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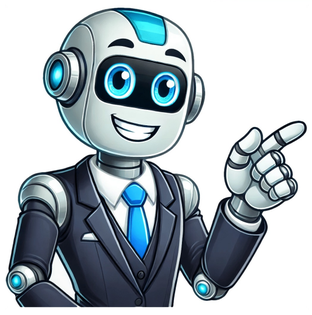

Written By: Darby Faubion BSN, RN Are you a nurse with a genuine desire to give the best care possible to patients and their families and to become a strong member of your nursing team? Maybe you are a nursing student eager to learn as much as possible to help you succeed in nursing. If so, the most important lesson you can learn is how to establish ethical nursing practices. There are several ways to demonstrate strong ethics, and knowing the main ethical principles of nursing is a great place to start. Perhaps you are wondering, "What are the 7 main ethical principles in nursing, and why they are important? In this article, you will learn about ethical nursing principles and how they apply to you. As you continue reading, you will find an in-depth look at the 7 main ethical principles in nursing, why theyre important, and examples of how they are applied in the four main areas of nursing.What Exactly is an Ethical Principle in Nursing? An ethical principle refers to the general judgments serving as justification for a person's behavior or actions. Ethical principles in nursing are the foundation upon which nursing actions are based. They describe what is expected of nurses in terms of right and wrong, good and bad, and correct and incorrect. The American Nurses Association Code of Ethics is the source of ethical principles in nursing. The Code of Ethics was established as a guide for carrying out nursing responsibilities in ways consistent with the ethical obligations of the profession, promoting quality patient care. Ethical principles in nursing provide a framework for assessing the behavior of nurses in practice. 1.Using ethical principles as the foundation of practice assists nurses in making good judgment calls.2.Ethical principles in nursing guide nurses in providing high-quality care within the laws that govern nursing practices.3.Nurses who work within the guidelines of ethical principles support the emotional, physical, and mental health of each patient, acting with their best interest in mind.4.Applying principles of ethics in nursing is beneficial to developing strong nurse-patient and interdisciplinary relationships, which is essential for collaboration and quality patient care.5.Patients cared for by nurses with solid ethical standards are typically more compliant than those whose nurses disregard ethical principles. When patients are compliant with prescribed health and nursing care plans, they experience improved health outcomes.6.Ethical nursing practices help reduce risks to patient and nursing safety. Because the ethical principles of nursing focus on acceptable behaviors and promoting the welfare of others, nurses who demonstrate these behaviors are instrumental in reducing patient and staff safety risks.7.Healthcare organizations that have nurses who exercise ethical nursing principles typically have higher patient satisfaction scores, higher employee satisfaction, and lower employee turnover rates. Sources vary regarding the actual number of ethical principles in nursing. Any behavior that is honorable and professional, upon which a set of rules is established, may be considered an ethical principle. For the purposes of this article, we will discuss the following seven main ethical principles all nurses should demonstrate:1.Accountability2.Justice3.Nonmaleficence4.Autonomy5.Beneficence6.Fidelity 7.Veracity Perhaps the most common conflict regarding ethical principles in nursing is the one that arises between the patients right to autonomy versus the nurses responsibility to practice under the principle of beneficence. Autonomy is the right of competent adults to make decisions about their medical care based on informed consent. The nurse must find a way to balance autonomy and beneficence by facilitating open communication, educating the patient, and finding ways to manage care that satisfies the patient and goes along with standards of ethical practices. There are seven primary ethical principles of nursing: accountability, justice, nonmaleficence, autonomy, beneficence, fidelity, and veracity. The following is detailed information about the seven ethical principles in nursing, why they are important, and examples of ways to apply them in the four main areas of nursing: clinical practice, nursing leadership, nursing education, and nursing research. Per the American Nursing Associations Code of Ethics, professional accountability, one of the important ethical principles in nursing is defined as "being answerable to oneself and others for one's own actions." Nurses are accountable for their actions when caring for patients and must accept the personal and professional consequences of those actions or any inactions. The following is detailed information about why accountability is important, examples of ways to apply it, and consequences of not applying it in the four main areas of nursing: clinical practice, nursing leadership, nursing education, and nursing research. Establishing an atmosphere of accountability in nursing is every nurse's responsibility. There are several key reasons being an accountable nurse is essential, including the following. When nurses practice accountability, they build stronger nurse-patient relationships based on increased trust and reduced fear.Accountable nurses demonstrate higher quality job performance, which benefits patients, peers, organizations, and the profession.Nurses who act with a high level of accountability are more likely to succeed in their roles. As a nurse, if you take personal responsibility for your actions, right or wrong, employers and peers appreciate you and your efforts, increasing your chance for success. The best way to demonstrate accountability in nursing is to stay within your designated Scope of Practice. The scope of practice describes the care and services a qualified health professional is competent to perform and permitted to accept within the terms of their professional license. Each state's legislature passes a "Nurse Practice Act." Regulatory bodies then create and implement the rules and regulations of the nurse practice act intended to protect the nurse and the public. Nurse Vicky, RN and charge nurse at a local hospital, completed an admission assessment on a newly admitted patient, Mr. Hendrix. Following the admission assessment, Nurse Vicky created a nursing care plan specific to Mr. Hendrix, including establishing which tasks the licensed practical/vocational nurse will complete. Although she delegates the patient's routine care to the LPN/LVN, Nurse Vicky realizes she is responsible for ensuring Mr. Hendrix is cared for within the boundaries of the patient care plan. She follows up with Mr. Hendrix by performing assessments as needed and ensuring all delegated tasks are completed promptly and efficiently. Lack of accountability in nursing can result in significant consequences. Nurses must understand their roles and perform within their scope of practice to prevent risks to patients, themselves, and their organization. The following are a few examples of the far-reaching consequences of nurses failing to be accountable. Poor nurse-patient relationships: Patients expect nurses to provide quality, professional care to promote their well-being and improve their health. Nurses who do not demonstrate accountability lack professional responsibility, leading to distrust from patients and their loved ones. The lack of trust can compromise nurse-patient relationships, leading to a risk of non-compliance and resulting in negative patient outcomes.Reprimand at work and/or loss of job: Depending on the level of unaccountability, nurses could face a reprimand from management or risk losing their jobs. Loss of nursing license: Serious cases of lack of accountability resulting in patient harm may lead to disciplinary action through the state board of nursing or loss of licensure. Accountability in nursing leadership is instrumental in establishing strong nursing teams, promoting positive patient outcomes, and contributing to the success of the healthcare facility or organization. The following are a few reasons why nurse leaders should demonstrate accountability. Effective nurse leaders lead by example. If a nurse leader is accountable for her actions, the likelihood of the nurses on the team being accountable increases. The behavior of accountable nurse leaders positively impacts employee morale, making teams happier and more content with their jobs. The best way to ensure accountability among nursing teams is for nurse leaders to model accountability in their behaviors and practices. Nurse leaders are accountable for their actions and the actions of their nursing team. At times, accountability in nurse leadership involves assessing a situation, delegating responsibilities, and following up to ensure work is complete. Nurse Kristy is the charge nurse in a busy emergency department with a team of registered nurses under her supervision. After a multi-car pileup on the interstate, several crash victims came to her emergency room for care. Nurse Kristy assigned additional nurses to work triage to determine which patients require immediate care. She also distributes nurses for each area of care in the emergency department, carefully following the nurse-to-patient ratio as designated by the hospital policies and procedures. Nurse Kristy monitors the status of patient flow, ensures supply cabinets are stocked to accommodate the needs of all patients, including those in the car crash, and offers assistance as needed. In this scenario, the charge nurse demonstrates accountability by making sure the staff she supervises have appropriate supplies, patients are triaged and treated in a timely manner, and offering her assistance. Nurse leaders play an integral role in developing strong teams. Positive leadership behaviors lead to favorable outcomes. Conversely, poor leadership behaviors lead to unfavorable outcomes. If nurse leaders fail to demonstrate the ethical principle of accountability, subordinate nurses are likely to follow their behavior, leading to negative consequences like the ones listed below. When leadership lacks essential ethical principles, it doesn't take long to see a breakdown in the team's structure. Lack of accountability not only affects professional relationships but it can also affect patient outcomes. Nurse leaders who lack accountability rarely demand it from their teams, which impacts patient care, leading to poor health outcomes. The old saying, "the buck stops here," could be taken quite literally when discussing the ethical principle of accountability. Nurse leaders are responsible for how their teams perform, and when they lack the accountability true leadership demands, errors in care occur more often, leading to increased healthcare costs. There are three main types of nurse educators: Instructional nurse faculty teach nursing students in academic settings such as colleges or universities. Clinical nurse educators typically work in hospitals or other healthcare facilities, helping nurses gain hands-on experience as they learn facility processes and best practices. CNEs also teach staff nurses about new policies and procedures and may educate nurses about new equipment. Staff development nurses train nursing staff in new roles and provide ongoing mentorship and training to help nurses enhance their skills. All nurse educators play a vital role in healthcare and promoting ethical principles in nursing. The following are a few reasons nurse educators must exercise accountability in their practice. Nurse educators bear significant responsibility for educating current and future nurses. Demonstrating accountability shows other nurses the importance of accepting responsibility for their own behavior. Nurse educators are influential in advocating for change in nursing education in higher institutions of learning and within healthcare organizations. Acting with professional accountability makes their efforts more appealing to decision- and policymakers, as those who make vital nursing and healthcare decisions desire to work with nurses they can depend on. Nurse educators are obligated to provide the education and tools nurses, and nursing students need to become better nurses, which impacts patients, their families, healthcare facilities, and the nursing profession. Mrs. Stennett is the clinical nurse educator at a large university hospital. Part of her job description includes having the responsibility to update staff nurses about new policies and procedures within the organization. The administration recently approved new guidelines for reporting errors related to patient care. In response to the updates, Mrs. Stennett scheduled four in-service meetings to accommodate nursing staff and update them on the new policies and procedures. At each in-service, the staff in attendance sign the attendance log to verify their presence. Mrs. Stennett logs information about the in-service in her activity logbook and attaches each sign-in sheet. Although Mrs. Stennett could have conducted the in-service and expected administration or state surveyors to take her word that the staff was aware of policy changes, she understands the importance of being accountable for her own work. By logging information about the in-services and attaching sign-in sheets, Mrs. Stennett protects herself. Suppose a staff member acts outside the scope of the new policies and procedures but attended the in-service. In that case, Mrs. Stennett can show the sign-in sheet to her supervisor, removing any risk of repercussion due to the other staff member's actions. The lack of accountability in any nursing position can have dire consequences. In nursing education, the lack of ethical principles like accountability can have significant long-term effects. Here are a few things to consider about the lack of accountability in nursing education. If nurse educators lack accountability, the nursing students they teach are likely to conduct themselves with a lack of accountability, as well. This blatant lack of accountability can result in shifting blame, poor patient care, and negative patient outcomes. Nurse educators working in healthcare facilities or for healthcare organizations are responsible for ensuring staff nurses get adequate hands-on training to help develop the skills necessary to provide adequate care. Failure to demonstrate accountability in this example could mean staff nurses are poorly prepared to take on patients and provide independent care, which could result in errors in care and other safety issues. Nurse researchers are at the forefront of clinical efforts to find new treatments and improve patient care. It is of utmost importance for nurse researchers to be accountable in their practices. Here are a few reasons why: The results of nursing research are instrumental in determining future steps in patient care. Nurses must be accountable for conducting research according to the plan so results can be validated. When nurse researchers demonstrate accountability, investors and other funding sources have confidence in their intentions, making it easier for them to offer financial resources to support research. Nurse researchers are accountable to themselves, their team, study participants, supporting organizations, and financial contributors, to name a few. One of the best ways to demonstrate accountability in nursing research is to use resources for their intended use. Nurse Researcher Ava is working on a research project with a group of colleagues. After securing their project's funding, Nurse Ava and her team realize they may have a significant amount of the funds remaining when the project is complete. Some colleagues suggest moving the extra money to another project, stating that since the money was for a research grant, it shouldn't be a problem. However, Nurse Ava objects to the suggestion arguing that the funds they received were designated for a specific project. She recommends completing the research project and then assessing how much, if any, of the funds remain available. She also suggests if funds are still available, the team should notify the grantor and request permission to use the funds toward another project. When nurses act outside the boundaries of ethical principles and behaviors, it can lead to several consequences, of which some may be severe. Here are a few possible consequences of lack of accountability in nursing research. If nurse researchers do not act with accountability in nursing research, they may be viewed as unreliable or untrustworthy and lose future research opportunities. Money