##### Objectives:

1. Outline vitamin / trace element deficiency and excess.

#### D-12-4) - (9) Congenital metabolic abnormality

##### Objectives:

1. Outline hemochromatosis.
2. Outline porphyria.
3. Outline Wilson's disease.

#### D-12-4) - (10) Neoplastic diseases

##### Objectives:

1. Classify thyroid tumors, and explain signs and symptoms, pathological findings, and treatment methods.
2. Explain the pathophysiology, signs and symptoms, image findings, pathological findings, diagnosis, and treatment of pheochromocytoma.
3. Outline neuroblastoma and explain its differential features from other infantile abdominal solid tumor (nephroblastoma, embryoma, and teratoma).

### D-13 Eye / visual system

#### Goal:

Understand the structure and function of the eye / visual system, signs and symptoms, pathophysiology, diagnosis, and treatment of their diseases.

#### D-13-1) Structure and function

##### Objectives:

1. Explain the structure and function of the eyeball and its accessory.
2. Explain the mechanism of reception of visual information, and visual pathway.
3. Explain the mechanism of eye movements.
4. Explain the mechanism of light reflex, convergence reflex and corneal reflex.

#### D-13-2) Basics of diagnoses and tests

##### Objectives:

1. List basic ophthalmologic examinations (visual acuity, visual field, slit-lamp microscopy, tonometry, and funduscopy), explain their principles and indications, and interpret main findings.

#### D-13-3) Signs and symptoms

##### D-13-3) - (1) Major signs and symptoms related to eye and visual system

##### Objectives:

1. List major signs and symptoms related to the ophthalmic / visual system (vision disorders, visual field abnormalities, achromatopsia, disturbances of eye movement, eye discharge / ocular redness, floaters, and ocular pain) and explain their etiologies, causing diseases, and treatment.

##### D-13-3) - (2) Other signs and symptoms

##### Objectives:

1. Vertigo and dizziness
2. Headache / dull headache
3. Nausea / vomiting

#### D-13-4) Diseases

##### D-13-4) - (1) Benign diseases of eye and visual system

##### Objectives:

1. Explain the pathophysiology of refraction abnormalities (myopia, hyperopia, and astigmatism) and

- accommodation disorders.
2. Explain signs and symptoms, diagnosis, and treatment of infectious keratoconjunctival diseases.
  3. Explain the etiology, signs and symptoms, diagnosis, and treatment of cataracts.
  4. List the etiologies and explain their pathogenesis, signs and symptoms, and treatment of glaucoma.
  5. Explain signs and symptoms, diagnosis, and treatment of rhegmatogenous retinal detachment.
  6. Explain the retinal changes caused by diabetes mellitus and hypertension / arteriosclerosis.
  7. Explain the etiology, signs and symptoms, diagnosis, and treatment of uveitis.
  8. Explain the etiology, signs and symptoms, and diagnosis of optic neuritis (disease) / Papilledema.
  9. Explain signs and symptoms and emergency treatment of chemical injuries due to alkali and acid.
  10. Explain signs and symptoms, diagnosis, and treatment of retinal vein / artery occlusion.

#### D-13-4) - (2) Neoplastic diseases

##### Objectives:

1. Explain signs and symptoms, diagnosis, and treatment of retinoblastoma.

### D-14 Ear / nose / throat / mouth system

#### Goal:

Understand the structure and function of the otorhinolaryngologic and oral system, signs and symptoms, pathophysiology, diagnosis, and treatment of their diseases.

#### D-14-1) Structure and function

##### Objectives:

1. Illustrate the structure of external ear, middle ear, and inner ear.
2. Explain the reception mechanism and the neural pathways of the auditory / equilibrium sensation.
3. Illustrate the structure of the oral cavity, nasal cavity, pharynx, and larynx.
4. Explain laryngeal function and innervation.
5. Explain the equilibrium sensation system in connection with ocular motor and postural control.
6. Explain the acceptance mechanism and conduction pathway of taste and olfactory sensation.

#### D-14-2) Basics of diagnoses and tests

##### Objectives:

1. Explain audiometry and equilibrium function test.
2. Explain gustometry and olfactometry.

#### D-14-3) Signs and symptoms

##### D-14-3) - (1) Major signs and symptoms of otorhinolaryngology and oral system

##### Objectives:

1. List diseases causing airway stenosis, hearing loss, nasal bleeding, sore throat, lockjaw, and recurrent nerve paralysis (hoarseness) and explain their pathophysiology.

##### D-14-3) - (2) Other signs and symptoms

##### Objectives:

1. Vertigo and dizziness
2. Dysphagia / aspiration

#### D-14-4) Diseases

##### D-14-4) - (1) Benign diseases of the otorhinolaryngologic and oral system

##### Objectives:

1. Explain the etiology, diagnosis, and treatment of serous, acute, and chronic otitis media.
2. Differentiate conductive and sensory hearing loss, and labyrinthine and central hearing loss by their pathophysiology, and explain their treatment.
3. Differentiate peripheral and central vertigo, and explain treatment.
4. Explain signs and symptoms, diagnosis, and treatment of benign paroxysmal positional vertigo.
5. Explain the common sites and hemostatic technique of nasal bleeding.
6. Explain the pathophysiology and treatment of (acute, chronic) sinusitis .
7. Explain the pathogenic mechanism of allergic rhinitis.
8. Explain the pathophysiology and treatment of tonsillar inflammatory diseases.
9. Outline dental diseases (dental caries / periodontal diseases, etc.), their influences on the whole body, and

- oral function management.
10. Explain indication of tracheostomy.
  11. Explain typical foreign bodies in ear canal, nasal cavity, pharynx, larynx, and esophagus, and their removal methods.
  12. List diseases of salivary gland.

#### D-14-4) - (2) Neoplastic diseases

##### Objectives:

1. Explain etiology, staging, laboratory findings, image findings, pathological findings, and treatment methods for oral and pharyngeal cancer.
2. Explain etiology, staging, laboratory findings, image findings, pathological findings, and treatment methods for laryngeal cancer.

### D-15 Mental system

#### Goal:

Understand the pathophysiology, diagnosis, and treatment of the mental and behavioral disorders, according to the life stages from childhood / early adolescence to old age, and learn the holistic medical care based on the good patient-physician trustful relationship.

#### D-15-1) Basics of diagnoses and tests

##### Objectives:

1. Explain the basics of the psychiatric interview based on a good patient-physician relationship.
2. Explain diagnostic criteria of psychiatric disorders.
3. Explain essential items related to laws and ethics on mental health (Act on Mental Health and Welfare for the Mentally Disabled, Act on Medical Care and Treatment for Persons Who Have Caused Serious Cases under the Condition of Insanity, and informed consent).
4. Explain consultation-liaison psychiatry.
5. Explain types and overview of psychological assessment (questionnaire, Rorschach test, Brief Psychiatric Rating Scale <BPRS>, Hamilton depression assessment scale, Beck's depression self-assessment scale, State-Trait Anxiety Inventory <STAI>, Mini-Mental State Examination <MMSE>, Revised Hasegawa Dementia Scale, etc.).

#### D-15-2) Signs and symptoms

##### Objectives:

1. List mental disorders causing anxiety, depression and mania, and explain differential diagnoses.
2. List mental disorders causing consciousness disturbance, insomnia, hallucinations / delusions, and explain their differential diagnoses.
3. List representative diseases in which psychosocial factors (e.g. stress) closely relate with signs and symptoms (dyspnea, epigastric pain, abdominal pain, headache, fatigue, itch, chronic pain, etc.), and explain differential diagnoses.

#### D-15-3) Diseases / disorders

##### Objectives:

1. Outline the concept and diagnosis of psychosis due to physical conditions.
2. Explain diagnosis and treatment of dementia.
3. Explain the pathophysiology, and signs and symptoms of mental disorders related with drug use, and addiction to alcohol, gambling, etc.
4. Explain signs and symptoms, diagnosis, emergency treatment of schizophrenia.
5. Explain signs and symptoms, and diagnosis of depression.
6. Explain signs and symptoms, and diagnosis of bipolar disorder.
7. Explain signs and symptoms, and diagnosis of anxiety disorders, and trauma- and stress-related disorders.
8. Explain signs and symptoms, and diagnosis of somatic symptom disorders and related disorders group, dietary behavior disorder, and eating disorders group.
9. Explain signs and symptoms, diagnosis, and treatment of dissociated disorders group.
10. Outline personality disorders group.
11. Outline the intellectual disability group and autism spectrum disorder (ASD).
12. Outline the attention-deficit hyperactivity disorder <ADHD> and movement disorders group.

## E. Systemic Physiological Change, Pathophysiology, Diagnosis, and Treatment

### E-1 Genetic / genomic medicine

#### Goal:

Understand the characteristics of genetic / genomic information and learn diagnosis and treatment based on genetic / genomic information, and assistance for a patient and family including those who have not had pathogenesis.

#### E-1-1) Genetic / genomic medicine and characteristics of information

##### Objectives:

1. Outline Hardy-Weinberg law as the basis of population genetics.
2. Construct and interpret (Bayes' theorem and risk assessment) family pedigree.
3. Explain the difference between germline and somatic mutations, and outline the purpose and significance of genetic tests.
4. Explain the characteristics (invariability, predictability, and communality) of genetic information.
5. Explain the significance and methods of genetic counseling.
6. Explain ethical, legal, and social implications in genetic medicine.
7. Access genetic medicine related information.
8. Outline appropriate measures including treatment and prevention based on genetic information.

### E-2 Infectious diseases

#### Goal:

Learn epidemiology, pathophysiology, signs and symptoms, diagnosis, and treatment of major infectious diseases. Understand the relationship among pathogenic microorganisms necessary for diagnosis and treatment, infected organs, and therapeutic agents.

#### E-2-1) Pathophysiology

##### Objectives:

1. Explain signs and symptoms, diagnosis, and treatment of sepsis.
2. Explain community and nosocomial (hospital) infection.
3. Explain device-associated infections (vascular indwelling catheter, urethra indwelling catheter, and ventilator), postoperative infection, and surgical site infection.
4. Outline drug resistance (antimicrobial resistance <AMR>), microbial substitution, drug resistant bacteria (Methicillin-resistant *Staphylococcus aureus* <MRSA>, vancomycin-resistant enterococci <VRE>, extended spectrum  $\beta$ -lactamase <ESBL> producing Gram-negative bacteria, multidrug-resistant *Acinetobacter*, carbapenem-resistant Enterobacteriaceae, etc.).
5. Explain the difference between colonization and infection.
6. Explain compromised hosts and opportunistic infections.
7. List emerging / re-emerging infections (Middle East respiratory syndrome <MERS>, Zika fever, fulminant group A streptococcal infection, etc.), zoonotic infections, and bioterrorism related infections.

#### E-2-2) Basics of diagnoses, tests, and treatment

##### Objectives:

1. Explain the history and physical findings that serve as clues for a diagnosis of each pathogenic microorganism and each infected organ.
2. Explain antigen test, nucleic acid amplification test, and serum antibody test in virus infection diagnosis.
3. Explain direct smearing, Gram stain, culture test, antigen test, nucleic acid amplification test, toxin detection test, and serum antibody test in diagnosis of bacterial infection.
4. Explain direct smear, culture test, antigen test, nucleic acid amplification test in mycotic infection diagnosis.
5. Explain appropriate antimicrobial agents for each pathogenic microorganism and infected organ.
6. Explain the antimicrobial stewardship <AMS>.
7. Explain the indications, significance, types, and administration methods for vaccination.
8. Outline the Infectious Disease Control law.