designated for research projects must be used to achieve the purpose for which it is granted. When nurse researchers do not handle financial contributions within the guidelines of the research proposal and outline, they may be forced to repay the misused money. Autonomy is another one of the essential ethical principles in nursing. It refers to a nurse's ability to act according to their knowledge and judgment while providing nursing care within their scope of practice. The full scope of one's nursing practice is defined by existing regulatory, organizational, and professional rules. The following is detailed information about why Autonomy is important, examples of ways to apply it, and consequences of not applying it in the four main areas of nursing: clinical practice, nursing leadership, nursing education, and nursing research. Autonomy is essential in all aspects of nursing practice. This vital ethical nursing principle goes hand-in-hand with the principle of accountability. The following are a few reasons why autonomy is important in nursing practice. Autonomy helps nurses strengthen their critical thinking and decision-making skills.Nurses who practice with autonomy typically have more confidence and freedom to make critical patient care decisions. Any time a nurse acts within their scope of practice and knowledge to perform a patient care task independently, this is considered an act of autonomy in nursing practice. Nurses can demonstrate autonomy by administering PRN medications, delegating tasks to appropriate personnel, and checking vital signs when a patient's condition concerns them. Mr. Phillips is a patient at Mercy Hospital, where Nurse William is his primary nurse. Upon entering Mr. Phillips' room to give routine medications, Nurse William observes that Mr. Phillips is pale, diaphoretic, and complaining of dizziness. Nurse William checks Mr. Phillips' vital signs, finding his blood pressure is extremely low. Nurse William holds Mr. Phillips' medications, including an antihypertensive, notifying the physician of Mr. Phillips' current status and continues monitoring the patient until the doctor responds with new orders. Autonomy is one of the nursing ethical principles that often directly affects the nurse's outlook on their job. Lack of autonomy can significantly impact the way nurses relate to others and how they feel their employers feel about them. The following are a few consequences of lack of autonomy in nursing practice. Nurses who experience a lack of autonomy, whether it is related to their choice not to exercise autonomy or because of employer restrictions, experience burnout at a much higher rate than nurses who have higher levels of autonomy. The absence of autonomy in nursing often leaves nurses feeling their knowledge and skills underappreciated. Unfortunately, this can lead to patient care that lacks the personal approach needed to establish solid nurse-patient relationships. Autonomy in nursing leadership gives leaders the authority to enrich nursing practices within their teams and organization. Nurse leaders who demonstrate autonomy contribute their unique nursing knowledge and experiences, helping to strengthen the profession and positively impact patient outcomes. Nurse leaders make autonomous decisions daily. A few ways nurse leaders act with autonomy include collaborating with staff to develop nursing care plans, delegating assignments to staff nurses, implementing emergency measures according to policies and procedures, and handling conflicts within their team. Nurse Mitchell is the Assistant Director of Nursing at Magnolia Long-Term Care Facility. It has been brought to his attention that staff nurses on the west wing are unhappy with their assignments. Nurse Mitchell meets with the nurses to discuss their concerns and possible resolutions. He explains to the nurses that the team's primary concern is patient-centered teamwork and the delivery of high-quality care. After meeting with the nurses and determining which nurses are better suited to care for specific patients, Nurse Mitchell updates and distributes new nursing assignments. Nurse Mitchell exercised the principle of autonomy by initiating communication with the nursing team and trying to find ways to resolve their issues and concerns. He was not required to change the assignments. However, his willingness to listen to his staff and adjust assignments with patient care at the center of his decisions shows genuine concern for his staff as well as the patients, which promotes employee satisfaction and retention. Strong nursing teams require strong nursing leadership. Nurse leaders must understand the importance of their role and how their leadership impacts teams and patient care. The following are a few examples of what could happen if there is a lack of autonomy in nurse leadership. Nurse leaders set the tone for how teams collaborate. If they fail to exercise authority in decision-making and establishing means of effective, respectful communication, it could result in poor collaborative efforts, negatively impacting patient outcomes, interdisciplinary relationships, and organizational order. One of the primary responsibilities of nurse leaders is to manage nursing teams. Some of their activities include creating work schedules, managing staffing issues, and supporting continuing education within their facilities. If nurse leaders fail to implement autonomy within their roles, important decisions may be overlooked, resulting in poor team management and impacting patient and organizational outcomes. Nurse educators impact nursing students and current nurses on many levels. Implementing the ethical principle of autonomy in nursing education is vital for several reasons, including the following. Nursing Students Learn Autonomy by Their Educators Example: Nurse educators teach nursing students how to conduct themselves in practice. They teach the ethical principles of nursing, including autonomy, in theory, and then demonstrate them in clinical settings. Autonomy in Nursing Education Promotes Independence While Supporting Teamwork: Although nurse educators work with a level of independence or autonomy, their actions impact everyone on the nursing team. Nurses and nursing students observe how nurse educators handle situations and learn to engage in the same behaviors in nursing care. Nurse educators apply autonomy in several ways. Whether they establish class schedules, assign clinical rotations, or arrange for continuing education classes for staff at healthcare facilities, applying autonomy in nursing education is essential. Mrs. Williams is a nurse educator working at a local university school of nursing. She primarily works with fourth-year students. Her students are preparing for final clinical skills exams, including demonstrating their ability to make sound clinical judgments and work independently. Mrs. Williams creates clinical lesson plans and schedules assignments for each student. She also works with nursing leadership at various clinical sites to arrange preceptors for students. Mrs. Williams' ability to work independently and oversee nursing students is an example of practicing autonomy in nursing education. The students who accept assignments and work within their scope of practice as nursing students also practice autonomy, within designated guidelines. Nursing education is multi-faceted, requiring independent decision-making and critical thinking skills. A lack of autonomy in nursing education could result in the following consequences. Nurse educators are responsible for arranging clinical contracts and assignments for students. Although the director of nursing may approve or assist with procuring contracts, most instructors have some level of freedom to choose sites where they prefer to work and train students. If nurse educators fail to act responsibly and independently to arrange clinical training sites and assignments, nursing students may not have adequate experiences to meet the requirements for graduation or to sit for the licensure examination. Nurse educators independently prepare a syllabus, and schedule quizzes, tests, and laboratory intensives for each class they teach. If they do not exercise their authority to establish class guidelines and schedules, lessons and classroom experiences become poorly structured, and student success suffers. Autonomy in nursing research relates to the researcher and study participants alike. Nurse researchers make autonomous decisions throughout the course of a study based on study guidelines. They must also respect the autonomy of participants or prospective participants to decide whether to be involved in the research study. Recognizing the participant's right to autonomy and respecting their decisions helps ensure willing participation in studies. This is vital, as coercion or manipulation of a potential participant to encourage participation in a study is unethical. Nurse researchers must develop an understanding of autonomy and how to apply this ethical nursing principle in nursing research. Nurse Holyfield is responsible for collecting and reviewing surveys from research participant applicants and presenting suitable candidates to her research team. She independently reviews each application and makes notes about the applicants. Nurse Holyfield then schedules interviews with the top prospects from the applicant pool. She provides each applicant with detailed information about the research project, the expected outcomes, and an explanation of the participant's role in the study. Nurse Holyfield gives each applicant the opportunity to ask questions about the study and consider if they wish to continue with the application process. In this example, Nurse Holyfield demonstrates autonomy in two ways. First, she acts independently to review applications and interview applicants. She then promotes the individual autonomy of the applicants by providing them with pertinent information so they can make an informed decision about participation in the study. When there is a lack of autonomy in nursing research, the consequences may affect the study, persons conducting the study, and participants negatively. Here are a few examples. If nurse researchers fail to contribute to the autonomy of study participants or applicants, that means they fail to adhere to the patient/participants rights. Violating ethical principles related to ones right to autonomy can be grounds for disciplinary action, loss of job, or cancellation of a research project. Nursing research involves teams of people working together for an end cause. Typically, team members have individual responsibilities related to the project. Although they work together, if one member fails to demonstrate autonomy or perform their work, it can result in work not being completed and compromise the validity of the research study. Beneficence, another one of the important ethical principles in nursing is defined as charity and kindness and is demonstrated by nursing actions that benefit others. The ethical principle of beneficence is a quality requiring nurses to act with genuine care, concern, and generosity regarding the welfare of others, acting with the best interest of patients in mind, regardless of the nurse's personal opinion or self-interest. The following is detailed information about why Beneficence is important, examples of ways to apply it, and consequences of not applying it in the four main areas of nursing: clinical practice, nursing leadership, nursing education, and nursing research. Beneficence is vital to effective nursing practice. The following are a few reasons why beneficence in nursing practice is important. Beneficence in nursing practice ensures the nurse considers the individual circumstances of each patient, recognizing that what is good or helpful for one patient may not be the best option for another.The principle of beneficence requires nurses to provide nursing care to the best of their ability, which promotes positive patient outcomes. Nurses apply beneficence in practice in several ways. The most common acts of beneficence involve simple acts of kindness, such as holding a patient's hand, offering to sit with a loved one, or ensuring privacy for patients and loved ones as they say their final goodbyes. Mr. Douglas, whose wife has stage IV breast cancer, just learned his wife's condition has worsened. She is not responding to verbal commands and has little response to tactile stimulation. The doctors have advised Mr. Douglas all they can do for Mrs. Douglas at this time is to help make her comfortable. Mr. Douglas is visibly shaken. Nurse Leah demonstrates beneficence when she offers to sit with Mr. Douglas for a while, holding his hand and letting him talk. At the appropriate time, Nurse Leah asks Mr. Douglas if there is anyone he would like for her to call to be with him and his wife, stating she wants to help as much as possible so he can spend time at his wifes bedside. Because the principle of beneficence is based upon promoting the welfare of others, a lack of beneficence can be counterproductive, resulting in profound consequences. If nurses fail to promote the best interest of patients, the risk of safety issues increases. Safety events may include medication errors, not using the most appropriate equipment, or failure to chart vital information. Patients want to know the nurses caring for them have their best interest in mind and can typically determine if they do by the nurse's behavior toward them. When nurses do not demonstrate beneficence in practice, it can create a strain on the nurse-patient relationship. Unfortunately, poor nurse-patient relationships tend to have a snowball effect, resulting in a lack of compliance on the patient's part and a risk of poor patient outcomes. Nurse leaders should strive to demonstrate beneficence in every aspect of their roles. The following are a few reasons why beneficence in nursing leadership is important. Nurse leaders who practice beneficence support efforts to not only improve patient care but also work to ensure safe work environments with leadership support for staff nurses. When nurses feel safe and supported, they are typically happier with their jobs which improves job performance and employee satisfaction rates. It also contributes to higher employee retention rates. Beneficence reflects the nurse leader's ability to contribute to the welfare of patients, staff, and organizations. As nurse leaders act with beneficence, everyone within their leadership grasp is positively influenced and benefits from their ethical behavior. Beneficence in nurse leadership may be a simple act, or it could require a nurse leader to step out of their comfort zone to get things done that benefit patients and staff. Nurse Mark works in a small community hospital and is the nurse leader in the surgical unit. Despite nurses on his team making maintenance requests, some equipment on the unit needs repair. Nurse Mark also contacted maintenance and received no response. He understands the maintenance department is busy, but he also realizes patient and staff safety is his priority. Because requests for maintenance have been overlooked, Nurse Mark contacts the nursing supervisor and asks if the supervisor will contact the maintenance supervisor for assistance. In this example, Nurse Mark followed the chain of command, which is a good leadership quality. He made the safety of the patients and staff on the surgical unit a priority and chose to seek help from upper management to help promote the safety and well-being of everyone on his team. Beneficence is one of the essential ethical principles in nursing. Because beneficence involves promoting the best interests of others, the lack of the principle can have far-reaching, serious consequences. A few examples follow here: A lack of beneficence in nursing leadership typically leads to a lack of beneficence among all nursing staff, which impacts the level of patient care they provide, often leading to poor outcomes. Nurses working under the supervision of leaders who have little interest in promoting their welfare or success often feel frustrated or bitter. If the situation is not remedied, it can lead to conflicts between nurses and their leaders. Unresolved conflicts can result in poor employee satisfaction rates and higher employee turnover. Nurse educators are responsible for teaching student nurses and other nurses, preparing them to provide the best possible nursing care. One of the most important lessons nurse educators can teach students is the principle of beneficence, and the most effective way to teach it is by demonstrating it in action. Beneficence in nursing