#### E-2-3) Signs and symptoms

##### Objectives:

1. Shock

2. Fever
3. Convulsion
4. Consciousness disorder / syncope
5. Dehydration
6. General fatigue
7. Jaundice
8. Rash
9. Lymph node enlargement
10. Edema
11. Pleural effusion
12. Chest pain / oppression
13. Dyspnea / shortness of breath
14. Cough / sputum
15. Bloody sputum / hemoptysis
16. Headache / heavy-headedness
17. Abdominal pain
18. Nausea, vomiting
19. Constipation / diarrhea / bloody stool
20. Hematemesis / melena
21. Hematuria / proteinuria
22. Arthralgia, joint swelling
23. Low back pain

#### E-2-4) Diseases

##### E-2-4) - (1) Viral infection / prion diseases

###### Objectives:

1. Explain signs and symptoms, diagnosis, and treatment of influenza.
2. Explain signs and symptoms, diagnosis, complications, and preventive measures of measles.
3. Explain signs and symptoms, diagnosis, complications, and preventive measures of rubella.
4. Explain signs and symptoms, diagnosis, treatment, and preventive measures of varicella / herpes zoster.
5. Explain signs and symptoms, diagnosis, complications, and preventive measures of mumps.
6. Explain signs and symptoms, diagnosis, treatment, and infection control of human immunodeficiency virus <HIV> infection.
7. Explain herpes simplex virus infection, erythema infectiosum, hand-foot-and-mouth disease, exanthema subitum, pharyngoconjunctival fever, and infectious mononucleosis.
8. Explain cytomegalovirus <CMV> infection.
9. Explain human T-cell leukemia virus type 1 <HTLV-1> infection.
10. Explain prion diseases.

##### E-2-4) - (2) Bacterial infection

###### Objectives:

1. Explain signs and symptoms, diagnosis, and treatment of *Staphylococcus aureus* infection.
2. Explain signs and symptoms, diagnosis, and treatment of group A  $\beta$ -hemolytic streptococcal infection.
3. Explain signs and symptoms, diagnosis, treatment, and preventive measures of pneumococcal infections.
4. Explain *Haemophilus influenzae* infection and *Moraxella catarrhalis* infection.
5. Explain signs and symptoms, diagnosis, and treatment of *Pseudomonas aeruginosa* infection.
6. Explain signs and symptoms, diagnosis, and treatment of *Escherichia coli* infection.
7. Explain signs and symptoms, diagnosis, and treatment of *Clostridium difficile* infection.
8. Explain signs and symptoms, diagnosis, treatment, and preventive measures of tuberculosis and nontuberculous mycobacterial diseases / infections.
9. Explain mycoplasma infection.
10. Explain *Chlamydia* infection.
11. Explain *Legionella* infection.
12. Explain *Rickettsia* infection.
13. Explain *Campylobacter*, *Salmonella*, and *Listeria* infection.

##### E-2-4) - (3) Mycotic infection and parasitic diseases

###### Objectives:

1. Explain signs and symptoms, diagnosis, and treatment of candidiasis, cryptococcosis, and aspergillosis.

2. Explain signs and symptoms, diagnosis, and treatment of Pneumocystis pneumonia.
3. Explain major parasitic infections (ascariasis, anisakiasis, and trematodiasis).
4. Explain major protozoal infections (malaria, toxoplasmosis, and amebic dysentery).

#### E-2-4) - (4) Sexually transmitted diseases

##### Objectives:

1. Explain the causal microorganisms of sexually transmitted diseases
2. Explain signs and symptoms, diagnosis, and treatment of syphilis.
3. Explain diagnosis and treatment of gonococcal infection.
4. Explain diagnosis and treatment of genital chlamydia, genital herpes, and condyloma acuminatum.

#### E-2-4) - (5) Nosocomial infection

##### Objectives:

1. Explain pathogenic microorganisms that require standard precautions, prevention measures by infection route (droplet infection, contact infection, airborne infection, etc.).
2. Outline personal protective equipment, immunization, etc. to prevent exposure of pathogenic microorganisms from patients to healthcare professionals.
3. Outline the preventive measures for infection after health professionals exposed to body fluids.

### E-3 Tumor

#### Goal:

Learn the pathophysiology, diagnosis, and treatment of the tumor.

#### E-3-1) Definition / pathophysiology

##### Objectives:

1. Explain the definition and pathophysiology of the tumor.
2. Explain signs and symptoms of the tumor.
3. Outline grading and staging of the tumor.

#### E-3-2) Diagnosis

##### Objectives:

1. Explain laboratory findings of the tumor.
2. Explain the image findings and diagnosis of the tumor.
3. Explain the pathological findings and diagnosis of the tumor.

#### E-3-3) Treatment

##### Objectives:

1. Outline the multidisciplinary treatment of tumors.
2. Outline surgical therapy of tumor.
3. Outline radiation therapy of tumor.
4. Outline drug therapy of tumor (cytotoxic anticancer drug, molecular target drug, and immune checkpoint inhibitor).
5. Outline the biological therapy of the tumor.
6. Outline the supportive therapy for cancer patients.
7. Outline palliative care for cancer patients.

#### E-3-4) Basic items of medical practice

##### Objectives:

1. Outline team-based health care in medical treatment of tumor.
2. Outline the bioethics in the medical treatment of tumors.
3. Deeply recognize the situation of patients with tumor.

#### E-3-5) Specifics

##### Objectives:

1. Blood / hematopoietic / lymphatic system: acute leukemia, chronic myelogenous leukemia, myelodysplastic syndrome <MDS>, adult T cell leukemia, polycythemia vera, essential thrombocythemia, myelofibrosis, malignant lymphoma, and multiple myeloma
2. Nervous system: brain / spinal tumor, metastatic brain tumor
3. Skin system: skin benign tumor, skin malignant lymphoma, angiosarcoma, basal cell epithelioma (carcinoma), squamous cell carcinoma, and malignant melanoma

4. Musculoskeletal system: metastatic spinal tumor and osteosarcoma
5. Cardiovascular system: myxoma
6. Respiratory system: lung cancer, metastatic lung tumor, mediastinal tumor, and pleural mesothelioma
7. Digestive system: esophageal cancer, gastric cancer, colorectal polyp, colorectal cancer, gallbladder / bile duct cancer, hepatoma, pancreatic endocrine tumor, cystic pancreatic tumor, and pancreatic cancer
8. Renal / urinary tract system: kidney cancer and urothelial carcinoma including bladder cancer
9. Reproductive system: prostate cancer, testicular tumor, cervical cancer, endometrial cancer, ovarian tumor (ovarian cancer, ovarian cyst), trophoblastic diseases (hydatidiform mole and choriocarcinoma)
10. Breast: primary breast cancer
11. Endocrine / nutritional / metabolic system: thyroid tumor (adenomatous goiter and thyroid cancer), and pheochromocytoma
12. Ocular / visual system: retinoblastoma
13. Ear / nose / throat / mouth system: tongue cancer, pharyngeal cancer, and laryngeal cancer
14. Pediatric tumor: neuroblastoma

## E-4 Immunity / allergy

Goal:

Understand the pathophysiology of autoimmune diseases, allergic diseases, immunodeficiency diseases, and study signs and symptoms, diagnosis, and treatment.

### E-4-1) Basics of diagnoses and tests

Objectives:

1. Explain the types and clinical significance of autoantibodies.

### E-4-2) Signs and symptoms

Objectives:

1. Shock
2. Fever
3. General malaise
4. Rash
5. Anemia
6. Lymphadenopathy
7. Edema
8. Dyspnea / shortness of breath
9. Cough / sputum
10. Hematuria / proteinuria
11. Arthralgia / joint swelling

### E-4-3) Pathophysiology and diseases

#### E-4-3) - (1) Autoimmune diseases in general

Objectives:

1. Outline collagen diseases and autoimmune diseases and list the types.
2. List diseases that cause arthritis.
3. Explain rash which is characteristic of collagen diseases and list related diseases.

#### E-4-3) - (2) Rheumatoid arthritis and related diseases

Objectives:

1. Explain the pathophysiology, signs and symptoms, diagnosis, treatment, and rehabilitation of rheumatoid arthritis.
2. Explain the extra-articular symptoms of rheumatoid arthritis.
3. Explain the signs and symptoms, diagnosis, and treatment of adult-onset Still's disease.
4. Explain the characteristics of juvenile idiopathic arthritis <JIA>.

#### E-4-3) - (3) Systemic lupus erythematosus (SLE), antiphospholipid antibody syndrome

Objectives:

1. Explain pathophysiology, signs and symptoms, diagnosis, and treatment of systemic lupus erythematosus <SLE>.
2. Explain the complications of systemic lupus erythematosus <SLE> (neuropsychotic SLE, lupus nephritis).
3. Explain the pathophysiology, signs and symptoms, diagnosis, and treatment of antiphospholipid antibody

syndrome.

E-4-3) - (4) Systemic sclerosis, dermatomyositis / polymyositis, mixed connective tissue disease, Sjögren's syndrome.

Objectives:

1. Explain the pathophysiology, classification, signs and symptoms, diagnosis, and organ lesions (especially lungs / kidneys) of systemic scleroderma.
2. Explain signs and symptoms, diagnosis, treatment, and complications (interstitial pneumonia, malignant tumor) of dermatomyositis / polymyositis.
3. Outline mixed connective tissue disease.
4. Outline Sjögren's syndrome.

E-4-3) - (5) Systemic vasculitis, Behçet's disease, Kawasaki disease (acute febrile mucocutaneous lymphnode syndrome)

Objectives:

1. Classify / list systemic vasculitis and explain its pathophysiology, signs and symptoms, diagnosis, and treatment.
2. Explain signs and symptoms, diagnosis, and treatment of Behçet's disease.
3. Explain the pathophysiology, symptoms, diagnosis and treatment of Kawasaki disease (acute febrile mucocutaneous lymphnode syndrome).

E-4-3) - (6) Allergic diseases

Objectives:

1. Outline the classification and characteristics of major systemic allergic diseases.
2. Explain signs and symptoms, diagnosis, and treatment of anaphylaxis.
3. Explain the types, diagnosis, and treatment of food allergy.

E-4-3) - (7) Congenital immunodeficiency disease

Objectives:

1. Outline the pathophysiology, diagnosis, and treatment of congenital immunodeficiency disease.

## E-5 Diseases due to physical and chemical factors / agents

Goal:

Understand the pathophysiology of diseases caused by intoxication and environmental factors and learn their signs and symptoms, diagnosis, and treatment.

E-5-1) Basics of diagnoses and tests

Objectives:

1. Outline the tests of intoxicated patients and the analysis of causative substances.

E-5-2) Signs and symptoms

Objectives:

1. Shock
2. Fever
3. Consciousness disorder / syncope
4. Dehydration
5. Jaundice
6. Rash
7. Anemia
8. Dyspnea / shortness of breath
9. Motor paralysis / muscle weakness
10. Abdominal pain
11. Nausea / vomiting
12. Constipation / diarrhea / bloody stool
13. Hematemesis / melena
14. Abnormal urine volume / urination

E-5-3) Diseases

E-5-3) - (1) Poisoning



Objectives:

1. Explain the etiology, signs and symptoms, and preventive measures of food poisoning.
2. Explain the pathogenesis, signs and symptoms, diagnosis, and treatment of carbon monoxide poisoning.
3. Explain the pathogenesis, diagnosis, and treatment of intoxication caused by organic phosphorous agents, organic chlorine agents, and organic solvents.
4. Outline intoxication due to heavy metals, hydrocyanic acid, arsenic, paraquat, and natural poisons.
5. Explain intoxication by alcohol, drugs of abuse such as psychostimulants / narcotics / cannabis.
6. Explain intoxication by medicinal chemicals.