education creates an atmosphere conducive to developing strong bonds between students, nurses, and nurse educators. As bonds strengthen, nursing teams become more effective in providing patient care and improving outcomes for patients and the profession. Beneficence in nursing education seeks to promote the greater good of students and staff. As nurse leaders demonstrate beneficence, students and staff learn how to apply this ethical nursing principle. Nurse educators must demonstrate beneficence on behalf of patients, students, and staff. Sometimes, acting with beneficence means making difficult decisions. Dr. Jones, DNP, is making rounds at a local hospital where students in her nursing program are involved in clinical rotations. Students have been assigned to work with preceptors in various specialty areas, such as Med-Surg, Labor and Delivery, Emergency, and Pediatrics. As Dr. Jones visits the various stations to check on students, she finds several preceptors have allowed the first-year nursing students to work alone, stating it is the best way for them to learn. The school of nursing policy is that all first-year nursing students must be accompanied by a preceptor or nursing instructor any time hands-on patient care is provided. The Director of Nursing at the hospital is unavailable to discuss the dilemma, and the charge nurse on the floor reports they are too short-staffed to require preceptors to accompany students. Dr. Jones makes the decision to end the clinical day and instructs students to return to campus tomorrow for an update and possible new assignments. Dr. Jones acted with beneficence on behalf of the patients, her students, and the hospital staff. Allowing students to continue providing care unsupervised could lead to liability against the school, Dr. Jones, the students, and the hospital. Nurse educators have a great responsibility to prepare nurses to provide high-quality care focused on improving patient outcomes. Acting with beneficence is critical in nursing education. The lack of beneficence, on the other hand, can also have serious consequences. Nurse educators who fail to demonstrate beneficence send a message that it may not be necessary to promote the well-being of others at all costs. This is false and can lead to compromised patient outcomes. Good nurses know the importance of acting with beneficence. When there is a lack of beneficence in nursing education, students and peers alike tend to lose respect for the nurse educator. The nursing code of conduct emphasizes the need to care for patients, offer beneficial services, and do no harm. The ethical principle of beneficence is as important to nursing research as it is to clinical nursing, nursing leadership, and education. Beneficence requires the nurse researcher to weigh the balance of potential risks and benefits and make judgment calls about beginning, continuing, or stopping research based on that assessment. Although all principles of ethics in nursing are vital, beneficence is especially important in nursing research. Research should benefit individuals and society. However, no matter how beneficial research is to society, it should never be more important than the safety of patients and participants. Researchers must place more emphasis on the safety and well-being of research participants than the potential effects the results could have on society. Nurse Brown is working on a nursing research project involving four participants. At the midpoint of the research project, two participants experience unexpected negative effects. Although the other two participants show no significant changes or complications, the risk to participants at this point seems greater than the potential benefits. Therefore, Nurse Brown consults with her research team and chooses to conclude the study until sufficient data is gathered and a new plan is developed. Beneficence is perhaps the most important of the ethical principles in nursing research. Beneficence in nursing research operates with the understanding that it is unethical to involve research participants or patients in any type of research that is not expected to demonstrate benefits to patients and/or society. Lack of beneficence on the part of nurse researchers could result in the following consequences. If it is determined that nursing research is being conducted without the expectation of beneficial results, a research organization could lose funding. Loss of funding may be temporary until the goals and anticipated outcomes are more clearly defined. In some cases, funding may be withdrawn permanently, especially if there is evidence that positive outcomes were never anticipated. If nurse researchers fail to practice beneficence and patient harm results, the researcher and/or funding party could be sued. It is the responsibility of the person or organization conducting research to inform any participant of any possible risks. When a participant understands the risks of research participation and makes an informed decision to continue, negative consequences are typically not grounds for lawsuits. However, if the nurse researcher fails to inform the participant of known potential risks or performs research out of their scope of practice, resulting in harm, they may be held legally responsible. Another one of the main ethical principles in nursing is fidelity. Fidelity is the act of being faithful and keeping one's promises. It is demonstrated by offering support and loyalty to a person, cause, or belief. The following is detailed information about why Fidelity is important, examples of ways to apply it, and consequences of not applying it in the four main areas of nursing: clinical practice, nursing leadership, nursing education, and nursing research. Fidelity addresses the nurses responsibility to be honest and loyal in their relationships with others. The following are a few reasons fidelity in nursing practice is important. In nursing practice, fidelity supports fulfilling professional commitments and being trustworthy. Fidelity in nursing is associated with more positive patient outcomes, increased patient satisfaction scores, and more trusting relationships. Nurses demonstrate the ethical principle of fidelity by meeting the reasonable expectations of their role and the nursing profession. Simple acts such as following up on medication or treatments or delegating a job to appropriate staff are ways to show fidelity in nursing practice. Mr. Grayson is a patient at an inpatient rehabilitation center following left knee surgery. Following physical therapy this morning, Mr. Grayson complained of increased pain and asked the nurse for pain medication. Nurse Michaels administered pain-relieving medicine as per the physician's order at 1:20 p.m. and told Mr. Grayson she would check on him in an hour. At 2:15 p.m., Nurse Michaels returned to Mr. Grayson's room to evaluate the effectiveness of the pain medication and verify if he requires any other assistance. Nurses are in a unique position to create an atmosphere of trust where patients feel safe and cared for and can make this happen by being open and honest and delivering quality patient care. Solid nurse-patient and interprofessional relationships are built upon a foundation of trust and confidence, which are basic characteristics of fidelity. Lack of fidelity in nursing practice can result in serious consequences. Here are a few examples of the consequences of lack of fidelity in nursing practice. Patients often feel vulnerable and unsure of who they can trust or depend on. Failure to demonstrate fidelity in nursing leaves patients questioning whether the nurse is dedicated to their care or has their best interests at heart, negatively impacting nurse-patient relationships. When patients feel a lack of trust in their nurses, it leads to non-compliance with treatment plans, which negatively impacts patient outcomes. Nurse leaders impact every aspect of patient care in every healthcare setting. A few reasons nurse leaders must practice fidelity include the following. It is no secret that subordinates tend to follow the behavioral patterns of their leaders. Therefore, nurse leaders should strive to create an acceptable model of behavior for other nurses to follow. When nurse leaders demonstrate fidelity, it helps strengthen relationships with patients, families, team members, and other healthcare professionals. An excellent way for nurse leaders to show fidelity is to fulfill commitments associated with their role. As nurse leaders fulfill commitments, patients, staff, and interdisciplinary colleagues typically consider them dependable and trustworthy. Charge Nurse Victoria was recently assigned to lead a nursing team at her hospital. To her surprise, she learned two nurses on her team were classmates and graduated from her nursing class with her. When making morning rounds, one of the patients asked to speak to Nurse Victoria privately. The patient reported that his nurse did not give his morning medication and that she was rude every time she entered his room. He asked for a new nurse. Nurse Victoria discovered the nurse in question was one of her former classmates. Despite her care for the nurse on her staff, Nurse Victoria was obligated to provide fair patient care in the most responsible way. She discussed the situation with the nurse and stated another nurse would take over the patient's care. Fidelity in nursing leadership requires leaders to promote competent patient care in the most honest, fair, and responsible way possible. Although she could have told the patient she would make sure his medications were given on time and that the nurse would be more cheerful, that response could have left the patient guarded, which would have been counterproductive. Instead, Nurse Victoria assessed the situation as a whole and made the appropriate judgment call. Lack of fidelity in nursing leadership can have significant effects on patients, nurses, healthcare organizations, and the profession of nursing. The following are a few examples of consequences of lack of fidelity in nursing leadership. Fidelity means demonstrating honesty and integrity. When nurse leaders lack those qualities, they may be viewed as unreliable or unprofessional and lose credibility with their team and among peers. The way nurses act and their willingness to demonstrate ethical principles in nursing, such as fidelity, can impact the atmosphere of their organizations. For example, a lack of fidelity among nurse leaders can lead to poor relationships within our healthcare facilities, leading to conflicts within the organization. Fidelity in nursing education is of utmost importance. A few reasons fidelity in nursing education is important are listed below. Nurse educators play an integral role in developing desired characteristics in nursing students and nursing staff through staff development. Practicing fidelity gives students and staff a positive model upon which to base their own practices. Fidelity involves promoting all ethical principles of nursing and promoting positive patient outcomes. When nurse educators act with fidelity, they create an atmosphere conducive to learning and implementing good nursing practices in those they teach. One of the best ways to demonstrate fidelity in nursing education is to teach students the importance of promoting patient autonomy. If students realize how patient autonomy impacts decision-making and nursing care, they soon realize that it is wise to be supportive of that right, which is an act of fidelity. Nurse educators are instrumental in helping students learn this. Nurse Joseph is working with a small group of students at a local long-term care facility. One of the students is concerned about a patient who has been given a poor prognosis related to colon cancer. The student feels it is important for the patient to try any means necessary to prolong his life, despite doctors saying the only option is to keep him comfortable. Nurse Joseph talks with the student and reiterates the importance of the patient's right to choose what care, if any, to pursue. He explains that if the patient is competent to make decisions, it is the nurse's job to be loyal and supportive and to continue providing competent, efficient care. It is essential to have fidelity in nursing education. The principle is based on the nurses obligation to be faithful to their professional promises and responsibilities. A lack of fidelity in nursing education can result in consequences like the following. Patient care requires the collaborative efforts of everyone on the healthcare team. If nurse educators fail to promote fidelity among students and staff, it can cause conflicts, resulting in difficult interprofessional relationships. Nurses can promote better relationships between themselves and other healthcare team members by acting with fidelity. The stronger the relationships between nurses and other team members, the higher the chances of improved patient outcomes and employee satisfaction. Success of nursing programs means it is essential for nursing faculty to work together. Nurse educators must demonstrate dedication to their professional role, their students, and peers. Lack of fidelity in nursing education can lead to a breakdown in the structure of the educational team. The lack of cohesiveness that results can lead to poor student outcomes, low NCLEX pass rates, and loss of funding for programs. Fidelity is an important aspect of nursing research. It is the research principle concerned with building trusting relationships between nurse researchers and research participants. Everything nurse researchers do impacts clinical nursing, nursing leadership, and nursing education, making the need for fidelity paramount. Research participants entrust themselves to the researcher. This trust creates an obligation for the nurse researcher to safeguard the participant and their welfare throughout the research period. The best way to apply fidelity in nursing research is to be honest and open with participants. Nurse Kayla is the lead nurse researcher working on a new project. As the time to initiate the study begins, she meets with participants to discuss the goal and anticipated outcomes for the study. Nurse Kayla understands the importance of informed consent and discusses known and potential risks associated with the research, and explains her role in ensuring her commitment to their care, demonstrating fidelity to the prospective participants. She also discusses the fact that some risks remain unknown, as this is new research, and there are no previous studies to base conclusions upon. Lack of fidelity can negatively impact all aspects of nursing research. Some of the consequences nurse researchers may experience due to lack of fidelity include the following. When nurse researchers lack fidelity, participants or prospective participants can lose confidence in them and their ability to provide safe, effective care. If any area of nursing demands faithfulness to a belief or cause, it is nursing research. A lack of fidelity in nursing research can lead to conflicts among team members, which could cause concern for participants. If disagreements remain unresolved, team members may branch out and make individual choices or actions which undermine the research and invalidate the study. Justice is one of the ethical principles in nursing concerned with the act of being fair or impartial. Nurses must make impartial decisions about patient care without showing partiality due to a patient's age, ethnicity, economic status, religion, or sexual orientation. The following is detailed information about why Justice is important, examples of ways to apply it, and consequences of not applying it in the four main areas of nursing: clinical practice, nursing leadership, nursing education, and nursing research. The ethical nursing principle of justice is centered on achieving and maintaining equity, obligation, and fairness in nursing by applying moral rules, principles, and standards. It is crucial for nurses to understand the impact justice has on nurse-patient and interprofessional relationships. When nurses apply justice in clinical practice, patients feel valued and are typically more compliant with care, improving patient outcomes. Justice also reflects the level of fairness and impartiality expressed by employers, impacting the way nurses and other healthcare team members feel about their jobs and their employers. Applying justice in nursing practice means treating patients fairly. Fairness means providing the same quality of care for all patients. Nurse Brooks is working in the after-hours pediatric clinic. Two families arrived within a