E-5-3) - (2) Diseases due to environmental factors, etc.

Objectives:

1. Explain disorders caused by high temperature (heat stroke).
2. Explain disorders caused by low temperature.
3. Explain disorders by vibration and noise.
4. Explain the causes and measures of disorders due to atmospheric pressure.

E-5-3) - (3) Burn

Objectives:

1. Explain the severity of burn based on burn area (rule of 9) and depth staging.
2. Outline the treatment policy of burn.

## E-6 Biological effects of and damage from radiation

Goal:

Understand the effects on and applications for living organisms caused by radiation and electromagnetic waves which are widely applied in medical fields

### E-6-1) Living organisms and radiation

Objectives:

1. Explain types of radiation and radioactivity, their characteristics, quantitative methods, and units
2. Explain dose assessment and its pathophysiology, signs and symptoms, diagnosis, and treatment of internal and external radiation exposure.
3. Explain the (acute and late) effects of radiation and electromagnetic waves on the human body (including the fetus).
4. Explain the difference in radiation permeability and sensitivity of various normal tissues.
5. Outline phenomena such as heat generation of human body and implanted device due to magnetic field and electromagnetic waves used in magnetic resonance imaging <MRI>.
6. Explain radiation action on genes and cells, and the mechanism of cell death and the local / systemic effects by radiation.
7. Explain the three principles of radiation exposure reduction and safety management.

### E-6-2) Medical radiation and biological effects

Objectives:

1. Know the principles of radiation exposure reduction from radiological diagnosis and interventional radiology, and perform them.
2. Know the benefit and cost / risk (exposure dose, acute and late effects, etc.) of radiation diagnosis (X-ray imaging, computed tomography <CT>, nuclear medicine), angiography and interventional radiology, and determine the indication of them.
3. Explain the biological principles of radiation therapy, and the acute and late effects on the human body.
4. Explain radiation protection and safety management regarding medical radiation exposure.
5. Provide easily understandable explanation to patients regarding radiation exposure from radiation diagnosis or radiotherapy.

### E-6-3) Risk communication for radiation

Objectives:

1. Pay sufficient attention to patients' and families' mental and social distress peculiar to radiation.
2. Accept the vague anxiety of the patient, explain with easy-to-understand words to reduce anxiety, and have a dialogue.

### E-6-4) Medical practice in radiation disaster

Objectives:

1. Explain the pathophysiology, signs and symptoms, dose assessment, and treatment of internal and external exposure.
2. Explain mental health in radiation disasters and nuclear emergency.

## E-7 Growth and development

### Goal:

Understand the physiological growth / development of fetuses / newborns / infants / childhood through adolescence, the characteristics of their abnormalities, and mental / social problems.

### E-7-1) Fetus / newborn

#### Objectives:

1. Explain the physiological characteristics of circulation and respiration in the fetus and the changes upon birth.
2. List major congenital diseases.
3. Explain the physiological characteristics of newborns.
4. Explain non-reassuring fetal status <NRFS>.
5. Explain the pathogenesis of neonatal asphyxia.
6. Explain newborn mass screening.
7. Explain the differential diagnosis and treatment of neonatal jaundice.
8. List the etiologies of breathing disorders in neonatal period.
9. Explain the basics of management of normal infants, low birth weight infants, and sick infants.
10. Outline diseases specific to low birth weight infants.

### E-7-2) Infants

#### Objectives:

1. Explain the development of the physiological functions of infants.
2. Explain the normal psychomotor development of infants.
3. Outline the fundamentals of caring and feeding infants.
4. Explain sudden infant death syndrome <SIDS>.

### E-7-3) Childhood in general

#### Objectives:

1. Explain psychomotor development and psychosomatic correlation in children.
2. List nutritional problems with children.
3. Outline the relationship between childhood immunity development and infection.
4. Explain the significance and content of vaccination in pediatric health.
5. List the major abnormalities (including pediatric psychosomatic diseases) related to growth.
6. Outline child abuse.
7. Outline the characteristics of diagnostic methods and treatments for children.
8. List disorders of neurological development (autism spectrum disorder <ASD>, attention-deficit hyperactivity disorder <ADHD>, specific learning disorder, tic disorder group).

### E-7-4) Adolescence

#### Objectives:

1. Explain the mechanism and sexual character of puberty expression.
2. List mental health problems related to puberty.
3. Explain the status quo and issues of transitional care.

## E-8 Aging

### E-8-1) Aging and characteristics of elderly people

#### Goal:

Learn issues related with physical, mental / psychological changes associated with aging, diagnosis and treatment of diseases / conditions specific to the elderly, rehabilitation, long-term care, and end of life care.

#### Objectives:

1. Explain the aging theory, aging control, structural / functional changes of organs with aging, and the physiological changes brought to patients such as lower reserve capacity.
2. Conduct comprehensive geriatric assessment (CGA).

3. Explain the concept of geriatric syndrome (gait disturbance / falling, cognitive dysfunction, excretory disorders, nutritional disorders, feeding disorders / dysphagia etc.).
4. Explain the concept of, measures against, and preventive measures for frailty, sarcopenia, and locomotive syndrome.
5. Explain the difference among dementia, depression, and delirium, and conduct differential diagnosis and initial response for each.
6. Assess gait disturbance / falling, conduct differential diagnosis, and explain preventive measures for falling / rehabilitation according to the cause.
7. Assess oral function deterioration and eating / dysphagia disorders, consider differential diagnosis, and conduct treatment, rehabilitation and prevention for them according to the cause.
8. Explain nutrition management for elderly people.
9. Explain changes in the pharmacokinetics associated with aging, and points of drug therapy for the elderly, and conduct appropriate intervention such as rectifying polypharmacy.
10. Explain disability and disuse syndrome of the elderly, and rehabilitation to them.
11. Explain discharge support for the elderly and long-term care insurance system.
12. Explain the medical care (end of life care) at the end stage of life.

## E-9 Death of a person

### E-9-1) Biological and social death

#### Goal:

Understand the death of an individual.

#### Objectives:

1. Explain the concept and definition of death and the biological death of individuals.
2. Explain the difference between a vegetative state and brain death.
3. Explain the difference and contents of natural and unnatural deaths.
4. Explain the definition of sudden death and list diseases that can cause sudden death including sudden infantile death syndrome <SIDS>.
5. Explain medical-related death.
6. Explain the process of the body and mind of a dying person and empathize / pay thoughtful attention to his / her individuality.
7. Explain communication with patients in end of life care, frequent pain, and its coping measure / care.
8. Explain the end of life care (including water, rehydration, and nutrition management) and specific care for children.
9. Explain the concept of autonomic decision making, advance directive, life-prolonging treatment, do not attempt resuscitation <DNAR>, death with dignity and euthanasia, and discontinuation and withholding of treatment.
10. Explain the posthumous family care (grief care).

## F. Basis of Medical Practice

It is important to provide integrated education by linking basic practical knowledge and skills with the basics of major signs and symptoms, and pathophysiology from the early stages after admission, and toward the acquisition of knowledge, skills and attitudes as the basics of general practice, no field of basic science or clinical medicine should be overly biased to expertise. At this point, it is effective for universities and local health facilities to cooperatively promote various measures in a step-by-step and organic manner so that learning can be accomplished through various experiences.

### F-1 Approaches from signs and symptoms / pathophysiology

Goal:

Achieve the basis of medical practice which is essential as a physician by learning through integrating the cause, classification, outline of diagnosis and treatment of signs and symptoms / pathophysiology.

#### F-1-1) Fever

Objectives:

1. Explain the etiology and pathophysiology of fever.
2. List the diseases (group) that cause fever, and explain the points of diagnosis.
3. Explain the therapeutic points for patients with fever and outline the condition requiring specialty care.

#### F-1-2) General malaise

Objectives:

1. Explain the etiology and pathophysiology of general malaise.
2. List diseases (group) that cause general malaise and explain the points of diagnosis.
3. Explain the therapeutic points for patients with general malaise and outline the condition requiring specialty care.

#### F-1-3) Anorexia

Objectives:

1. Explain the etiology and pathophysiology of anorexia.
2. List the diseases (group) that cause anorexia, and explain the points of diagnosis.
3. Explain the therapeutic points for patients with anorexia and outline the condition requiring specialty care.

#### F-1-4) Weight loss / gain

Objectives:

1. Explain the etiology and pathophysiology of weight loss / gain.
2. List the diseases (groups) that cause weight loss / gain, and explain the points of diagnosis.
3. Explain the therapeutic points for patients with weight loss / gain and outline the condition requiring specialty care.

#### F-1-5) Shock

Objectives:

1. Explain the etiology and pathophysiology of shock.
2. List the diseases (group) that cause shock, and explain the points of diagnosis.
3. Explain the therapeutic points for patients with shock and outline the condition requiring specialty care.

#### F-1-6) Cardiac arrest

Objectives:

1. Explain the etiology and pathophysiology of cardiac arrest.
2. List the diseases (groups) that cause cardiac arrest and explain the points of diagnosis.
3. Explain the therapeutic points for patients with cardiac arrest and outline the condition requiring specialty care.

#### F-1-7) Consciousness disorder / syncope

Objectives:

1. Explain the etiology and pathophysiology of consciousness disorder / syncope.
2. List the diseases (group) that cause consciousness disorder / syncope, and explain the points of diagnosis.
3. Explain the therapeutic points for patients with consciousness disorder / syncope and outline the condition requiring specialty care.

#### F-1-8) Convulsion

##### Objectives:

1. Explain the etiology and pathophysiology of convulsions.
2. List the diseases (group) that cause convulsion and explain the points of diagnosis.
3. Explain the therapeutic points for patients with convulsions and outline the condition requiring specialty care.

#### F-1-9) Vertigo and dizziness

##### Objectives:

1. Explain the etiology and pathophysiology of vertigo and dizziness.
2. List the diseases (groups) that cause vertigo and dizziness, and explain the points of diagnosis.
3. Explain the therapeutic points for patients with vertigo and dizziness, and outline the condition requiring specialty care.

#### F-1-10) Dehydration

##### Objectives:

1. Explain the etiology and pathophysiology of dehydration.
2. List the diseases (group) that cause dehydration and explain the points of diagnosis.
3. Explain the therapeutic points for patients with dehydration and outline the conditions requiring specialty care.

#### F-1-11) Edema

##### Objectives:

1. Explain the etiology and pathophysiology of edema.
2. List the diseases (group) that cause edema and explain the points of diagnosis.
3. Explain the therapeutic points for patients with edema and outline the condition requiring specialty care.

#### F-1-12) Rash

##### Objectives:

1. Explain the etiology and pathophysiology of rash.
2. List the diseases (group) that cause rash and explain the points of diagnosis.
3. Explain the therapeutic points for patients with rash and outline the condition requiring specialty care.

#### F-1-13) Cough / sputum

##### Objectives:

1. Explain the etiology and pathophysiology of cough / sputum.
2. List the diseases (group) that cause cough / sputum and explain the points of diagnosis.
3. Explain the therapeutic points for patients with cough / sputum and outline the condition requiring specialty care.

#### F-1-14) Bloody sputum / hemoptysis

##### Objectives:

1. Explain the causes and pathophysiology of bloody sputum / hemoptysis.
2. List the diseases (group) causing bloody sputum / hemoptysis and explain the point of diagnosis.
3. Explain the therapeutic points for patients with bloody sputum / hemoptysis, and outline the condition requiring specialized care.

#### F-1-15) Dyspnea

##### Objectives:

1. Explain the cause of dyspnea and the pathophysiology.
2. List the diseases (group) that cause dyspnea and explain the points of diagnosis.
3. Explain the therapeutic points for patients with dyspnea, and outline the condition requiring specialty care.