few minutes of one another. One family has a fifteen-month-old son with a severe rash and cough. His parents report he has had an elevated temperature for the past eight hours. The second family has three children suspected of being exposed to COVID. None of the children is currently symptomatic. Nurse Brooks must decide which patient to treat first and what protocol to follow. Some people may think that fairness would be for Nurse Brooks to see the children potentially exposed to COVID first. Nurse Brooks understands the importance of preventing the spread of COVID. However, the three children who may have been exposed are asymptomatic. Therefore, she takes the family to an isolation room to await triage and the physician. She then takes the fifteen-month-old patient to an examination room, gets all his vital signs and health history, and notifies the physician the child is ready to be evaluated. In this situation, Nurse Brooks understood the importance of reducing the risk of possible COVID exposure but also realized the children were asymptomatic. Conversely, the fifteen-month-old patient had a fever, rash, and a cough, which warranted immediate attention. It is important for nurses to understand how to apply justice in nursing practice. It is equally important to know the consequences which could arise if there is a lack of justice in nursing. Here are a few examples of what could happen if nurses do not apply justice in their practices. Justice in clinical practice involves acting fairly and requires nurses to utilize critical thinking and decision-making skills. Without utilizing those skills to implement justice, it is possible that treatment for patients requiring priority care could be delayed. In some cases, delay of treatment could result in dire consequences for the patient and the nurse. Without justice, nurses may show partiality to one patient or population over another. If this occurs, some patients may feel rejected or even abandoned. Depending on the severity of the situation, nurses could face reprimand for not demonstrating ethical principles. It is especially vital for nurse leaders to treat the nurses on their teams with fairness and impartiality. Nurses who feel they are as equally valued by their leaders as others on their team feel appreciated and tend to work well with others. Further, staff nurses often mimic the behavior of their leaders. When nurse leaders demonstrate justice within their roles, the nurses they lead usually do, as well. Justice in nursing leadership can take many forms. For instance, nurse leaders make decisions about schedules, patient assignments, and work to resolve conflicts within their teams. Nurse Collins is the RN, nurse leader in the Medical-Surgical unit. The med-surg unit typically staffs ten nurses per shift. In addition to making daily nurse assignments and ensuring proper nurse-patient ratios, Nurse Collins is responsible for reviewing requests from nurses for time off work. Two nurses have made formal requests for a week off for vacation. Consequently, the nurses have asked for the same week off. Like other hospitals and healthcare facilities nationwide, there is a shortage of nurses at Nurse Collins' facility, making it difficult to approve vacation for two nurses at the same time. To be fair, Nurse Collins reviews both requests. She speaks to each nurse privately to tell them another nurse has requested the same vacation time and asks if they have an alternate date that will work for them. This is her attempt to be fair and allow the nurses to find a solution. Because neither nurse wants to change their vacation date, Nurse Collins must decide whose request to approve. The nurses have the same amount of experience and have worked at the facility for the same length of time, meaning neither has seniority. However, one nurse turned her request in for consideration two days before the other. With no other information to consider and neither nurse willing to change their request, Nurse Collins made the impartial decision to approve the request she received first. Lack of justice in nursing leadership can be detrimental to the success of nursing teams and healthcare organizations and can negatively impact patient and organizational outcomes. Here are a few examples of the consequences of lack of justice in nursing leadership. Nurses who feel like their leaders value others more than them or believe their leaders make unfair decisions typically have a poor outlook on their job. These negative feelings can affect the whole team resulting in poor morale. This dissatisfaction leads to lower-quality care, poor patient outcomes, and higher rates of employee turnover. I remember my mother always told us, "Work hard and do your best in every task, especially work, because everyone is replaceable." Her words are still true today. Nurse leaders who fail to exercise the fundamental ethical principles of nursing, such as justice, may find their supervisors or employers become dissatisfied with them. The leader's job, after all, is to make things run smoothly and efficiently, and if they don't deliver, they could find themselves in big trouble, maybe even without a job. Nurse educators must provide adequate education to nursing students to help them understand the concept of justice and develop ways of implementing this ethical principle in practice. Students must learn to promote justice in contemporary healthcare while caring for diverse patient populations. Nurse educators apply justice in several ways. They must first demonstrate fairness and impartiality when dealing with students, such as when making clinical assignments, grouping students for class work, and the way they interact with students' individuality. One of the most influential methods nurse educators use to apply justice in nursing education is to use mock scenarios and laboratory intensives. In these situations, students interact with one another in a supervised environment, allowing them to act out planned scenarios and giving feedback on how to improve their judgment, critical thinking, hands-on skills, and the way they demonstrate ethical nursing principles. Ms. Bayles is reviewing ethical principles in nursing with second-year nursing students. Today, she has separated the class into groups, with some acting as patients and others acting as staff nurses. The group of "patients" is comprised of male and female students from diverse ethnic and religious backgrounds. Two of the students in this group are openly members of the LGBTQ population. Ms. Bayles gathers the group of students acting as nurses, gives a mock report, and then asks each "nurse" which "patient(s)" they prefer to care for. She asks the students to write down the patient they want to care for and give an explanation of why they chose that patient. After gathering the student's requests, she assigns patients without reading the requests. At the end of class, Ms. Bayles reads each student nurse's request and their reason for choosing the patient they wanted. She then gives the students an opportunity to discuss how justice may or may not have been served if the students were assigned the patient they chose. They also discuss how Ms. Bayles' decision to assign patients without input from the nurses demonstrated justice, as there were no conditions for care, no partiality, and no opportunities to deny care based on the student nurse's opinions. The lack of justice in nursing education can negatively impact students, nurse educators, nursing schools, and the healthcare facilities that host students and later employee graduates. Here are a few consequences that could result. Perhaps the most profound consequences of the absence of justice in nursing education relate to how nursing students perform in the clinical setting during and after graduating. If nurse educators do not teach justice and demonstrate the principle in the classroom and in clinicals, students may lack the ability to apply justice themselves. Until they learn the importance of justice and how to effectively apply the principle in their practices, they may find it difficult to establish good nurse-patient relationships or to work well within a team. Nursing instructors and educators must be careful to treat all students equally, avoiding stereotyping or showing partiality to one student or group of students. When nurse educators fail to demonstrate the ethical principle of justice, it may be difficult to develop rapport with students, compromising their ability to effectively teach students. Justice is a crucial ethical principle in nursing research. This principle requires the nurse researcher to be fair to research participants. One of the biggest obstacles to utilizing the principle of justice in nursing research is knowing how to select appropriate research participants based on populations. For example, the mentally ill, the elderly, and prisoners are considered vulnerable and should not be used simply because researchers may have convenient access to them. It is essential for nurse researchers to carefully choose study participants. Anyone from a vulnerable population or whose health history contradicts the reason for the study should not be included. Nurse Hillman is screening applications for potential participants in a new research study focused on the effectiveness of a new cardiac medication. Ten people applied to participate in the study. Nurse Hillman may choose six participants. As she reviews applications, Nurse Hillman finds one applicant is seventy-nine years old and has no family. Another applicant was recently discharged from an inpatient psychiatric unit due to complications of paranoid schizophrenia. Seven applicants have little or no significant health history other than cardiac-related issues. The final applicant has no history of any health issues. That applicant answered the screening questionnaire and included a statement about her need to "earn some money as a guinea pig" to help pay for college. Nurse Hillman demonstrates justice in nursing research by first eliminating the two applicants from vulnerable populations, the seventy-nine-year-old applicant and the applicant who was recently treated in the psychiatric unit. She also declines the applicant who wants to earn money for college, as this client has no significant health history. Nurse Hillman then schedules one-on-one interviews with each of the remaining applicants to determine those who best meet the criteria for the study. While there are consequences for the lack of any of the ethical principles in nursing, the consequences of lack of justice can be significant. Here are a few examples. Nurse researchers must choose targeted participants based on the type of research they are conducting. If researchers use participants because of their ease of access instead of carefully considering each applicant and choosing the most appropriate, it could raise questions as to the validity of the participant pool. Research is funded by several sources, and individuals or groups conducting research are accountable to those sources to perform ethically. If the question of whether justice is lacking in nursing research arises, it could cause contributions to slow or stop. Therefore, it is crucial for nurse researchers to conduct business within the confines of ethical nursing practices. Nonmaleficence is one of the ethical principles in nursing that means to do no harm to others. This principle involves actions by which a positive effect is intended and expected, and any risk of harm is outweighed by the likelihood that no harm will come to the patient or nurse. The following is detailed information about why Nonmaleficence is important, examples of ways to apply it, and consequences of not applying it in the four main areas of nursing: clinical practice, nursing leadership, nursing education, and nursing research. Nonmaleficence in nursing is a vital part of safe, effective, and high-quality patient care. Intentionally exercising nonmaleficence helps the nurse ensure every possible effort is made to protect patient safety and improve patient outcomes. Nonmaleficence in nursing may include measures such as withholding a medication until a patients allergies are confirmed, stopping a medication that is causing adverse reactions, or discontinuing a treatment strategy that seems to be causing more harm than good to the patient. Nurse Adam received an order to administer Sumatriptan to his patient, Mrs. Elliott, for the treatment of migraines. When Nurse Adam asked Mrs. Elliott if she had ever taken Sumatriptan, she reported she had never tried the medication and stated,

"Let's try it. The only medicine I'm allergic to is Azulfidine." Nurse Adam recognizes Azulfidine as a sulfa-containing drug and knows that Sumatriptan also contains sulfa. He asks Mrs. Elliott to describe the type of reaction she has when taking Azulfidine. Mrs. Elliott reports that when she took Azulfidine, she experienced a severe sunburn-like rash and tightness in her chest and throat. With this information, Nurse Adam chooses to hold the Sumatriptan and notify the physician of her sulfa-allergy and request an alternative non-sulfa-containing medication. Nurse Adam demonstrated nonmaleficence by acting in the best interest of Mrs. Elliott. With the knowledge he had of her severe allergic reaction to a sulfa drug previously, had Nurse Adam administered the new medication, he would be held accountable for any adverse events. If nonmaleficence is lacking in nursing practice, it can result in dire consequences affecting patients, their loved ones, nurses, and the profession. Here are a few examples of what happens when there is a lack of nonmaleficence in nursing. Nonmaleficence is based on the principle of preventing harm. When nurses fail to practice nonmaleficence, the risk of medication errors and other safety risks increase. Nurses must be especially careful to act with nonmaleficence in every nursing action. Failure to do so, resulting in patient or employee harm, could cause severe consequences for the nurse, including loss of job or loss of nursing license if the harm is severe. While all nurses must practice nonmaleficence in practice, it may be easy to overlook the importance of this ethical principle in the nursing leadership role. Nevertheless, it is vital for nursing leaders to demonstrate nonmaleficence in their roles. The principle of doing no harm applies to our actions toward patients and peers. For nursing leaders, this also encompasses the way we relate to the nurses in our charge. Nurse leaders may demonstrate nonmaleficence by removing risks to safe work environments, which helps staff feel more at ease in the performance of their duties. Nonmaleficence in nursing leadership is instrumental in promoting strong interprofessional relationships based on goals to serve the greater good of patients and staff. Nonmaleficence in nursing leadership is not only demonstrated in the way we care for patients and our expectation for the nurses on our team to do the same, it also includes implementing measures to protect the nurses we lead. Nurse leaders must implement measures to promote the safety and well-being of nurses to reduce the risk of harm and should never intentionally cause harm to another. Nurse leaders can be very influential, and that influence can be positive or negative, depending on the leader's behavior. If nurse leaders lack nonmaleficence in their practices, it can cause severe issues and dire consequences. If nursing leadership has a lack of nonmaleficence, it is likely every member of the team will be affected. Whether other nurses demonstrate the same behavior or simply avoid addressing the issue, it still creates issues related to patient care and outcomes. Nonmaleficence is the principle of promoting good and not causing harm. When nurse leaders lack nonmaleficence, their behavior could result in termination and may lead to the loss of their nursing license. Nurse educators must demonstrate desirable behavior in the classroom and in clinical settings. Promoting an attitude that supports nonmaleficence is of utmost importance. Here are a few reasons why nonmaleficence in nursing education is vital. Nonmaleficence in nursing education promotes the delivery of high-quality patient care and supports any action by the nurse to ensure patient safety and well-being. Nurse educators who act with nonmaleficence are excellent role models for how to put patient needs first without causing harm. Acting with the patient's best interest at heart and implementing measures to promote patient safety and prevent harm are at the heart of nonmaleficence. It is essential for nurse educators