#### F-1-16) Chest pain

##### Objectives:

1. Explain the etiology and pathophysiology of chest pain.
2. List the diseases (group) that cause chest pain and explain the points of diagnosis.
3. Explain the therapeutic points for patients with the therapeutic points of for patients with pain and outline

the conditions requiring professional care.

#### F-1-17) Palpitations

Objectives:

1. Explain the cause and the pathophysiology of palpitations.
2. List the diseases (group) that cause palpitations and explain the points of diagnosis.
3. Explain the therapeutic points for patients with palpitations and outline the conditions requiring specialty care.

#### F-1-18) Pleural effusion

Objectives:

1. Explain the cause and pathophysiology of pleural effusion.
2. List the diseases (group) that cause pleural effusion and explain the points of diagnosis.
3. Explain the therapeutic points for patients with pleural effusion and outline the condition requiring specialty care.

#### F-1-19) Dysphagia

Objectives:

1. Explain the etiology and pathophysiology of dysphagia.
2. List the diseases (group) that cause dysphagia, and explain the points of diagnosis.
3. Explain the therapeutic points for patients with dysphagia and outline the condition requiring specialty care.

#### F-1-20) Abdominal pain

Objectives:

1. Explain the etiology and pathophysiology of abdominal pain.
2. List diseases (group) that cause abdominal pain and explain the points of diagnosis.
3. Explain the therapeutic points for patients with abdominal pain and outline the condition requiring specialty care.

#### F-1-21) Nausea / vomiting

Objectives:

1. Explain the etiology and pathophysiology of nausea / vomiting.
2. List the diseases (group) that cause nausea / vomiting and explain the points of diagnosis.
3. Explain the therapeutic points for patients with nausea / vomiting and outline the condition requiring specialty care.

#### F-1-22) Hematemesis / melena

Objectives:

1. Explain the etiology and pathophysiology of hematemesis / melena.
2. List the diseases (group) that cause hematemesis / melena, and explain the points of diagnosis.
3. Explain the therapeutic points for patients with hematemesis / melena and outline the condition requiring specialty care.

#### F-1-23) Constipation / diarrhea

Objectives:

1. Explain the etiology and pathophysiology of constipation / diarrhea.
2. List the diseases (group) that cause constipation / diarrhea, and explain the points of diagnosis.
3. Explain the therapeutic points for patients with constipation / diarrhea and outline the condition requiring specialty care.

#### F-1-24) Jaundice

Objectives:

1. Explain the etiology and pathophysiology of jaundice.
2. List the diseases (group) that cause jaundice and explain the points of diagnosis.
3. Explain the therapeutic points for patients with jaundice and outline the condition requiring specialty care.

#### F-1-25) Abdominal distension (including ascites) / mass

Objectives:

1. Explain the etiology and pathophysiology of abdominal distension (including ascites) / mass.

2. List the diseases (group) that cause abdominal distension (including ascites) / mass, and explain the points of diagnosis.
3. Explain the therapeutic points for patients with abdominal distension (including ascites) / mass and outline the condition requiring specialty care.

#### F-1-26) Anemia

##### Objectives:

1. Explain the etiology and pathophysiology of anemia.
2. List the diseases (group) that cause anemia, and explain the points of diagnosis.
3. Explain the therapeutic points for patients with anemia and outline the condition requiring specialty care.

#### F-1-27) Lymphadenopathy

##### Objectives:

1. Explain the etiology and pathophysiology of lymphadenopathy.
2. List the diseases (group) that cause lymphadenopathy, and explain the points of diagnosis.
3. Explain the therapeutic points for patients with lymphadenopathy and outline the condition requiring specialty care.

#### F-1-28) Urine volume / urination abnormality

##### Objectives:

1. Explain the etiology and pathophysiology of urine volume / urination abnormality.
2. List the diseases (group) that cause urine volume / urination abnormality, and explain the points of diagnosis.
3. Explain the therapeutic points for patients with urine volume / urination abnormality and outline the condition requiring specialty care.

#### F-1-29) Hematuria / proteinuria

##### Objectives:

1. Explain the etiology and pathophysiology of hematuria / proteinuria.
2. List the diseases (group) that cause hematuria / proteinuria, and explain the points of diagnosis.
3. Explain the therapeutic points for patients with hematuria / proteinuria and outline the condition requiring specialty care.

#### F-1-30) Menstrual abnormality

##### Objectives:

1. Explain the etiology and pathophysiology of menstrual abnormality.
2. List the diseases (group) that cause menstrual abnormality, and explain the points of diagnosis.
3. Explain the therapeutic points for patients with menstrual abnormality and outline the condition requiring specialty care.

#### F-1-31) Anxiety / depression

##### Objectives:

1. Explain the etiology and pathophysiology of anxiety / depression.
2. List the diseases (group) that cause anxiety / depression, and explain the points of diagnosis.
3. Explain the therapeutic points for patients with anxiety / depression and outline the condition requiring specialty care.

#### F-1-32) Amnesia

##### Objectives:

1. Explain the etiology and pathophysiology of amnesia.
2. List the diseases (group) that cause amnesia, and explain the points of diagnosis.
3. Explain the therapeutic points for patients with amnesia and outline the condition requiring specialty care.

#### F-1-33) Headache

##### Objectives:

1. Explain the etiology and pathophysiology of headache.
2. List the diseases (group) that cause headache, and explain the points of diagnosis.
3. Explain the therapeutic points for patients with headache and outline the condition requiring specialty care.

### F-1-34) Motor paralysis / muscle weakness

#### Objectives:

1. Explain the etiology and pathophysiology of motor paralysis / muscle weakness.
2. List the diseases (group) that cause motor paralysis / muscle weakness, and explain the points of diagnosis.
3. Explain the therapeutic points for patients with motor paralysis / muscle weakness and outline the condition requiring specialty care.

### F-1-35) Low back pain

#### Objectives:

1. Explain the etiology and pathophysiology of low back pain.
2. List the diseases (group) that cause low back pain, and explain the points of diagnosis.
3. Explain the therapeutic points for patients with low back pain and outline the condition requiring specialty care.

### F-1-36) Arthralgia / joint swelling

#### Objectives:

1. Explain the etiology and pathophysiology of arthralgia / joint swelling.
2. List the diseases (group) that cause arthralgia / joint swelling, and explain the points of diagnosis.
3. Explain the therapeutic points for patients with arthralgia / joint swelling and outline the condition requiring specialty care.

### F-1-37) Trauma / burn

#### Objectives:

1. Explain the etiology and pathophysiology of trauma / burn.
2. List the diseases (group) that cause trauma / burn, and explain the points of diagnosis.
3. Explain the therapeutic points for patients with trauma / burn and outline the condition requiring specialty care.

## F-2 Basic clinical knowledge

### F-2-1) Clinical reasoning

#### Goal:

Predict and discuss issues to clarify health problems in patients and to make decisions for management.

#### Objectives:

1. List the processes from identification of problems to treatment and management.
2. Explain three methods of information gathering: medical interview, physical examination, and laboratory testing.
3. Explain the importance of basic medical science such as anatomy, pathology, physiology, biochemistry, etc. and of disease frequency to recall diagnostic hypotheses.
4. Conduct information gathering based on diagnostic hypotheses for verification.
5. Explain the causes of diagnostic errors and how to prevent them.
6. Explain diagnostic process, treatment, and management are performed in parallel, depending on the situation.
7. Conduct information sharing and negotiation with a patient to make decisions regarding treatment and management.
8. Explain situations for which consultation and referral are essential.

### F-2-2) Evidence-based medicine <EBM>

#### Goal:

Use the best available medical knowledge and acquire an appropriate method for decision making in clinical settings.

#### Objectives:

1. List five steps of evidence-based medicine <EBM>.
2. Define the clinical question using patient / population / problem, intervention (exposure), comparison, and outcome <PICO (PECO)>.
3. Outline research designs (observational research [descriptive research, cross-sectional study, case-control study, and cohort study], intervention study [clinical trial and randomized controlled trial], systematic review, and meta-analysis).



4. Search evidences from databases or secondary articles, and clinical practice guidelines.
5. Critically appraise the information obtained.
6. List the types of clinical practice guidelines and pitfalls in their use.
7. Describe the difference in grading strength of recommendations in clinical practice guidelines.

### F-2-3) Laboratory test

#### Goal:

Explain the methods of laboratory tests and indication, significance, and interpretation of laboratory test results in clinical reasoning.

#### Objectives:

1. Explain the purpose and significance of laboratory test, and select the minimally essential examination items.
2. Explain the appropriate specimen collection and preservation methods for laboratory test.
3. Explain the safe practices in laboratory test (patient and sample confirmation, complications of laboratory test, prevention of infection, and accuracy control).
4. Explain characteristics of laboratory test (sensitivity, specificity, false positive, false negative, pre-test probability, post-test probability, likelihood ratio, receiver operating characteristic <ROC> curve) and criteria (reference value / reference range, cutoff value, panic value).
5. Explain physiological fluctuation of laboratory test, measurement error, accuracy control, and human error.
6. Explain characteristics in test values of children, elderly people, and pregnant women, and interpret the results.
7. Understand and explain the significance and difference of the basic laboratory tests to reason pathophysiology and to confirm a diagnosis.
8. Explain the purpose and indication of blood count, coagulation / fibrinolysis test, urine / feces test, and biochemical test, and interpret the results.
9. Explain the purpose and indication of chromosome / genetic testing, and interpret the results.
10. Explain the significance of pathological examination, cytology, and flow cytometry.
11. Explain the purpose and indication of immune serology tests and transfusion tests, and interpret the results.
12. Explain the purpose and indication of physiological function test (electrocardiogram, cardiac function, respiratory function, ultrasound, endocrine / metabolic function, electroencephalogram, needle electromyogram, peripheral nerve conduction study), and interpret the result.
13. Explain the purpose and indication of bacteriology test (bacterial smear, culture, identification, drug susceptibility test), and interpret the results.
14. Explain the purpose and indication of arterial blood gas analysis, and percutaneous oxygen saturation monitoring, and interpret the results.
15. Explain the purpose and indication of cerebrospinal fluid, pleural effusion, and ascites test, and interpret the results.

### F-2-4) Pathological diagnosis

#### Goal:

Understand the purpose, method, and significance of pathological diagnosis and cytology essential for clinical diagnosis.

#### Objectives:

1. Explain appropriate handling, specimen preparation, and diagnostic process for pathological diagnosis and cytology sample.
2. Explain the appropriate way to provide clinical information necessary for diagnosis.
3. Explain the advantages and disadvantages of intraoperative rapid diagnosis.
4. Explain the advantages and disadvantages of pathological diagnosis using digital images (including remote diagnosis).
5. Explain the significance, legal matters, procedure, etc. of pathological anatomy in medical care.

### F-2-5) Diagnostic imaging and radiation treatment

#### Goal:

Learn the fundamentals of diagnosis and treatment with radiation.

#### Objectives:

1. Explain the principles of X-ray imaging, computed tomography <CT>, magnetic resonance imaging <MRI>, and nuclear medical examination.
2. Explain the basics of interpretation of X-ray imaging, computed tomography <CT>, magnetic resonance

- imaging <MRI> and nuclear medical examination.
3. Explain the principles of radiation therapy and list the major radiation treatment methods.
  4. Explain the advantages and disadvantages of radiation diagnosis and treatment.
  5. Outline interventional radiology.

#### F-2-6) Diagnosis and treatment using endoscope

##### Goal:

Learn the principles of endoscopy and the fundamentals of diagnosis and treatment.