to demonstrate this behavior to students and staff. Nurse Wilson is a registered nurse employed in clinical staff development. One of the staff nurses at her facility has asked for guidance on how to administer a new medication the physician ordered for a client. Nurse Wilson is unfamiliar with the medication, so she consulted the pharmacist, who told her the medication is in a trial period and has not yet been proven to be effective. He also states that some serious side effects are associated with the medication. Based on the information she gathered from the pharmacist, Nurse Wilson decided the medication may not be in the best interest of the patient. She informs the staff nurse she is not comfortable educating about administering a drug that has not been proven effective. She also notifies the nursing supervisor and physician of her findings, requesting the medication order be reconsidered. Although the physician wrote an order for the medication, Nurse Wilson could not in good conscience be a party to giving the drug to the patient because she felt the risk was too high. Her refusal to take part in the education and administration of this drug at this time also protected the staff nurse who came to her for guidance. This is one way to demonstrate nonmaleficence in nursing education. Nonmaleficence is one of the most important ethical principles in nursing and is closely linked to all other ethical principles. It is crucial for nurse educators to understand the risks associated with a lack of nonmaleficence and to make those risks clear to the students and nurses they teach. Lack of nonmaleficence is associated with adverse medication events, which can lead to serious patient complications, including death. Nurse educators must stress the importance of nonmaleficence and make it clear to the nurses they teach it is their responsibility to verify and question any order they feel is inappropriate or unsafe. In nursing research, nonmaleficence assumes no harm will come to any research participant as a result of participating in the research study. While all research studies have the potential to cause harm, nonmaleficence ensures no intentional harm will come to any participant. Nonmaleficence is important in nursing research as it involves a conscientious act on the part of the nurse researcher to ensure participant safety throughout the study. Practicing nonmaleficence in nursing research creates a positive reputation for the research team, which can have a positive impact on future research endeavors. The principle of nonmaleficence is based on the concept of doing no harm. It is every nurse's responsibility to demonstrate this ethical nursing principle. Although all nursing research has the potential to cause some degree of harm, nurse researchers must identify the risks and determine the extent to which participants may be affected. They must also determine if a study should continue, be stopped, or never start at all. Nurse Phillips is the head nurse researcher at a local research center. As she reviews data related to a scheduled research study, Nurse Phillips must determine the category of risk the study falls under and ensure it is safe to proceed. After careful consideration of all available data, Nurse Phillips discovers some data indicate risk of permanent damage while other data suggest certainty of permanent damage. Although data also suggests some benefits are likely, the risk of permanent damage to participants outweighs the chance of benefit. Therefore, Nurse Phillips concludes the study is not safe and cancels the research study. The lack of principles of ethics in nursing, especially nonmaleficence, can carry dire consequences in nursing research. The following are a few examples of what could happen if nurse researchers do not practice nonmaleficence. Some nursing research is considered highly questionable, even if it has the potential to create benefits. Nonmaleficence in nursing research ensures that nurse researchers act in the best interests of the participants, causing no intentional harm. A lack of nonmaleficence could result in research studies that cause permanent damage to participants. All nursing research should offer greater benefits than risks, or the research study should not occur. If nurse researchers fail to practice nonmaleficence, they are less likely to weigh the benefits and risks to ensure the benefits are greater than the risks. Veracity is sometimes viewed as one of the most difficult ethical principles in nursing to uphold. The principle of veracity requires nurses to be completely honest with patients. It means telling the truth, even if the truth may cause the patient distress. The following is detailed information about why Veracity is important, examples of ways to apply it, and consequences of not applying it in the four main areas of nursing: clinical practice, nursing leadership, nursing education, and nursing research. Although implementing veracity may feel a little overwhelming, especially in difficult patient situations, it is an essential ethical principle in nursing. Here are a few reasons why demonstrating veracity is so important. Veracity creates a bond of trust between patients and nurses. It helps bind and strengthen nurse-patient relationships, which are essential in developing treatment plans and establishing attainable goals. Veracity in nurses helps promote patient autonomy. Honesty between nurses and patients allows patients to make informed decisions about their care, which is the right of every competent patient. Veracity in nursing practice requires the nurse to tell the truth in every situation, regardless of how others may respond to that truth. Mr. Douglas has congestive heart failure and lung cancer that has metastasized to his spine. The doctor came to his room to explain the severity of his condition and told Mr. Douglas they had tried all possible treatments and his life expectancy is less than six months. The doctor recommends hospice at home. After the doctor leaves, Mrs. Douglas questions the nurse stating, "As soon as we get him home, the hospice people will take good care of him. He will be better in no time, right?" The nurse understands that Mrs. Douglas is grasping for hope and wants the nurse to give her something to cling to. However, the principle of veracity demands the nurse to explain what the doctor said to Mrs. Douglas without giving her false hope. Although nurses may wish to withhold all or part of the information to help ease a patient or loved one, it is crucial to avoid that. Even with the best of intentions, a lack of veracity in nursing practice can cause more problems than good. When nurses are dishonest with patients and family members, it creates barriers to effective communication, which complicates patient care even more. If patients feel they cannot trust nurses to be honest, they may distance themselves and begin to be non-compliant. Poor nurse-patient relationships make it difficult to communicate patient needs and care plans, and non-compliance leads to poor patient outcomes. Nurses count on nurse leaders to be honest and forthcoming with them about all issues related to patient care or other pertinent information affecting their roles. It is vital for nurse leaders to grasp the need for veracity and implement it in every way possible. Veracity in nursing leadership helps establish trusting nurse-nurse leader and interprofessional relationships. Nurse leaders who act with honesty and integrity usually experience higher employee morale and job satisfaction rates within their teams, leading to decreased nurse turnover. Nurse leaders can positively impact patients, nurses, and their organizations by always demonstrating veracity. Nurse Brister is the primary nurse leader for a large outpatient clinic located within the university hospital. The outpatient clinic includes several sub-clinics that each employ five to ten nurses. Nurse Brister announced to his staff during a staff meeting that he plans to meet with the nursing administration and seek allocation of funds to improve the outpatient facility. Several of the clinics have old furniture and have not been cosmetically updated for several years. So, this announcement made the nurses happy. Despite being told the administration would likely deny his request for funds, Nurse Brister typed a proposal and asked for an appointment with the hospital administrator and chief financial officer. He presented his request and made a cordial argument as to how the updates could be a positive change for the hospital. After considering the request, the administration approved a plan to allocate funds to update the clinic. After being discouraged about approaching administration, Nurse Brister could have simply told his staff he was unable to secure an appointment with them. However, his word to his staff meant more than the risk of being denied a request. This is an excellent way for a nurse leader to demonstrate honesty toward their team members. Lack of veracity in nurse leadership can cause challenges at every level of the organization. Here are a few examples of consequences of lack of veracity. If staff nurses feel they cannot trust their leaders, they are less likely to develop strong relationships, which could impact patient care and organizational outcomes. Employers seek to hire nurse leaders who demonstrate all the ethical principles in nursing. Veracity is especially important as they need to count on what leaders say as the truth. If nurse leaders fail to be honest, they may lose leadership positions or be separated from employment. Veracity in nursing education is vital to the development of ethically strong nurses. Here are a few reasons why it is an important ethical nursing principle. Nurse educators who act with honesty and integrity are instrumental in cultivating those behaviors in student nurses and staff nurses. Veracity in nursing education encourages students to approach any situation with honesty, facing the consequences, good or bad, and learning how to overcome challenges. Nurse educators can demonstrate veracity in a number of ways. The following is an example of how a nursing instructor may apply veracity in a clinical setting with students. Mrs. Adams is the nursing instructor supervising students on the Medical-Surgical unit at a local hospital. After students complete assignments and are dismissed to go home, Mrs. Adams remains at the hospital to discuss the next days clinical assignments with the nursing supervisor. The nursing supervisor expresses concerns about one of the students stating she feels the student may not make it in the program. She asks Mrs. Adams opinion about the student. Mrs. Adams responds to the nursing supervisor by assuring her that each student in the clinical rotation has strengths and weaknesses. She tells the nursing instructor she is aware of which students need more hands-on skills development and who may need coaching to develop better communication skills, etc. She does not discuss a student by name, but thanks the nursing supervisor for her input and agrees to pay special attention to any student who needs help to succeed. Lack of veracity can be detrimental to the success of nursing students, staff, and healthcare organizations. The following are a few consequences associated with a lack of veracity in nursing education. If nurse educators do not teach the need for veracity in patient care, students may fail to exercise veracity, negatively impacting relationships with patients, nursing staff, and instructors. Healthcare facilities and organizations enter into contracts with nursing schools allowing students to engage in clinical rotations. If nursing students or nurse educators do not demonstrate veracity, it could indicate to the facility the nursing school does not value important ethical principles of nursing. When this occurs, the facility may choose to terminate clinical contracts. The principle of veracity in nursing research highlights the obligation of the nurse researcher to be honest about the research project. The following are some reasons veracity in nursing research is vital. Veracity in nursing research gives investors and prospective participants the opportunity to make decisions about the research and their level of involvement based on facts, not assumptions. Nurse researchers who practice veracity are more likely to be respected, making future research opportunities easier to procure. Veracity in nursing research is vital for the success of any research project. In nursing research, its veracity involves several aspects. The research team at ABC Research Lab wishes to conduct a study on patients with paranoid schizophrenia. The team develops a question upon which they wish to base their research. They discuss criteria for research participants, meet with applicants, and ensure informed consent. The team also meets with investors to describe the nature of the research and anticipated outcome. They answer questions and present evidence to support their proposal. By being open and honest with everyone involved with the proposed research project, nurse researchers allow each person or group to make an informed decision about their involvement before moving forward. Lack of veracity in nursing research, like the lack of other ethical nursing principles, can result in unpleasant consequences, including the following. Lack of veracity in nursing research undermines ones respect for autonomy, which leaves prospective participants feeling as though their wants, needs, or concerns are not important. Lack of veracity among nurse researchers could lead to deceiving research participants. Even the most experienced nurses face challenges related to ethical principles in nursing. Identifying challenges and knowing how to overcome them is key to nursing success. The following are a few of the most common challenges you will face when you apply the seven ethical principles in nursing featured in this article, along with suggestions for how to overcome them. Autonomy vs. Beneficence is one of the most common challenges related to ethical principles in nursing. Autonomy deals with respecting the patient's wishes, while beneficence means doing what is good and right for the patient. Both principles are important and should be upheld. The challenge arises when the patient's wishes and what the nurse feels is best for the patient do not agree. Legal precedents declare patient autonomy is the most important ethical principle between autonomy and beneficence. The only time exceptions to this rule apply is if the patient is a minor or lacks the ability to make informed decisions. If the patient's wishes conflict with what medical professionals feel is in the patient's best interest, nurses and other healthcare workers should make every effort to educate the patient and ensure his understanding of the implications of their decisions. However, if the patient is competent and of legal age, his wishes must be upheld. Veracity is the ethical nursing principle associated with truthfulness. Although it is appropriate to be completely honest with patients, it is not uncommon for nurses to face issues that make them question if withholding information may be the better option. Nurses are obligated to be honest with patients, even if the outcome of truthfulness leads to distress or sadness. It may be easier to approach difficult conversations or situations if you have a charge nurse with you. Also, if the patient has a family member or loved one who can be present with them, it may make it easier for them to deal with the situation. Autonomy deals with the patient's right to make decisions for himself, based on his own wants or needs. Challenges to patient autonomy may arise related to informed consent if the nurse is concerned that a patient or their family has not been properly informed about a treatment or procedure or that they do not understand the information provided. Nurses can overcome this challenge by asking the patient and/or family questions about the education they received and offering them opportunities to ask questions and clarify any information. The nurse should ensure the patient understands details of the treatment plans, benefits and risks, and expected outcomes. This allows the patient to maintain a sense of autonomy while the nurse ensures the patient has been properly informed. Fidelity is an important aspect in developing and maintaining strong nurse-patient and interprofessional relationships. Nurses may face challenges with fidelity for several reasons. For example, if the nurse promises to follow up or check on a patient and they are suddenly transferred to another department unless proper follow-through occurs, the patient can feel neglected. If you give your word to do something for a patient, family member, or team member, it is best to keep your word if possible. However, if circumstances are beyond your control, you can still uphold fidelity by notifying you're the person of your situation. You may need to tell a patient you have been reassigned, but assure them that the next nurse will be in to follow up with them. Nurses demonstrate nonmaleficence by selecting nursing interventions that cause the least harm while achieving the most beneficial outcomes. In some situations, implementing appropriate interventions may border on compromising the patients right to privacy. For example, if a patient poses a threat to himself or others, the nurses priority is to ensure the safety of the patient and others. If the patient does not give consent to share his information, the nurse faces the dilemma of choosing between nonmaleficence and the patients right to privacy. Nurses must weigh the benefits against the risks of any nursing intervention. If the patient or others are at risk due to unsafe conditions, the principle of nonmaleficence demands that nurses place the safety and the community first. Acting with a high level of ethical integrity is vital to the success of every nurse, which is why we have addressed the question, What are the 7 main ethical principles in nursing and why they are important? Throughout this article, we have discussed 7 main ethical principles in nursing, why theyre important, and examples of how they are applied in the four main areas of nursing. Developing an understanding of these principles and applying them to practice can help promote higher-quality patient care, improve patient outcomes, reduce employee and patient turnover, and further the profession. Darby Faubion BSN, RN Darby Faubion is a nurse and Allied Health educator with over twenty years of experience. She has assisted in developing curriculum for nursing programs and has instructed students at both community college and university levels. Because of her love of nursing education, Darby became a test-taking strategist and NCLEX prep coach and assists nursing graduates across the United States who are preparing to take the National Council Licensure Examination (NCLEX). Share copy and redistribute the material in any medium or format for any purpose, even commercially. 