##### Objectives:

1. Explain the types and mechanisms of the endoscopic devices.
2. List and outline the varieties of endoscopic examination.
3. Outline endoscopic treatment.

#### F-2-7) Diagnosis and treatment using ultrasound

##### Goal:

Learn the mechanisms of ultrasound devices and the fundamentals of ultrasound diagnosis and treatment.

##### Objectives:

1. Explain the types and principles of ultrasound equipment.
2. List and outline the types of ultrasonography.
3. Outline ultrasound images of major diseases and pathological conditions.
4. Outline the treatment using ultrasound.
5. Explain biological reaction and safety of ultrasound.
6. Explain the contrast-enhanced ultrasound.

#### F-2-8) Basic principles of medication

##### Goal:

Learn the basics of medication (pharmacological actions, adverse events, precautions on administration) necessary for medical care.

##### Objectives:

1. Explain the accumulation, tolerance, tachyphylaxis, dependence, habit-forming effect, and addiction of drugs (including opioid).
2. List the major drug allergy signs and symptoms, physical examination, and diagnosis, and explain preventive measures and management.
3. Explain signs and symptoms, diagnosis, and management of drug-induced anaphylactic shock.
4. Explain pharmacological effects, indication, adverse events, and precautions on administration of drugs to each organ system (central and peripheral nervous, cardiovascular, respiratory, digestive, renal and urinary, hematology, endocrine, etc.).
5. Explain the pharmacological actions, indications, adverse events, and precautions on administration of antimicrobial drugs.
6. Explain indications, adverse events, and precautions on administration of antineoplastic drugs.
7. Explain indications, adverse events, precautions on administration of narcotic analgesics / sedatives.
8. Outline adverse events of major drugs.
9. Explain precautions on drug administration based on pharmacokinetic characteristics according to age and impaired organs.
10. Explain pharmacokinetic interaction with examples.
11. Explain how to write prescriptions, basic administration methods of / adherence to prescribed medication.
12. Explain the pharmacological actions and adverse events of molecular-targeted agents.
13. Outline the characteristics of Kampo medicine (traditional Japanese medicine), and indication and pharmacological effects of major Kampo formulas.
14. Explain polypharmacy, contraindications, drug use under specific conditions (anti-doping, etc.).

#### F-2-9) Surgical treatment and perioperative management

##### Goal:

Learn the fundamentals of surgical treatment and perioperative management.

##### F-2-9) - (1) Surgical treatment

##### Objectives:

1. Explain the concept and necessity of cleanliness.
2. Explain the meaning of hand-washing and its procedure.
3. Explain the necessity and procedure of gown technique.
4. Explain the mechanism of wound healing.
5. Explain the meaning and method of disinfection, and the types, adaptations, and effects of dressing materials.
6. Explain indications and complications of surgical treatment.

#### F-2-9) - (2) Perioperative management

##### Objectives:

1. List operative risk factors and explain the fundamentals to address them.
2. Explain the significance of basic vital signs (body temperature, respiratory rate, pulse rate, blood pressure) and how to monitor them.
3. List the major postoperative complications and explain the fundamentals of prevention.
4. List points for informed consent on surgery.
5. Explain prior risk assessment in perioperative management.
6. Explain the necessity of management (continuation, withdrawal, etc.) of the major medication in the perioperative period and the basis of its accompanying risk.
7. Explain the fundamentals of infusion / blood transfusion in perioperative management.
8. Explain the management of postoperative pain.
9. Outline the role of postoperative recovery room.
10. Outline the role of the intensive care unit.

#### F-2-10) Anesthesia

##### Goal:

Learn the fundamentals of general and local anesthesia.

##### Objectives:

1. Explain the concepts of, types of, and the biological reaction to anesthesia.
2. Outline preoperative assessment and respiratory management for safe anesthesia management.
3. Explain the types of anesthetics and muscle relaxants and the principles on their use.
4. Outline indications, contraindications, methods, accidents, and complications of inhalation anesthesia and intravenous anesthesia.
5. Outline various airway control methods including tracheal intubation.
6. Outline indication, contraindications, and complications of local anesthesia, peripheral nerve block, plexus block, spinal subarachnoid anesthesia, and epidural anesthesia.
7. Outline the monitoring method, essential abnormal findings, and management for safe anesthesia.
8. Outline anesthetic management considerations in patients with malignant hyperthermia or neuromuscular diseases.

#### F-2-11) Diet and nutrition therapy and fluid management

##### Goal:

Learn the basics of diet / nutritional therapy and infusion therapy.

##### Objectives:

1. Outline dietary behavior, dietary reference intakes, dietary balance, Japan Food standard ingredient table, supplementary food, and dietary fiber / probiotics / prebiotics.
2. Explain nutritional assessment, nutrition care management, nutrition support team <NST>, and disease-specific nutritional therapy.
3. Explain indications and precautions on administration of various infusion formulations (including vitamins and trace elements) according to their characteristics and pathophysiology.
4. Explain indications, methods and complication, and precautions on long-term administration of intravenous and tube / enteral nutrition.
5. Explain infusion therapy for infants and children.

#### F-2-12) Medical devices and artificial organs

##### Goal:

Learn the fundamentals of medical devices and artificial organs.

##### Objectives:

1. Outline the types and mechanisms of major medical devices.

2. Outline the types and mechanisms of major artificial organs.

#### F-2-13) Blood transfusion and organ transplantation

##### Goal:

Learn the fundamentals of blood transfusion and organ transplantation.

##### Objectives:

1. Explain the types and indication of blood products and plasma derivatives.
2. Explain blood type test (ABO, RhD), cross-match test, and antibody screening test.
3. Explain adverse reactions to blood transfusion, obligation to keep records of blood transfusion use, and procedures to prevent incompatible blood transfusion.
4. Explain the appropriate use of blood transfusion, transfusion of blood components, autologous blood transfusion, and transfusion in emergency.
5. Explain the types and indication of organ transplantation and hematopoietic stem cell transplantation.
6. Explain the relationship between transplantation and histocompatibility.
7. Explain the pathophysiology and management at onset of the rejection reaction after transplantation and graft-versus-host disease.
8. Explain the types, indications, and side effects of immunosuppressants.

#### F-2-14) Rehabilitation

##### Goal:

Learn the fundamentals of rehabilitation.

##### Objectives:

1. Explain the concept and indication of rehabilitation (including cardiovascular diseases, respiratory diseases, and internal disorders such as cancer).
2. Understand the membership of the rehabilitation team and explain the role of physicians.
3. Explain the role of rehabilitation in collaboration with welfare and long-term care.
4. Explain disability based on body functions and structures, activities, and participation of International Classification of Functioning, Disability and Health.
5. Assess impairment and activities of daily living (ADL).
6. Outline physical therapy, occupational therapy and speech-language-hearing therapy.
7. Outline the walking aid, wheelchair, prostheses (artificial limbs) and braces.

#### F-2-15) Home medical care and long-term care

##### Goal:

Learn the basics of home medical care and long-term care.

##### Objectives:

1. Outline the concept of home medical care, and future roles and challenges.
2. Explain the importance of interprofessional work in home medical care.
3. Explain the importance of prevention, assessment, procedures / treatment of decubitus ulcer, and team-based health care.
4. Outline the end-of-life home medical care, and ideal care and challenges in caring for dying patients.
5. Explain the definition and types of long-term care.
6. Outline the points of long-term care and environmental maintenance depending on levels of activities of daily living <ADL> (excretion, feeding, bathing, etc.).
7. Outline the healthcare and welfare system such as the community-based integrated care system, long-term care insurance system, Comprehensive Services and Supports for Persons with Disabilities Act, etc.

#### F-2-16) Palliative care

##### Goal:

Learn the fundamentals of palliative care.

##### Objectives:

1. Outline palliative care (including palliative care team, hospice, palliative care unit, and home palliative care).
2. Explain total pain.
3. List major physical and psychosocial pains in palliative care.
4. Explain pain assessment, drug therapy for pain relief, and cancer pain treatment.
5. Explain the indications and issues regarding opioids.

6. Explain the psychology of patients and families in palliative care.

### F-3 Basic medical practice skills

Goals and objectives listed under "G. Clinical clerkship" are, in general, those which students should acquire under the supervision of supervising physicians as they directly see the patients (or use of simulators depending on the objectives) in clinical clerkship in the ward, etc. (including central medical departments as necessary) in the university and community hospitals.

On the other hand, goals and objectives listed under F-3 are the contents to be learned before clinical clerkship; students achieve basic knowledge related to clinical examination and practical skills for the goals and objectives required at the timing of graduation through simulators, simulated patients and students' mutual role-playing, etc. Therefore F-3 does not mean the goals and objectives for skills learned by clinical clerkship in the actual practice in the ward, etc.

#### F-3-1) Problem-oriented system and clinical reasoning

Objectives:

1. Collect and analyze clinical case information based on basic medical knowledge.
2. Extract problems of the case based on the obtained information.
3. Integrate information of history taking and physical examination to list differential diagnoses.
4. Make diagnoses / treatment plans in common disease cases.

#### F-3-2) Medical interview

Objectives:

1. See the patients with appropriate attire, language, and attitude.
2. Demonstrate basic communication skills in medical interview.
3. Take medical history (chief complaint, history of present illness, regular medication, allergy history, past history, family history, habits, lifestyle, social / occupation history, living environment, home environment, overseas travel history, systems review), and select and organize it.
4. Explain the appropriate posture (standing, sitting, Fowler, recumbent, and lithotomy position) to the patient in physical examination.
5. Explain and report findings and diagnosis obtained from the consultation, and necessary laboratory tests to the senior physician.

#### F-3-3) Medical record (chart)

Objectives:

1. Collect patient information appropriately to produce problem-oriented medical record <POMR>.
2. Produce progress notes in the format of subjective findings, objective findings, assessment, and plan <SOAP>.
3. Become accustomed to appropriately summarize cases and present them according to the situation.
4. Pay sufficient attention to privacy protection and security.

#### F-3-4) Clinical judgment

Objectives:

1. List necessary and sufficient laboratory tests considering clinical epidemiological indicators (sensitivity / specificity, likelihood ratio, etc.), and interpret the clinical significance of the test result in each case.
2. Explain therapeutic plans based on scientific evidence.

#### F-3-5) Physical examination

##### F-3-5) - (1) Basics

Objectives:

1. Respect the patient's situation to earn his / her trust.
2. Stress and appropriately address patient safety in case an adverse event happens.
3. Pay attention to patients' privacy, sense of shame, and pain and protect the confidentiality of personal information, etc.
4. Demonstrate standard precautions before and after clinical examination to prevent infection.
5. Pay attention to professional attire, language, and attitude.
6. Judge patients' general condition to evaluate if he / she can tolerate physical examination and perform physical examination depending on the situation.

F-3-5) - (2) General appearance and vital signs

Objectives:

1. Measure height and weight, calculate body mass index <BMI>, and assess nutritional status.
2. Measure blood pressure by both palpation and auscultation methods at a brachial artery.
3. Count the pulse rate at radial arteries on both sides.
4. Measure respiratory rate to evaluate respiratory abnormality.
5. Measure body temperature in the axilla.
6. Perform artery palpation at lower extremities, etc., blood pressure measurement at lower leg (by palpation), and at thigh (by auscultation).
7. Assess general appearance of a patient (body shape, nutrition, posture, gait, facial appearance, skin, and voices).

F-3-5) - (3) Head and neck

Objectives:

1. Examine the head (face, hair, scalp, and cranium).
2. Examine the eyes (visual fields, pupils, light reflex, ocular movement / exophthalmos, and conjunctiva).
3. Examine the ears (auricle and hearing ability).
4. Inspect the patient's ear canal and eardrum with an otoscope.
5. Perform hearing test using tuning fork.
6. Perform examination of lips, mouth, pharynx, and tonsils.
7. Perform examination of the nasal cavity and sinuses.
8. Inspect the anterior nasal cavity using a nasoscope.
9. Perform physical examination of thyroid glands, cervical blood vessels, trachea, and salivary glands.
10. Perform physical examination of head and neck lymph nodes.

F-3-5) - (4) Chest

Objectives:

1. Perform inspection, palpation, and percussion of the chest.
2. Perform auscultation of breath sounds and adventitious sound.
3. Perform auscultation of heart sounds and heart murmurs.
4. Confirm percussion tenderness on the back.
5. Examine the breasts (use of a simulator permitted).

F-3-5) - (5) Abdomen

Objectives:

1. Perform inspection and auscultation of the abdomen.
2. Perform percussion and palpation according to abdominal regions.
3. Judge presence or absence of tenderness, peritoneal irritation signs, and muscular defense.
4. Judge the presence or absence of ascites.
5. Perform auscultation for bowel sound and vascular bruit.
6. Perform rectal digital examination including prostate (use of a simulator permitted).

F-3-5) - (6) Nerve

Objectives:

1. Determine the level of consciousness.
2. Examine the cranial nerves (including funduscopic examination).
3. Conduct deep tendon reflex.
4. Examine cerebellar / motor function.
5. Examine the sensory system (pain, temperature, tactile, and deep sensation).
6. Confirm meningeal irritation findings (nuchal rigidity and Kernig's sign).

F-3-5) - (7) Extremities and spinal column

Objectives:

1. Examine extremities and the spine (curvature and pain).
2. Examine joints (range of motion, swelling, pain, and deformity).
3. Examine the musculoskeletal system (manual muscle test).

F-3-5) - (8) Pediatric examination

Objectives (partly including strategies):

1. Construct and trace diagnostic reasoning from chief complaints.

2. Understand the pathophysiology and epidemiology of diseases.
3. Participate in planning and implementation of treatment wherever possible.
4. Participate in obtaining necessary information and corresponding with parents wherever possible.
5. Participate to the extent possible in the assessment of growth and development of children.
6. Perform basic pediatric examinations.
7. Explain how to consult to pediatricians.

#### F-3-6) Basic clinical procedures

##### F-3-6) - (1) General procedure

###### Objectives:

1. Perform skin disinfection.
2. Perform venous blood drawing with a simulator.
3. Perform standard precautions such as hand hygiene.

##### F-3-6) - (2) Laboratory test procedure

###### Objectives:

1. Perform urinalysis (including urinary sediment).
2. Prepare and observe peripheral blood smears.
3. Perform microbiological examination (including Gram stain).
4. Record 12 lead electrocardiogram.
5. Measure percutaneous oxygen saturation.

##### F-3-6) - (3) Surgical procedure

###### Objectives:

1. Perform aseptic procedure.
2. Perform hand washing for surgery and procedures.
3. Demonstrate gown technique for surgery in the operating room.

##### F-3-6) - (4) Life support procedures

###### Objectives:

1. Judge whether the situation is highly urgent to some extent.
2. Perform basic life support.

## G. Clinical Clerkship

Clinical clerkship is based on participatory style in the practice. Clinical clerkship is defined as "clinical training done by medical students, who take on certain roles and responsibilities in a medical team including supervising physicians and residents, and even nurses and pharmacists. "Examples are the roles of taking a pre-examination in the outpatient department, checking evidences about diseases of a ward patient, and accompanying with the examination of the patient to ease anxiety. In the clinical settings, the roles that medical students can play are generally larger than assumption of supervising physicians. With reference to legitimate peripheral participation, clinical clerkship should be established to make "obtained rewards by actually playing roles in the clinical settings even if the roles are very small" learning motivation for medical students. In addition, if the training has to become observatory style by periodical reason, etc., plan the training to make it as much as active learning, for example, students record what they observed at the clinical settings and discuss it based on their reflection.

### G-1 Basis of medical practice

#### G-1-1) Clinical clerkship

G-1-1) - (1) Basic qualities and abilities required of a physician (see A)

Conduct clinical clerkship as they always become conscious of "A. Basic qualities and abilities required of a physician" (hereinafter re-listed).

1. Professionalism
2. Medical knowledge and problem-solving ability
3. Practical skills and patient care
4. Communication skills
5. Practice of team-based health care
6. Management of quality of care and patient safety
7. Medical practice in society
8. Scientific inquiry
9. Attitude for life-long and collaborative learning

G-1-1) - (2) Basics of medical practice (see F)

Based on the contents of "F. Basis of medical practice," learning should be accumulated in the clinical settings.

G-1-1) - (3) Role to entrust students

When assessing students in clinical clerkship, refer to the concept of entrustable professional activities <EPA>. Consider "what kind of tasks can be entrusted for medical students in clinical clerkship" and "which tasks can be independently performed on the first day of the mandatory clinical training" in each clinical department to use following major items as the framework, and develop goals and objectives in the form of actual clinical tasks.

1. Listen to medical history and perform physical examination.
2. Think of differential diagnoses.
3. Interpret the results of basic laboratory tests.
4. Plan prescriptions.
5. Document medical record (medical chart)
6. Orally present patient situation.
7. Clarify clinical problems and collect evidences.
8. Conduct / receive handover of a patient case.
9. Collaborate in interprofessional team.
10. Perform initial responses to highly urgent patients.
11. Obtain informed consent.
12. Perform basic clinical techniques.
13. Contribute to patient safety through identification and improvement of organizational issues.

### G-2 Clinical reasoning

In clinical clerkship, students produce problem lists on health problems of patients in charge in each department. Examples of differential diagnoses that should be assumed with consideration of frequency and severity for each sign or symptom / pathophysiology as described in "F-1 Approaches from signs and symptoms / pathophysiology" are described. For each problem, take medical history and physical examination necessary for diagnosis while assuming the following differential diagnoses and participate in the basic laboratory tests.



Meanwhile, this list follows an example of diseases selected from 2018 edition of the National Medical Practitioners Qualifying Examination standard for "required basic facts", but does not cover all the diseases corresponding to signs and symptoms. Because clinical reasoning emphasizes the process of retrieving diseases from possible pathophysiological conditions and does not expect students to memorize causative diseases by heart. Through learning of this reasoning process, students are expected to become able to assume differential diagnoses including diseases even if they are not sufficiently learned in each study area.

#### G-2-1) Fever

Infectious diseases: pneumonia, tuberculosis, urinary tract infection

Tumor: malignant lymphoma, renal cell carcinoma

Autoimmune: systemic lupus erythematosus <SLE>, inflammatory bowel diseases

Environment: heat stroke

#### G-2-2) General malaise

Infectious disease / inflammatory: tuberculosis, hepatitis

Psychiatry: depression, bipolar disorder

Intoxication: alcoholism, drug addiction

Endocrine / metabolism: hyperthyroidism, hypothyroidism, climacteric disturbance

Tumor: Malignant tumor in general

#### G-2-3) Anorexia

Tumor: Malignant tumor in general

Digestive: functional dyspepsia <FD>

Respiratory: chronic obstructive pulmonary disease <COPD>

Cardiovascular: heart failure

Psychiatry: depression

#### G-2-4) Weight loss / gain

[Weight loss]

Tumor: Malignant tumor in general

Endocrine: diabetes mellitus, hyperthyroidism

Psychiatry: depression

Infectious diseases: tuberculosis

Autoimmune: inflammatory bowel diseases

Digestive: chronic pancreatitis

Intoxication: alcoholism

[Weight gain]

Acute: heart failure, nephrotic syndrome

Chronic: hypothyroidism

#### G-2-5) Shock

Hypovolemic: acute gastrointestinal bleeding, aortic aneurysm rupture, burn

Cardiogenic: acute myocardial infarction, myocarditis

Obstructive: tension pneumothorax, pulmonary embolism

Blood distribution abnormality: sepsis, acute pancreatitis, anaphylaxis, spinal cord injury

#### G-2-6) Cardiac arrest

Cardiovascular: acute myocardial infarction, acute aortic dissection, ruptured aortic aneurysm

Respiratory: tension pneumothorax, traumatic pneumothorax

Neurogenic: subarachnoid hemorrhage, head trauma, spinal cord injury

Autoimmune: anaphylaxis

Environment: heat stroke, hypothermia

#### G-2-7) Consciousness disorder / syncope

Cerebral primary: subarachnoid hemorrhage, intracranial hematoma, encephalitis

Systemic: myocardial infarction, arrhythmia, pulmonary embolism, epilepsy, acute gastrointestinal bleeding, hepatic failure

#### G-2-8) Convulsion

Cerebrovascular disorder: cerebral infarction

Intoxication: drug addiction, alcoholism

Infectious diseases: encephalitis, encephalopathy, febrile convulsion

#### G-2-9) Vertigo and dizziness

Peripheral: benign paroxysmal positional vertigo

Central nervous system: cerebral hemorrhage, cerebral infarction

Syncope: arrhythmia, pulmonary embolism, valvular disease

Psychogenic: panic disorder

#### G-2-10) Dehydration

Digestive: acute gastrointestinal bleeding, infant diarrhea, acute pancreatitis

Endocrine / metabolism: diabetes mellitus

Environment: heat stroke, burn

#### G-2-11) Edema

Local: deep vein thrombosis

Systemic: heart failure, nephrotic syndrome, chronic kidney disease, liver cirrhosis, hypothyroidism

#### G-2-12) Rash

Infectious diseases: viral rash (measles, rubella, varicella, herpes)

Allergy, autoimmune: urticaria, drug eruption, systemic lupus erythematosus <SLE>

#### G-2-13) Cough / sputum

Infections: bronchitis, pneumonia, sinusitis

Tumor: lung cancer

Idiopathic: interstitial lung diseases

Autoimmune: bronchial asthma

Digestive: gastroesophageal reflux disease <GERD>

#### G-2-14) Bloody sputum / hemoptysis

Respiratory: pulmonary tuberculosis, lung cancer

Cardiovascular: mitral valve disease, heart failure

Hemorrhagic tendency: leukemia, disseminated intravascular coagulation <DIC>

#### G-2-15) Dyspnea

Respiratory: pulmonary embolism, acute respiratory distress syndrome <ARDS>, bronchial asthma, chronic obstructive pulmonary disease <COPD>, tension pneumothorax

Cardiovascular: heart failure

Psychogenic: panic disorder, hyperventilation syndrome

#### G-2-16) Chest pain

Respiratory: pulmonary embolism, pneumothorax

Cardiovascular: acute coronary syndrome

Digestive: gastroesophageal reflux disease <GERD>

Psychogenic: panic disorder

#### G-2-17) Palpitations

Cardiovascular: arrhythmia

Secondary: hyperthyroidism

Psychogenic: panic disorder

#### G-2-18) Pleural effusion

Cardiovascular: heart failure

Respiratory: pneumonia, pulmonary tuberculosis, lung cancer

Digestive: liver cirrhosis, acute pancreatitis

Autoimmune: rheumatoid arthritis, systemic lupus erythematosus <SLE>

Kidney / urology: Nephrotic syndrome

#### G-2-19) Dysphagia

Nervous: cerebral hemorrhage, cerebral infarction

Respiratory: tonsillitis, lung cancer

Digestive: gastroesophageal reflux disease <GERD>, esophageal cancer

Psychogenic: somatic symptom and related disorders

#### G-2-20) Abdominal pain

Digestive: functional dyspepsia <FD>, irritable bowel syndrome, inflammatory bowel diseases, peptic ulcer, acute appendicitis, cholelithiasis, acute pancreatitis, ileus, inguinal hernia