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For example, other rights such as publicity, privacy, or moral rights may limit how you use the material. Knowledge of the principles of ethics plays a significant role in upholding professional standards, as required by the Nursing and Midwifery Council Code (NMC, 2018). Understanding ethics in healthcare helps nurses to advocate for and support their patients by overcoming ethical and moral dilemmas, as well as navigating a range of scenarios.Knowledge of ethics helps practitioners make morally-sound judgements, and better understand and support patient needs (Ellemers et al, 2019; Varkey, 2021). The ethical principles of beneficence, non-maleficence, autonomy and justice, as well as their implications for decision making and patient care in nursing, are explored in this article.Principles of Nursing Ethics Nursing is a noble profession that requires an understanding of the fundamental principles of ethics. Ethics refers to the principles and values that govern the conduct of individuals and organizations. In healthcare, ethics plays a crucial role in ensuring that patients receive safe and compassionate care. Nursing ethics encompasses a set of principles that guide the practice of nursing and the ethical responsibilities of nurses. In this article, we will discuss nursing ethics in detail.The concept of nursing ethics dates back to the early 20th century when nursing was recognized as a distinct profession. Florence Nightingale, the founder of modern nursing, emphasized the importance of ethical behavior and the need for nurses to act in the best interests of their patients. In the 1950s, nursing ethics became more formalized, and the American Nurses Association (ANA) established a Code of Ethics for nurses.Autonomy is a foundational principle in nursing ethics, emphasizing the respect for an individuals right to make informed decisions about their own healthcare. In practice, this means that as healthcare providers, we must prioritize patient autonomy, ensuring they have the necessary information to make decisions about their treatment and care.Beneficence in nursing ethics involves the obligation to act in the best interest of the patient. It entails providing care that maximizes the benefits and minimizes harm. As nurses, we are tasked with continuously evaluating the potential benefits and risks of our actions to ensure the well-being of our patients.The principle of non-maleficence is often summed up in the well-known phrase, First, do no harm. This principle requires nurses to refrain from causing harm or suffering to patients intentionally. Its a principle that underscores the importance of careful and considerate nursing practices.Justice in nursing ethics centers on fairness and equitable distribution of healthcare resources. Nurses are responsible for ensuring that patients receive equal access to care, without discrimination. This principle also extends to advocating for healthcare policies that promote fairness in the healthcare system.Understanding the principles of nursing ethics is vital, as they guide our daily practice and decision-making processes. Lets explore how each of these principles manifests in the real world of nursing.In a healthcare environment, honoring patient autonomy means involving them in their care decisions. This involves explaining treatment options, potential risks, and benefits. It ensures that patients have the information they need to make decisions that align with their values and preferences.Nurses must continually assess the effectiveness of treatment plans, making necessary adjustments to maximize benefits and minimize harm. This could involve advocating for a different course of action, additional interventions, or alternative treatments when the current plan proves to be less effective.Avoiding harm to patients is a primary concern. This is achieved through strict adherence to safety protocols, double-checking medication administration, and maintaining a vigilant eye on changes in the patients condition to catch potential complications early.Advocating for justice in healthcare means ensuring that all patients, regardless of their background, receive the same level of care. This includes raising awareness about disparities in healthcare access and working towards solutions that promote a more equitable healthcare system.Nursing ethics is not a static set of principles; it evolves alongside advances in healthcare and changing societal values. As nurses, it is our responsibility to stay updated on the latest ethical guidelines and participate in ongoing education to ensure we provide the best possible care to our patients.Nursing ethics is an essential component of safe and effective patient care. Nurses must adhere to a set of principles that guide their conduct and ensure that they provide care that is safe, compassionate, and respectful of patients rights and dignity. The Code of Ethics for Nurses provides a framework for ethical practice and serves as a guide for nurses to ensure that they provide safe and effective care to their patients. Despite the challenges that nurses may face, upholding ethical principles is crucial to promoting the well-being of patients and maintaining the integrity of the nursing profession.Nursing ethics ensures that patient care is delivered with compassion, respect, and adherence to moral principles.Nurses approach ethical dilemmas by carefully considering conflicting values and principles to find ethically sound solutions.Cultural competence allows nurses to provide respectful and sensitive care that aligns with individual patient beliefs and traditions.This glossary of medical terms is a list of definitions about medicine, its sub-disciplines, and related fields.AarskogScott syndrome (AAS) A rare, inherited (X-linked) disease characterized by short stature, facial abnormalities, skeletal and genital anomalies.[1]Abdomen The part of the body between the chest and pelvis, which contains most of the tubelike organs of the digestive tract, as well as several solid organs.Abdominal external oblique muscle The largest, and outermost, of the three flat muscles of the lateral anterior abdominal wall.Abdominal internal oblique muscle A muscle of the abdominal wall, which lies below the external oblique and just above the transverse abdominal muscles.Abductor pollicis brevis muscle A muscle in the hand that abducts (straightens) the thumb.Abductor pollicis longus muscle One of the extrinsic muscles of the hand. Its major function is to abduct the thumb at the wrist.Abscess A collection of pus that has built up within the tissue of the body.[2]Accommodation the process by which the eye focuses on an object.Accommodation reflex a reflex action of the eye, measured as a response to focusing on a near object, then looking at a distant object (and vice versa).Acetabulum a concave surface of the pelvis, which forms the pelvic section of the hip joint.[3][4]Achilles tendon a tendon of the back of the leg, and the thickest in the human body. It attaches the plantaris, gastrocnemius (calf) and soleus muscles to the calcaneus (heel) bone.Acne a long-term skin disease that occurs when hair follicles are clogged with dead skin cells and oil from the skin.[5]Acne vulgaris see AcneAcupressure an alternative medicine technique where pressure is applied to acupuncture points. Pressure may be applied by hand, by elbow, or with various devices.Acupuncture a form of alternative medicine[6] in which thin needles are inserted into the body.[7]Adam's apple the lump or protrusion that is formed by the angle of the thyroid cartilage surrounding the larynx seen especially in males.Adaptive immune system also known as the acquired immune system or, more rarely, as the specific immune system, is a subsystem of the overall immune system that is composed of highly specialized, systemic cells and processes that eliminate pathogens or prevent their growth.Adenoma (plural adenomas or adenomata) is a benign tumor of epithelial tissue with glandular origin, glandular characteristics, or both.Adrenal gland The adrenal glands (also known as suprarenal glands) are endocrine glands that produce a variety of hormones including adrenaline and the steroids aldosterone and cortisol.[8][9] They are found above the kidneys.Allergy Allergies, also known as allergic diseases, are a number of conditions caused by hypersensitivity of the immune system to typically harmless substances in the environment.[10] These diseases include hay fever, food allergies, atopic dermatitis, allergic asthma, and anaphylaxis.[11] Symptoms may include red eyes, an itchy rash, sneezing, a runny nose, shortness of breath, or swelling.[12] Food intolerances and food poisoning are separate conditions.[13][14]ADHD Attention deficit hyperactivity disorder.Alzheimer's disease (AD), also referred to simply as Alzheimer's, is a chronic neurodegenerative disease that usually starts slowly and worsens over time.[15][16] It is the cause of 6070% of cases of dementia.[15][16] The most common early symptom is difficulty in remembering recent events (short-term memory loss).[15]Anal canal is the terminal part of the large intestine.[17] It is situated between the rectum and anus,[18] below the level of the pelvic diaphragm. In humans it is approximately 2.5 to 4cm (0.98-1.58in) long. It lies in the anal triangle of perineum in between the right and left ischioanal fossa.Anatomy is the branch of biology concerned with the study of the structure of organisms and their parts.[19] Anatomy is a branch of natural science which deals with the structural organization of living things.Anesthesiology Anesthesiology, anaesthesiology, anaesthesia or anaesthetics (see Terminology) is the medical speciality concerned with the total perioperative care of patients before, during and after surgery.[20]Angiology is the medical specialty which studies the diseases of the circulatory system and of the lymphatic system, i.e., arteries, veins and lymphatic vessels, and its diseases.Ankle The ankle, or the talocrural region,[21] is the region where the foot and the leg meet.[22] The ankle includes three joints: the ankle joint proper or talocrural joint, the subtalar joint, and the inferior tibiofibular joint.[23][24][25] The movements produced at this joint are dorsiflexion and plantarflexion of the foot. In common usage, the term ankle refers exclusively to the ankle region. In medical terminology, "ankle" (without qualifiers) can refer broadly to the region or specifically to the talocrural joint.[21][26]Anterior tibial artery The anterior tibial artery of the leg carries blood to the anterior compartment of the leg and dorsal surface of the foot, from the popliteal artery.Antibiotic is a type of antimicrobial substance active against bacteria and is the most important type of antibacterial agent for fighting bacterial infections. Antibiotic medications are widely used in the treatment and prevention of such infections.[27][28]Antibody (Ab), also known as an immunoglobulin (Ig),[29] is a large, Y-shaped protein produced mainly by plasma cells that is used by the immune system to neutralize pathogens such as pathogenic bacteria and viruses.Aorta is the main artery in the human body, originating from the left ventricle of the heart and extending down to the abdomen, where it splits into two smaller arteries (the common iliac arteries). The aorta distributes oxygenated blood to all parts of the body through the systemic circulation.[30]Appendix The appendix (or vermiform appendix; also cecal [or caecal] appendix; vermix; or vermiform process) is a finger-like, blind-ended tube connected to the cecum, from which it develops in the embryo. The cecum is a pouch-like structure of the colon, located at the junction of the small and the large intestines. The term "vermiform" comes from Latin and means "worm-shaped." The appendix used to be considered a vestigial organ, but this view has changed over the past decades.[31]Arm is the part of the upper limb between the glenohumeral joint (shoulder joint) and the elbow joint. In common usage, the arm extends to the hand. It can be divided into the upper arm, which extends from the shoulder to the elbow, the forearm which extends from the elbow to the hand, and the hand. Anatomically the shoulder girdle with bones and corresponding muscles is by definition a part of the arm. The Latin term brachium may refer to either the arm as a whole or to the upper arm on its own.[32][33][34]Arteriole is a small-diameter blood vessel in the microcirculation that extends and branches out from an artery and leads to capillaries.[30] Arterioles have muscular walls (usually only one to two layers of smooth muscle) and are the primary site of vascular resistance. The greatest change in blood pressure and velocity of blood flow occurs at the transition of arterioles to capillaries.Artery is a blood vessel that takes blood away from the heart to all parts of the body (tissues, lungs, etc.). Most arteries carry oxygenated blood; the two exceptions are the pulmonary and the umbilical arteries, which carry deoxygenated blood to the organs that oxygenate it. The effective arterial blood volume is that extracellular fluid which fills the arterial system.Arthritis is a term often used to mean any disorder that affects joints.[35] Symptoms generally include joint pain and stiffness.[35] Other symptoms may include redness, warmth, swelling, and decreased range of motion of the affected joints.[35][36]Asperger syndrome (AS), also known as Asperger's, is a developmental disorder characterized by significant difficulties in social interaction and nonverbal communication, along with restricted and repetitive patterns of behavior and interests.[37] As a milder autism spectrum disorder (ASD), it differs from other ASDs by relatively normal language and intelligence.[38] Although not required for diagnosis, physical clumsiness and unusual use of language are common.[39][40]Asthma is a common long-term inflammatory disease of the airways of the lungs.[41] It is characterized by variable and recurring symptoms, reversible airflow obstruction, and bronchospasm.[42] Symptoms include episodes of wheezing, coughing, chest tightness, and shortness of breath.[43]Atony absence of muscle tone.Atrial fibrillation (AF or A-fib) is an abnormal heart rhythm characterized by rapid and irregular beating of the atria.[44] Often it starts as brief periods of abnormal beating which become longer and possibly constant over time.[45] Often episodes have no symptoms.[46]Attention deficit hyperactivity disorder is a mental disorder of the neurodevelopmental type.[47][48] It is characterized by problems paying attention, excessive activity, or difficulty controlling behavior which is not appropriate for a person's age.[49][50]Auscultation is listening to the internal sounds of the body, usually using a stethoscope. Auscultation is performed for the purposes of examining the circulatory and respiratory systems (heart and breath sounds), as well as the gastrointestinal system.Autism is a developmental disorder characterized by troubles with social interaction and communication, and by restricted and repetitive behavior.[50] Parents usually notice signs during the first two or three years of their child's life.[51][50] These signs often develop gradually, though some children with autism reach their developmental milestones at a normal pace before worsening.[52]Axilla (also, armpit, underarm or oxter) is the area on the human body directly under the joint where the arm connects to the shoulder. It also provides the under-arm sweat gland.Axillary artery is a large blood vessel that conveys oxygenated blood to the lateral aspect of the thorax, the axilla (armpit) and the upper limb. Its origin is at the lateral margin of the first rib, before which it is called the subclavian artery.Back The human back is the large posterior area of the human body, rising from the top of the buttocks to the back of the neck and the shoulders. It is the surface of the body opposite from the chest. The vertebral column runs the length of the back and creates a central area of recession. The breadth of the back is created by the shoulders at the top and the pelvis at the bottom.Back pain is pain felt in the back. It is divided into neck pain (cervical), middle back pain (thoracic), lower back pain (lumbar) or coccydynia (tailbone or sacral pain) based on the segment affected.[53] The lumbar area is the most common area for pain, as it supports most of the weight in the upper body.[54] Episodes of back pain may be acute, sub-acute, or chronic depending on the duration. The pain may be characterized as a dull ache, shooting or piercing pain, or a burning sensation. Discomfort can radiate into the arms and hands as well as the legs or feet, and may include numbness,[53] or weakness in the legs and arms.Barotrauma is injury caused by a pressure difference between tissues and a gas filled space.BasalAnatomy: In the direction of the base. Antonym apical.Physiology: Lowest sustained level or minimum level required, as in basal metabolic rate.Beta cell Beta cells (cells) are a type of cell found in pancreatic islets that synthesize and secrete insulin. Beta cells make up 50-70% of the cells in human islets.[55] In patients with type I or type II diabetes, beta-cell mass and function are diminished, leading to insufficient insulin secretion and hyperglycemia.[56]Biceps also biceps brachii (Latin for "two-headed muscle of the arm"), is a large muscle that lies on the front of the upper arm between the shoulder and the elbow. Both heads of the muscle arise on the scapula and join to form a single muscle belly which is attached to the upper forearm. While the biceps crosses both the shoulder and elbow joints, its main function is at the elbow where it flexes the forearm and supinates the forearm. Both these movements are used when opening a bottle with a corkscrew: first biceps unscrews the cork (supination), then it pulls the cork out (flexion).[57]Biceps brachii The biceps, also biceps brachii (Latin for "two-headed muscle of the arm"), is a large muscle that lies on the front of the upper arm between the shoulder and the elbow. Both heads of the muscle arise on the scapula and join to form a single muscle belly which is attached to the upper forearm. While the biceps crosses both the shoulder and elbow joints, its main function is at the elbow where it flexes the forearm and supinates the forearm. Both these movements are used when opening a bottle with a corkscrew: first biceps unscrews the cork (supination), then it pulls the cork out (flexion).[57]Bile duct is any of a number of long tube-like structures that carry bile. Bile, required for the digestion of food, is secreted by the liver into passages that carry bile toward the hepatic duct, which joins with the cystic duct (carrying bile to and from the gallbladder) to form the common bile duct, which opens into the intestine.Biliary tract The biliary tract, (biliary tree or biliary system) refers to the liver, gall bladder and bile ducts, and how they work together to make, store and secrete bile. Bile consists of water, electrolytes, bile acids, cholesterol, phospholipids and conjugated bilirubin. Some components are synthesised by hepatocytes (liver cells), the rest are extracted from the blood by the liver.Binge eating disorder (BED), is an eating disorder characterized by frequent and recurrent binge eating episodes with associated negative psychological and social problems, but without subsequent purging episodes (e.g. vomiting). BED is a recently described condition,[58] which was required to distinguish binge eating similar to that seen in bulimia nervosa but without characteristic purging. Individuals who are diagnosed with bulimia nervosa and binge eating disorder exhibit similar patterns of compulsive overeating, neurobiological features of dysfunctional cognitive control and food addiction, and biological and environmental risk factors.[59] Indeed, some consider BED a milder version of bulimia, and that the conditions are on the same spectrum.[60]Biological engineering or bioengineering, or bio-engineering, is the application of principles of biology and the tools of engineering to create usable, tangible, economically viable products.[61] Biological engineering employs knowledge and expertise from a number of pure and applied sciences,[62] such as mass and heat transfer, kinetics, biocatalysts, biomechanics, bioinformatics, separation and purification processes, bioreactor design, surface science, fluid mechanics, thermodynamics, and polymer science. It is used in the design of medical devices, diagnostic equipment, biocompatible materials, renewable bioenergy, ecological engineering, agricultural engineering, and other areas that improve the living standards of societies.Biology is the natural science that studies life and living organisms, including their physical structure, chemical processes, molecular interactions, physiological mechanisms, development and evolution.[63]Biochemistry sometimes called biological chemistry, is the study of chemical processes within and relating to living organisms.[64]Bioinformatics is an interdisciplinary field that develops methods and software tools for understanding biological data. As an interdisciplinary field of science, bioinformatics combines biology, computer science, information engineering, mathematics and statistics to analyze and interpret biological data.Biopsy is a medical test commonly performed by a surgeon, interventional radiologist, or an interventional cardiologist involving extraction of sample cells or tissues for examination to determine the presence or extent of a disease.Biostatistics are the application of statistics to a wide range of topics in biology. It encompasses the design of biological experiments, especially in medicine, pharmacy, agriculture and fishery; the collection, summarization, and analysis of data from those experiments; and the interpretation of, and inference from, the results. A major branch is medical biostatistics, which is exclusively concerned with medicine and health.[65]Bipolar disorder is a mental disorder that causes periods of depression and periods of abnormally elevated mood[66][67][68]Birth control also known as contraception and fertility control, is a method or device used to prevent pregnancy.[69]Bladder cancer is any of several types of cancer arising from the tissues of the urinary bladder.[70] It is a disease in which cells grow abnormally and have the potential to spread to other parts of the body.[71][72] Symptoms include blood in the urine, pain with urination, and low back pain.[70]Blood pressure is the pressure of circulating blood on the walls of blood vessels. Used without further specification, "blood pressure" usually refers to the pressure in large arteries of the systemic circulation. Blood pressure is usually expressed in terms of the systolic pressure (maximum during one heartbeat) over diastolic pressure (minimum in between two heartbeats) and is measured in millimeters of mercury (mmHg), above the surrounding atmospheric pressure.Blood vessel The blood vessels are the part of the circulatory system, and microcirculation, that transports blood throughout the human body.[73]Bone is a rigid organ that constitutes part of the vertebrate skeleton. Bones support and protect the various organs of the body, produce red and white blood cells, store minerals, provide structure and support for the body, and enable mobility. Bones come in a variety of shapes and sizes and have a complex internal and external structure. They are lightweight yet strong and hard, and serve multiple functions.Bone marrow is a semi-solid tissue which may be found within the spongy or cancellous portions of bones.[74] Bone marrow is the primary site of new blood cell production or hematopoiesis.[75] It is composed of hematopoietic cells, marrow adipose tissue, and supportive stromal cells. In adult humans, bone marrow is primarily located in the ribs, vertebrae, sternum, and bones of the pelvis.[76] On average, bone marrow constitutes 4% of the total body mass of humans; in an adult having 65 kilograms of mass (143lb), bone marrow typically accounts for approximately 2.6 kilograms (5.7lb).[77]Brachial artery is the major blood vessel of the (upper) arm. It is the continuation of the axillary artery beyond the lower margin of teres major muscle. It continues down the ventral surface of the arm until it reaches the cubital fossa at the elbow. It then divides into the radial and ulnar arteries which run down the forearm. In some individuals, the bifurcation occurs much earlier and the ulnar and radial arteries extend through the upper arm. The pulse of the brachial artery is palpable on the anterior aspect of the elbow, medial to the tendon of the biceps, and, with the use of a stethoscope and sphygmomanometer (blood pressure cuff) often used to measure the blood pressure.Brachial plexus is a network of nerves formed by the ventral rami of the lower four cervical nerves and first thoracic nerve (C5, C6, C7, C8, and T1). This plexus extends from the spinal cord, through the cervicoaxillary canal in the neck, over the first rib, and into the armpit. It supplies afferent and efferent nerve fibers to the chest, shoulder, arm and hand.Brachial veins In human anatomy, the brachial veins are venae comitantes of the brachial artery in the arm proper. Because they are deep to muscle, they are considered deep veins. Their course is that of the brachial artery (in reverse): they begin where radial veins and ulnar veins join (corresponding to the bifurcation of the brachial artery). They end at the inferior border of the teres major muscle. At this point, the brachial veins join the basilic vein to form the axillary vein. The brachial veins also have small tributaries that drain the muscles of the upper arm, such as biceps brachii muscle and triceps brachii muscle.Brachioradialis is a muscle of the forearm that flexes the forearm at the elbow. It is also capable of both pronation and supination, depending on the position of the forearm. It is attached to the distal styloid process of the radius by way of the brachioradialis tendon, and to the lateral supracondylar ridge of the humerus.Bradycardia is a condition typically defined wherein an individual has a resting heart rate of under 60 beats per minute (BPM) in adults.[78]Brain The human brain is the central organ of the human nervous system, and with the spinal cord makes up the central nervous system. The brain consists of the cerebrum, the brainstem and the cerebellum. It controls most of the activities of the body, processing, integrating, and coordinating the information it receives from the sense organs, and making decisions as to the instructions sent to the rest of the body. The brain is contained in, and protected by, the skull bones of the head.Brain tumor occurs when abnormal cells form within the brain.[79] There are two main types of tumors: malignant or cancerous tumors and benign tumors.[79]Brain metastasis is a cancer that has metastasized (spread) to the brain from another location in the body and is therefore considered a secondary brain tumor.[80] The metastasis typically shares a cancer cell type with the original site of the cancer.[81]Breast The breast is one of two prominences located on the upper ventral region of the torso of primates. In females, it serves as the mammary gland, which produces and secretes milk to feed infants.[82] Both females and males develop breasts from the same embryological tissues. At puberty, estrogens, in conjunction with growth hormone, cause breast development in female humans and to a much lesser extent in other primates. Breast development in other primate females generally only occurs with pregnancy.Breast cancer is cancer that develops from breast tissue.[83] Signs of breast cancer may include a lump in the breast, a change in breast shape, dimpling of the skin, fluid coming from the nipple, a newly inverted nipple, or a red or scaly patch of skin.[84] In those with distant spread of the disease, there may be bone pain, swollen lymph nodes, shortness of breath, or yellow skin.[85]Broca's area or the Broca area, is a region in the frontal lobe of the dominant hemisphere, usually the left, of the brain[86] with functions linked to speech production.Bronchiole The bronchioles or bronchioli are the passageways by which air passes through the nose or mouth to the alveoli (air sacs) of the lungs, in which branches no longer contain cartilage or glands in their submucosa. They are branches of the bronchi, and are part of the conducting zone of the respiratory system. The bronchioles divide further into smaller terminal bronchioles which are still in the conducting zone and these then divide into the smaller respiratory bronchioles which mark the beginning of the respiratory region.Bronchus A bronchi is a passage of airway in the respiratory system that conducts air into the lungs. The first bronchi to branch from the trachea are the right main bronchus and the left main bronchus. These are the widest and enter the lungs at each hilum, where they branch into narrower secondary bronchi known as lobar bronchi, and these branch into narrower tertiary bronchi known as segmental bronchi. Further divisions of the segmental bronchi are known as 4th order, 5th order, and 6th order segmental bronchi, or grouped together as subsegmental bronchi.[87][30][pageneeded] The bronchi when too narrow to be supported by cartilage are known as bronchioles. No gas exchange takes place in the bronchi.Bruit also called vascular murmur,[88] is the abnormal sound generated by turbulent flow of blood in an artery due to either an area of partial obstruction or a localized high rate of blood flow through an unobstructed artery.[89]Bulimia nervosa also known as simply bulimia, is an eating disorder characterized by binge eating followed by purging.[90] Binge eating refers to eating a large amount of food in a short amount of time.[90] Purging refers to the attempts to get rid of the food consumed.[90]Buttocks are two rounded portions of the anatomy, located on the posterior of the pelvic region and comprise a layer of fat superimposed on the gluteus maximus and gluteus medius muscles. Physiologically, the buttocks enable weight to be taken off the feet while sitting.Calcium Calcium ions (Ca^{2+}) contribute to the physiology and biochemistry of organisms and the cell. They play an important role in signal transduction pathways,[91][92] where they act as a second messenger, in neurotransmitter release from neurons, in contraction of all muscle cell types, and in fertilization. Many enzymes require calcium ions as a cofactor, those of the blood-clotting cascade being notable examples. Extracellular calcium is also important for maintaining the potential difference across excitable cell membranes, as well as proper bone formation.Calf is the back portion of the lower leg in human anatomy. The muscles within the calf correspond to the posterior compartment of the leg. The two largest muscles within this compartment are known together as the calf muscle and attach to the heel via the Achilles tendon. Several other, smaller muscles attach to the knee, the ankle, and via long tendons to the toes.Cancer is a group of diseases involving abnormal cell growth with the potential to invade or spread to other parts of the body.