Urogenital / reproductive: urolithiasis, abortion / premature birth

Cardiovascular: acute coronary syndrome

Psychogenic: somatic symptom and related disorders

#### G-2-21) Nausea / vomiting

Digestive: functional dyspepsia <FD>, ileus, food poisoning

Cardiovascular: acute myocardial infarction

Nervous: migraine, cerebral hemorrhage, subarachnoid hemorrhage, intracranial hematoma

Psychiatry: depression

#### G-2-22) Hematemesis / melena

[Hematemesis]

Esophagus: esophageal varices, esophageal cancer

Stomach: peptic ulcer, gastric cancer

[Melena]

Upper gastrointestinal tract: esophageal varices, peptic ulcer

Lower gastrointestinal tract: inflammatory bowel diseases, colorectal cancer

#### G-2-23) Constipation / diarrhea

[Constipation]

Functional: irritable bowel syndrome, hypothyroidism

Organic: ileus, colorectal cancer

[Diarrhea]

Inflammatory: acute gastroenteritis, inflammatory bowel disease

Intestinal motility dysfunction: irritable bowel syndrome, hyperthyroidism

Osmotic: chronic pancreatitis

#### G-2-24) Jaundice

Conjugated type: acute hepatitis, chronic hepatitis, liver cirrhosis, cholangitis, pancreatic cancer

Unconjugated type: hemolytic anemia

#### G-2-25) Abdominal distention (including ascites) / mass

Digestive: ileus, colorectal cancer

Ascites: liver cirrhosis, nephrotic syndrome, heart failure

Tumor: liver cancer, ovarian cyst

#### G-2-26) Anemia

Iron deficiency anemia: peptic ulcer, hemorrhoids, uterine fibroids

Hematopoietic tumor: leukemia, myeloma

Secondary anemia: liver cirrhosis, chronic kidney disease, alcoholism

#### G-2-27) Lymphadenopathy

Infectious diseases: viral rash (rubella / measles), tuberculosis

Autoimmune: systemic lupus erythematosus <SLE>

Tumor: malignant lymphoma, other malignancies in general

#### G-2-28) Urine volume / urination abnormality

[Polyuria]

Osmotic diuresis: diabetes mellitus

Intoxication: drug

[Pollakisuria / urinary frequency]

Urination disorders: urinary tract infection, spinal cord injury

Difficulty in elimination (discharge disorders): benign prostatic hyperplasia, urinary tract infection, prostate cancer

#### G-2-29) Hematuria / proteinuria

Kidney: glomerulonephritic syndrome, nephrotic syndrome, diabetic nephropathy, renal cell carcinoma

Ureter, bladder: urolithiasis, urinary tract infection, bladder cancer

#### G-2-30) Menstrual abnormality

Amenorrhea: pregnancy

Dysmenorrhea: dysmenorrhea, endometriosis

Irregular vaginal bleeding: cervical cancer, endometrial cancer

#### G-2-31) Anxiety / depression

Primary: depression, bipolar disorder, anxiety disorder

Secondary (anxiety disorder): hyperthyroidism, malignancy in general

Secondary (depression): hypothyroidism, dementia, Parkinson's disease, malignancy in general

#### G-2-32) Amnesia

Blood vessel: cerebral infarction

Degeneration: dementia, Parkinson's disease

Psychiatry: depression

#### G-2-33) Headache

Functional: tension type headache, migraine

Symptomatic: meningitis, cerebral hemorrhage, subarachnoid hemorrhage, glaucoma, acute sinusitis

#### G-2-34) Motor paralysis / muscle weakness

Brain lesion: cerebral infarction, transient ischemic attack, cerebral hemorrhage, intracranial hematoma

Spinal cord lesion: spinal cord injury, disc herniation

Peripheral nerve lesion: diabetes mellitus

Neuromuscular junction lesion: lung cancer

Muscle lesion: hyperthyroidism, alcoholic intoxication

#### G-2-35) Low back pain

Respiratory: lung cancer

Cardiovascular: acute aortic dissection

Digestive: cholelithiasis

Urology / reproductive organs: urolithiasis, renal cell carcinoma

Spine: disc herniation, degenerative spondylosis, spinal canal stenosis, vertebral compression fracture, myeloma

#### G-2-36) Arthralgia / joint swelling

Single arthritis: gout

Multiple arthritis: rheumatoid arthritis, systemic lupus erythematosus <SLE>

#### G-2-37) Trauma / burn

Primary: head trauma, fracture, traumatic pneumothorax, spinal cord injury, burn

Secondary: acute aortic dissection, cerebral hemorrhage, subarachnoid hemorrhage, intracranial hematoma

### G-3 Basic clinical procedures

Goal:

Sufficiently understand the purposes, indications, contraindications, complications, and actual methods of basic clinical procedures beforehand, conduct them by him / herself under the guidance or supervision of the supervising physician, or observe and assist the supervising physician's procedure.

### G-3-1) General procedures

#### Objectives:

1. Perform positional exchange and transfer.
2. Perform skin disinfection.
3. Attach / apply external medicine.
4. Perform tracheal suctioning and use a nebulizer.
5. Perform venous blood sampling.
6. Perform insertion of a peripheral intravenous line.
7. Observe and assist central venous catheterization.
8. Observe and assist arterial blood sampling and catheterization of arterial line.
9. Observe and assist the lumbar puncture.
10. Insert and remove the nasogastric tube.
11. Perform insertion and removal of urethral catheter.
12. Observe and assist inserting and withdrawing drain.
13. Perform injection (intradermal, subcutaneous, intramuscular, intravenous).
14. Observe and assist general anesthesia, local anesthesia, and blood transfusion.
15. Observe and assist treatment directly touching eyeballs.
16. Create a medical record.
17. Observe and assist preparation of various diagnostic certificates, postmortem certificates, and other certificates.

### G-3-2) Inspection technique

#### Objectives:

1. Perform urinalysis (including urinary sediment).
2. Prepare and observe peripheral blood smears.
3. Perform microbiological examination (including Gram stain).
4. Perform pregnancy test.
5. Perform blood type determination test.
6. Perform visual acuity, visual field, hearing, and equilibrium tests.
7. Conduct 12-lead electrocardiogram.
8. Conduct electroencephalogram.
9. Observe and assist the test that touches the eyeball directly.
10. Perform ultrasound examination of the heart and abdomen.
11. Measure percutaneous oxygen saturation.
12. Observe and assist X-ray imaging, computed tomography <CT>, magnetic resonance imaging <MRI>, nuclear medicine examination, and endoscopic examination.

### G-3-3) Surgical procedure

#### Objectives:

1. Perform aseptic procedure.
2. Perform hand washing for surgery and procedures.
3. Perform gown technique in the operating room.
4. Perform basic stitching and removal of it.
5. Perform wound disinfection and change gauze.
6. Observe and assist surgery, preoperative / intraoperative / postoperative management.

### G-3-4) Life saving measures

#### Objectives:

1. Judge the high urgency from the physical and vital signs.
2. Perform basic life support.
3. Participate to the extent possible in initial response of patients with high urgency including secondary life support.

## G-4 Clinical clerkship

In clinical clerkship, students are expected to achieve following goals and objectives through participating in actual practice as much as possible, as students see patients with common diseases in each department. Regarding clinical clerkship sites, not only university hospitals, but also community hospitals with assured and sufficient quantity / quality of supervising physicians are recommended because of the importance of experiencing common diseases, etc. Not only wards but also outpatient departments should be actively utilized. If some areas of practice cannot be experienced sufficiently, utilize simulation education too. In general it is

expected to promote clinical education using clinical settings throughout the entire grades. Furthermore, support students for continuous progress towards future acquisition of fundamental qualities and abilities required of physicians. Meanwhile, regarding items stated as experiential objectives, such as "participate ...," try to let students verbalize experiences as much as possible when reflecting on what they have done.

#### G-4-1) Required rotations

##### G-4-1) - (1) Internal medicine

###### Goal:

1. Learn the practical ability in the field of internal medicine necessary even if an internist is not selected as a career.
2. Obtain the image of an internist.

###### Objectives (partly including strategies):

1. Assemble or follow diagnostic reasoning from chief complaint.
2. Understand the pathophysiology and epidemiology of diseases.
3. Participate to the extent possible in planning and implementing internal medicine treatment.
4. Acquire a viewpoint of integrating problems involving multiple organs.
5. Learn basic internal medicine examination skills.
6. Understand how to consult with internal medicine department.

##### G-4-1) - (2) Surgery

###### Goal:

1. Learn the practical ability in the field of surgery necessary even if a surgeon is not selected as a career.
2. Obtain an image of a surgeon.

###### Objectives (partly including strategies):

1. Know the indication for surgical treatment.
2. Participate to the extent possible in operation planning.
3. Participate in perioperative management to the extent possible.
4. Participate to the extent possible in surgical treatment such as surgery.
5. Learn basic surgical procedures.
6. Understand how to consult with surgery department.

##### G-4-1) - (3) Pediatrics

###### Goal:

1. Learn the practical ability in the field of pediatrics necessary even if a pediatrician is not selected as a career.
2. Obtain an image of a pediatrician.

###### Objectives (partly including strategies):

1. Assemble or follow diagnostic reasoning from chief complaint.
2. Understand the pathophysiology and epidemiology of diseases.
3. Participate to the extent possible in planning and administering treatment.
4. Participate to the extent possible in obtaining or responding to necessary information from parents.
5. Participate to the extent possible in assessing growth and development of children.
6. Learn basic pediatric examination skills.
7. Understand how to consult with pediatrics department.

##### G-4-1) - (4) Obstetrics and gynecology

###### Goal:

1. Learn the practical ability in the field of obstetrics / gynecology necessary even if an obstetrician / gynecologist is not selected as a career.
2. Obtain an image of an obstetrician and gynecologist.

###### Objectives (partly including strategies):

1. Participate to the extent possible in perinatal health check-ups of a pregnant woman and delivery.
2. Deepen understanding of women's health problems.
3. Assemble or follow diagnostic reasoning from chief complaint.
4. Understand the pathophysiology and epidemiology of the diseases.
5. Participate to the extent possible in gynecological treatment including surgery.

6. Learn basic gynecological examination skills.
7. Understand how to consult with obstetrics and gynecology department.

#### G-4-1) - (5) Psychiatry

##### Goal:

1. Learn the practical ability in the psychiatric field necessary even if a psychiatrist is not selected as a career.
2. Obtain an image of a psychiatrist.

##### Objectives (partly including strategies):

1. Assemble or follow diagnostic reasoning from chief complaint.
2. Understand the pathophysiology and epidemiology of diseases.
3. Participate to the extent possible in psychiatric treatment.
4. Learn basic interview skills for psychiatry.
5. Understand how to consult with psychiatry department.

#### G-4-1) - (6) General practice

##### Goal:

1. Learn the required ability for general practice regardless of whatever physician career is selected.
2. Obtain the image of a general practitioner.

##### Objectives:

1. Assemble or follow diagnostic reasoning that emphasizes medical history / physical examination (including cases without diagnosis).
2. Experience a comprehensive approach to health problems (such as interactions of multiple health problems).
3. Have a viewpoint of family and community and participate to the extent possible in medical practice with more consideration for psychological / social background.
4. Experience home medical care.
5. Experience interprofessional work and recognize its importance.
6. Refer to the health, medical, welfare and long-term care systems in the clinical settings.

#### G-4-1) - (7) Emergency department

##### Goal:

1. Learn the required practical ability for emergency department regardless of whatever physician career is selected.
2. Obtain an image of an emergency physician.

##### Objectives:

1. Learn the initial treatment to stabilize breathing and circulation.
2. Assemble or follow diagnostic reasoning based on symptoms.
3. Practically communicate in a good manner as a member of team-based health care.
4. Have a viewpoint such as family and community, and learn collaboration with health, medical care, welfare and long-term care.
5. Learn the pre-hospital care and medical control through collaboration with emergency medical technicians.
6. Learn local disaster healthcare system.

#### G-4-2) Disciplines / services

Regarding the other clinical departments (dermatology, orthopedics, ophthalmology, otorhinolaryngology, urology, neurosurgery, radiology, anesthesiology, pathology, clinical pathology, plastic surgery, rehabilitation, dental surgery, etc.), plan and implement clinical clerkship depending on situation of each university by reference to the following goals and objectives.

##### Goal:

1. Learn the necessary and practical ability in the clinical field concerned even if the physician in the field concerned is not selected as a career.
2. Obtain the image of the physician in the department concerned.

##### Objectives:

1. Assemble or follow diagnostic reasoning from chief complaint.
2. Understand the pathophysiology and epidemiology of diseases.
3. Participate to the extent possible in the treatment of the department concerned.

4. Learn the basic examination skills of the department concerned.
5. Understand how to consult with the department concerned.

#### G-4-3) Regional medical practice

##### Goal:

Learn the necessity / importance of comprehensively constructing regional medical practice and community-based integrated care system through participating in activities in health care / medical practice / social welfare / long-term care needed in the community.

##### Educational strategies:

1. Obtain cooperation from regional hospitals, clinics, health centers, and social welfare facilities, such as clinical training hospitals, etc.
2. Use clinical professor system, etc. as necessary.
3. Expand early exposure training and set up opportunities for continuing contact with community health care sites from lower grades.
4. Collaborate with practical training conducted by hygienists / public health department, etc. and create learning opportunities to diagnose the community from social medicine (mainly quantitative) perspectives.
5. Collaborate with anthropology / sociology / psychology / philosophy / pedagogy, etc., learn medical care in the community life from the viewpoint of behavioral and social science (mainly qualitative), and create learning opportunities to experience it.

#### G-4-4) Simulation education

##### Goal:

From the viewpoint of medical safety, repetitive simulation training in the environment mimicking clinical settings will develop skills to deal with the issues.

##### Educational strategies:

1. Brush up clinical skills by repetitive exercises using simulators.
2. Acquire clinical skills (including communication skills) and attitudes required of medical professionals under the cooperation of simulated patients.
3. Acquire situational judgment and decision making ability through training using case scenarios.
4. Increase the ability to practice team-based health care through team training.
5. Promote self-reflection ability by reflection.

Based on the above, please refer to the clinical clerkship guideline as a reference to implement clinical clerkship.



Establishment of Permanent Organizations on Revision of the Model Core Curriculum for  
Medical Education and the Model Core Curriculum for Dental Education

May 30, 2007 Established

June 9, 2010 Partially revised

Director-General, Higher Education Bureau  
Ministry of Education, Culture, Sports, Science and Technology (MEXT)

1. Purpose

Based on the report of the “Survey/Research Cooperators Conference on Improvement and Enrichment of Medical Education” , permanent organizations for the revision of the Model Core Curriculum for Medical Education and the Model Core Curriculum for Dental Education (hereinafter referred to as the “Model Core Curricula”) were established.

2. Roles

- (1) Revision of the Model Core Curricula in accordance with revisions of the Standards for Adoption of Questions for in the National Examination for Medical Practitioners and the Standards for Adoption of Questions for the National Examination for Dental Practitioners, and modifications of legal systems, names, etc.
- (2) Verification/evaluation of the Model Core Curricula such as verification of effects of education for students
- (3) Survey/research necessary for revision of the Model Core Curricula
- (4) Necessary matters for utilization of the Model Core Curricula, such as thorough publicity of the Model Core Curricula among related agencies, and verification of status of efforts in universities
- (5) Other necessary matters for revision of the Model Core Curricula

3. Structure of the Organization Established

- (1) An organization which conducts specialized surveys/research, etc. and makes first drafts of revision of the Model Core Curricula (Model Core Curriculum Study Section Committees) and an organization which determines revisions, etc. of the Model Core Curricula (Model Core Curriculum Coordination Committee) were established. The organizations are hosted by the Ministry of Education, Culture, Sports, Science and Technology.
- (2) The structures of the committees in (1) are as shown in the attachment.
- (3) It shall be possible to establish a necessary organization to share surveys/research, etc. where necessary.
- (4) It shall be possible to hear opinions, etc. from related parties where necessary.

4. Members

- (1) Members shall be appointed from among persons with excellent insights into the curricula for medical education or dental education, the national examinations for physicians or dentists, etc. and other related persons.
- (2) The members' term of service shall be until the end of the next fiscal year after the fiscal year, which includes the date of appointment.
- (3) It shall be possible to add members where necessary.
- (4) It shall be possible to re-appoint members.

5. Others

General affairs related to the organizations in 3 shall be processed by the Medical Education Division, Higher Education Bureau (MEXT).

“Model Core Curriculum Coordination Committee”: List of Members

Hajime Arai (July,2016－)	Chair, The National Associate of Japan Medical Colleges Council; President, Juntendo University
Tetsuo Arakawa (March,2016－ June,2016)	Former Chair, The National Associate of Japan Medical Colleges Council; Chair & President, Osaka City University
Yoshinobu Ide (March,2016－)	President, Japanese Association of Private Dental Schools; President, Tokyo Dental College
Kazuhiro Eto (March,2016－)	Vice President, Common Achievement Tests Organization; Professor Emeritus, Tokyo Medical and Dental University
Shigechika Terakado (March,2016－ January,2017)	Former Director, Medical Education Division, Higher Education Bureau, Ministry of Education, Culture, Sports, Science and Technology
Akira Terano (March,2016－)	President, Japanese Association of Private Medical Schools; Chancellor, Dokkyo Group of Academic Institutions
Hironobu Uchiki (November,2016－)	Chair, Council of Head of National Medical Schools of Japan; Dean, University of Fukui School of Medical Sciences
○Ryozo Nagai (March,2016－)	President, Jichi Medical University
Takayuki Mori (January,2017－)	Director, Medical Education Division, Higher Education Bureau, Ministry of Education, Culture, Sports, Science and Technology
Masatsugu Moriyama (March,2016－ October,2016)	Former Chair, Council of Head of National Medical Schools of Japan; Dean, Oita University Faculty of Medicine

(Observers)

Fumimaro Takaku  
(March,2016—)

President, Japanese Association of Medical Sciences;  
President, Common Achievement Tests Organization

○ : Chairperson  
As of January 13, 2017

“Model Core Curriculum Study Section Committees”: List of Members

(Medical Education)

Miki Izumi  
(March,2016－) Professor, Tokyo Medical University Faculty of  
Medicine

Eiji Kajii  
(March,2016－) Director, Center for Community Medicine, Jichi  
Medical University

Satoshi Kamayachi  
(March,2016－ June,2016) Executive Director, Japan Medical Association

Kiyoshi Kitamura  
(March,2016－) Professor, International University of Health and  
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○Nobuhiko Saito  
(March,2016－) Vice President, Common Achievement Tests  
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Yujiro Tanaka  
(March,2016－) Executive Director & Executive Vice President of  
Hospital Administration and International Health Care  
Partnerships, Tokyo Medical and Dental University

Nobuo Nara  
(March,2016－) Specially Appointed Professor, Tokyo Medical and  
Dental University

Yutaka Hatori  
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Tsuguya Fukui  
(March,2016－) President, St. Luke’s International University; President  
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School of Medicine

(Dental Education)

Kinuko Goto (March,2016—)	Associate Professor, Showa University School of Dentistry
Takashi Saito (March,2016—)	Dean, Health Science University of Hokkaido School of Dentistry
Masahiko Shimada (March,2016—)	Director, Tokyo Medical and Dental University Dental Hospital
Tsuneo Sekimoto (March,2016—)	President, Japanese Dental Education Association; Dean, Nippon Dental University School of Life Dentistry at Niigata
Junji Tagami (March,2016—)	Executive Director & Executive Vice President of Education and International Student Exchange, Tokyo Medical and Dental University
Tatsuji Nishihara (March,2016—)	Chair & President, Kyushu Dental University
○Takeyasu Maeda (March,2016—)	Dean, Faculty of Dentistry Niigata University
Shiro Mataka (March,2016—)	Professor, Tokyo Medical and Dental University
Tadahiro Yanagawa (March,2016—)	Vice President, Japan Dental Association
(Public)	
Kimio Hemmi (March,2016—)	President, Japan Municipal Hospital Association
Masago Minami (March,2016—)	Chief Officer, Yomiuri Research Institute, Yomiuri Shimbun
Ikuko Yamaguchi (March,2016—)	Chair, Approved Specified Nonprofit Corporation Consumer Organization for Medical and Law(COML)

(Observers)

Teiji Takei  
(July,2016—)

Director, Medical Division, Ministry of Health,  
Labour and Welfare

Masatoshi Watanabe  
(March,2016— June,2016)

Former Director, Medical Division, Ministry of  
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Nobuhiro Taguchi  
(April,2016—)

Director, Dental Health Division, Ministry of Health,  
Labour and Welfare

Yoshinori Toriyama  
(March,2016)

Former Director, Dental Health Division, Ministry of  
Health, Labour and Welfare

○ : Chairperson  
As of January 13, 2017

“Model Core Curriculum Expert Research Committee”: List of Members in AY2016  
(\* Established at the contractors, The University of Tokyo and Tokyo Medical and Dental University )

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Masaomi Ikusaka	Professor, Chiba University School of Medicine
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Junji Otaki	Professor, Center for Medical Education, Hokkaido University Graduate School of Medicine
Hitoaki Okazaki	Director, Medical Education Center, Jichi Medical University
Hitomi Kataoka	Professor, Okayama University Graduate School of Medicine, Dentistry and Pharmaceutical Sciences
○Kiyoshi Kitamura	Professor, International University of Health and Welfare Graduate School
Tsutomu Sasaki	Associate Professor, Institute for Molecular and Cellular Regulation, Gunma University
Kazuki Takada	Professor, Institute of Education, Tokyo Medical and Dental University
Akizumi Tsutsumi	Professor, Kitasato University School of Medicine
Hiroshi Nishigori	Associate Professor, Center for Medical Education, Graduate School of Medicine Kyoto University
Masafumi Noda	Lecturer, Tohoku University Hospital
Hitoshi Hasegawa	Professor, Akita University Graduate School of Medicine
Tetsuhiro Maeno	Professor, Faculty of Medicine, University of Tsukuba
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Raoul Breugelmans	Associate Professor, Tokyo Medical University Faculty of Medicine
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Kouji Araki	Professor, Tokyo Medical and Dental University
Kazuhiro Ono	Professor, Niigata University Graduate School of Medical and Dental Sciences
Kinuko Goto	Associate Professor, Showa University School of Dentistry
Takashi Saito	Dean, Health Sciences University of Hokkaido School of Dentistry
○Masahiko Shimada	President, Tokyo Medical and Dental University Dental Hospital
Naoko Seki	Assistant Professor, Tokyo Medical and Dental University
Masahiro Nakajima	Professor, Osaka Dental University
Soichiro Hirata	Professor, Tokyo Dental College
Yoshizo Matsuka	Professor, Tokushima University Graduate School of Biomedical Sciences
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○ : Leader  
As of March 31, 2017

“Model Core Curriculum Expert Research Committee”: List of Members in AY2017  
(\* Established at the contractors, The University of Tokyo and Tokyo Medical and Dental University )

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