[93][94] These contrast with benign tumors, which do not spread to other parts of the body.[94]Capillary is a small blood vessel from 5 to 10 micrometres (m) in diameter, and having a wall one endothelial cell thick. They are the smallest blood vessels in the body: they convey blood between the arterioles and venules. These microvessels are the site of exchange of many substances with the interstitial fluid surrounding them.Carcinogen is any substance, radionuclide, or radiation that promotes carcinogenesis, the formation of cancer. This may be due to the ability to damage the genome or to the disruption of cellular metabolic processes.Carcinogenesis also called oncogenesis or tumorigenesis, is the formation of a cancer, whereby normal cells are transformed into cancer cells.Cardiac arrest a sudden loss of blood flow resulting from the failure of the heart to effectively pump.[95] Symptoms include loss of consciousness and abnormal or absent breathing.[96][97] Some individuals may experience chest pain, shortness of breath, or nausea before cardiac arrest.[97] If not treated within minutes, it typically leads to death.[95]Cardiac catheterization (heart cath or just cath), is the insertion of a catheter into a chamber or vessel of the heart. This is done both for diagnostic and interventional purposes.Cardiac muscle (also called heart muscle or myocardium), is one of three types of vertebrate muscles, with the other two being skeletal and smooth muscles. It is an involuntary, striated muscle that constitutes the main tissue of the walls of the heart. The myocardium forms a thick middle layer between the outer layer of the heart wall (the epicardium) and the inner layer (the endocardium), with blood supplied via the coronary circulation. It is composed of individual heart muscle cells (cardiomyocytes) joined by intercalated discs, encased by collagen fibres and other substances that form the extracellular matrix.Cardiac surgery or cardiovascular surgery, is surgery on the heart or great vessels performed by cardiac surgeons. It is often used to treat complications of ischemic heart disease (for example, with coronary artery bypass grafting); to correct congenital heart disease; or to treat valvular heart disease from various causes, including endocarditis, rheumatic heart disease, and atherosclerosis. It also includes heart transplantation.Cardiology is a branch of medicine dealing with disorders of the heart as well as parts of the circulatory system.Cardiothoracic surgery (also known as thoracic surgery) is the field of medicine involved in surgical treatment of organs inside the thorax (the chest)generally treatment of conditions of the heart (heart disease) and lungs (lung disease).Cardiovascular disease (CVD), is a class of diseases that involve the heart or blood vessels.[98] CVD includes coronary artery diseases (CAD) such as angina and myocardial infarction (commonly known as a heart attack).[98] Other CVDs include stroke, heart failure, hypertensive heart disease, rheumatic heart disease, cardiomyopathy, heart arrhythmia, congenital heart disease, valvular heart disease, carditis, aortic aneurysms, peripheral artery disease, thromboembolic disease, and venous thrombosis.[98][99]Carotid artery, common In anatomy, the left and right common carotid arteries (carotids) [100][101]) are arteries that supply the head and neck with oxygenated blood; they divide in the neck to form the external and internal carotid arteries.[102][103]Carotid artery, external The external carotid artery is a major artery of the head and neck. It arises from the common carotid artery when it splits into the external and internal carotid artery. It supplies blood to the face and neck.[104]Carotid artery, internal The internal carotid artery is a major paired artery, one on each side of the head and neck, in human anatomy. They arise from the common carotid arteries where these bifurcate into the internal and external carotid arteries at cervical vertebral level 3 or 4; the internal carotid artery supplies the brain, while the external carotid nourishes other portions of the head, such as face, scalp, skull, and meninges.Carotid artery stenosis is a narrowing or constriction of any part of the carotid arteries, usually caused by atherosclerosis.Carpal bones Are the eight small bones that make up the wrist (or carpus) that connects the hand to the forearm. In human anatomy, the main role of the wrist is to facilitate effective positioning of the hand and powerful use of the extensors and flexors of the forearm, and the mobility of individual carpal bones increase the freedom of movements at the wrist.[105]Carpal tunnel syndrome (CTS), is a medical condition due to compression of the median nerve as it travels through the wrist at the carpal tunnel.[106] The main symptoms are pain, numbness and tingling in the thumb, index finger, middle finger and the thumb side of the ring fingers.[106]Cartilage is a resilient and smooth elastic tissue, a rubber-like padding that covers and protects the ends of long bones at the joints, and is a structural component of the rib cage, the ear, the nose, the bronchial tubes, the intervertebral discs, and many other body components. It is not as hard and rigid as bone, but it is much stiffer and much less flexible than muscle. The matrix of cartilage is made up of chondrin.Cartilaginous joint Cartilaginous joints are connected entirely by cartilage (fibrocartilage or hyaline).[107] Cartilaginous joints allow more movement between bones than a fibrous joint but less than the highly mobile synovial joint. Cartilaginous joints also forms the growth regions of immature long bones and the intervertebral discs of the spinal column.Catheter Is a thin tube made from medical grade materials serving a broad range of functions. Catheters are medical devices that can be inserted in the body to treat diseases or perform a surgical procedure. By modifying the material or adjusting the way catheters are manufactured, it is possible to tailor catheters for cardiovascular, urological, gastrointestinal, neurovascular, and ophthalmic applications.Celiac disease another way of spelling coeliac diseaseCell biology also called cytology, is a branch of biology that studies the structure and function of the cell, which is the basic unit of life.[108] Cell biology is concerned with the physiological properties, metabolic processes, signaling pathways, life cycle, chemical composition and interactions of the cell with their environment.Central nervous system (CNS), is the part of the nervous system consisting of the brain and spinal cord.Cephalic vein is a superficial vein in the arm. It communicates with the basilic vein via the median cubital vein at the elbow and is located in the superficial fascia along the anterolateral surface of the biceps brachii muscle. Near the shoulder, the cephalic vein passes between the deltoid and pectoralis major muscles (deltopectoral groove) and through the deltopectoral triangle, where it empties into the axillary vein.Cerebellum (Latin for "little brain"), is a major feature of the hindbrain of all vertebrates. Although usually smaller than the cerebrum, in some animals such as the mormyrid fishes it may be as large as or even larger.[109] In humans, the cerebellum plays an important role in motor control. It may also be involved in some cognitive functions such as attention and language as well as in regulating fear and pleasure responses,[110] but its movement-related functions are the most solidly established. The human cerebellum does not initiate movement, but contributes to coordination, precision, and accurate timing: it receives input from sensory systems of the spinal cord and from other parts of the brain, and integrates these inputs to fine-tune motor activity.[111] Cerebellar damage produces disorders in fine movement, equilibrium, posture, and motor learning in humans.[111]Cerebrum is a large part of the brain containing the cerebral cortex (of the two cerebral hemispheres), as well as several subcortical structures, including the hippocampus, basal ganglia, and olfactory bulb. In the human brain, the cerebrum is the uppermost region of the central nervous system. The prosencephalon is the embryonic structure from which the cerebrum develops prenatally. In mammals, the dorsal telencephalon, or pallium, develops into the cerebral cortex, and the ventral telencephalon, or subpallium, becomes the basal ganglia. The cerebrum is also divided into approximately symmetric left and right cerebral hemispheres. With the assistance of the cerebellum, the cerebrum controls all voluntary actions in the body.Cervical cancer is a cancer arising from the cervix.[84] It is due to the abnormal growth of cells that have the ability to invade or spread to other parts of the body.[112] Early on, typically no symptoms are seen.[84] Later symptoms may include abnormal vaginal bleeding, pelvic pain, or pain during sexual intercourse.[84] While bleeding after sex may not be serious, it may also indicate the presence of cervical cancer.[113]Cervix or cervix uteri, is the lower part of the uterus in the human female reproductive system. The cervix is usually 2 to 3cm long (~1 inch) and roughly cylindrical in shape, which changes during pregnancy. The narrow, central cervical canal runs along its entire length, connecting the uterine cavity and the lumen of the vagina. The opening into the uterus is called the internal os, and the opening into the vagina is called the external os. The lower part of the cervix, known as the vaginal portion of the cervix (or ectocervix), bulges into the top of the vagina.Cheek The cheeks constitute the area of the face below the eyes and between the nose and the left or right ear. "Buccal" means relating to the cheek. In humans, the region is innervated by the buccal nerve. The area between the inside of the cheek and the teeth and gums is called the vestibule or buccal pouch or buccal cavity and forms part of the mouth.Chin is the area of the face below the lower lip and including the mandibular prominence.[114][115] It is formed by the lower front of the mandible.Chronic fatigue syndrome (CFS), also referred to as myalgic encephalomyelitis (ME), is a medical condition characterized by long-term fatigue and other persistent symptoms that limit a person's ability to carry out ordinary daily activities.[116][117]Ciliary muscle is a ring of smooth muscle[118][119] in the eye's middle layer (vascular layer) that controls accommodation for viewing objects at varying distances and regulates the flow of aqueous humor into Schlemm's canal. It changes the shape of the lens within the eye, not the size of the pupil[120] which is carried out by the sphincter pupillae muscle and dilator pupillae.Ciliary sulcus The space between the anterior surface of the ciliary body of the eye and the posterior surface of the base of the iris. It is one of the sites for intraocular lens implantation.[121]Circulatory system The circulatory system, also called the cardiovascular system or the vascular system, is an organ system that permits blood to circulate and transport nutrients (such as amino acids and electrolytes), oxygen, carbon dioxide, hormones, and blood cells to and from the cells in the body to provide nourishment and help in fighting diseases, stabilize temperature and pH, and maintain homeostasis.Clavicle also known as the collar bone, is a long bone that serves as a strut between the shoulder blade and the sternum. There are two, one on the right, and one on the left side of the trunk. Along with the shoulder blade, the clavicles make up the shoulder girdle. The clavicle has many functions. It connects the axial and appendicular skeleton in conjunction with the scapula, helps extend range of motion, and protects neurovascular structures.[122]Clinic (or outpatient clinic or ambulatory care clinic) is a healthcare facility that is primarily focused on the care of outpatients. Clinics can be privately operated or publicly managed and funded.Clinical research is a branch of healthcare science that determines the safety and effectiveness (efficacy) of medications, devices, diagnostic products and treatment regimens intended for human use. These may be used for prevention, treatment, diagnosis or for relieving symptoms of a disease. Clinical research is different from clinical practice. In clinical practice established treatments are used, while in clinical research evidence is collected to establish a treatment.Coeliac disease Coeliac disease or celiac disease is a long-term autoimmune disorder that primarily affects the small intestine.[123] Classic symptoms include gastrointestinal problems such as chronic diarrhoea, abdominal distention, malabsorption, loss of appetite and among children failure to grow normally.[124] This often begins between six months and two years of age.[124] Non-classic symptoms are more common, especially in people older than two years.[125][126][127][128] There may be mild or absent gastrointestinal symptoms, a wide number of symptoms involving any part of the body or no obvious symptoms.[124] Coeliac disease was first described in childhood;[129][125] however, it may develop at any age.[124][125] It is associated with other autoimmune diseases, such as diabetes mellitus type 1 and thyroiditis, among others.[129]Colorectal surgery is a field in medicine dealing with disorders of the rectum, anus, and colon.[130]Common carotid artery In anatomy, the left and right common carotid arteries (carotids) [100][101]) are arteries that supply the head and neck with oxygenated blood; they divide in the neck to form the external and internal carotid arteries.[102][103]Common cold also known simply as a cold, is a viral infectious disease of the upper respiratory tract that primarily affects the nose.[131] The throat, sinuses, and larynx may also be affected.[132] Signs and symptoms may appear less than two days after exposure to the virus.[132] These may include coughing, sore throat, runny nose, sneezing, headache, and fever.[133][134] People usually recover in seven to ten days,[133] but some symptoms may last up to three weeks.[135] Occasionally, those with other health problems may develop pneumonia.[133]Common iliac artery The common iliac arteries are two large arteries that originate from the aortic bifurcation at the level of the fourth lumbar vertebra. They end in front of the sacroiliac joint, one on either side, and each bifurcates into the external and internal iliac arteries.Common iliac vein The common iliac veins are formed by the external iliac veins and internal iliac veins. The left and right common iliac veins come together in the abdomen at the level of the fifth lumbar vertebra,[136] forming the inferior vena cava. They drain blood from the pelvis and lower limbs. Both common iliac veins are accompanied along their course by common iliac arteries.Coronary arteries are the blood vessels (arteries) of coronary circulation, which transports oxygenated blood to the actual heart muscle. The heart requires a continuous supply of oxygen to function and survive, much like any other tissue or organ of the body.[137]Corpus callosum also callosal commissure, is a wide, thick nerve tract consisting of a flat bundle of commissural fibers, beneath the cerebral cortex in the brain. The corpus callosum is only found in placental mammals.[138] It spans part of the longitudinal fissure, connecting the left and right cerebral hemispheres, enabling communication between them. It is the largest white matter structure in the human brain, about ten centimetres in length and consisting of 200300 million axonal projections.[139][140]Cranial nerves are the nerves that emerge directly from the brain (including the brainstem), in contrast to spinal nerves (which emerge from segments of the spinal cord).[141] Ten of the cranial nerves originate in the brainstem. Cranial nerves relay information between the brain and parts of the body, primarily to and from regions of the head and neck.[142]Cure is a substance or procedure that ends a medical condition, such as a medication, a surgical operation, a change in lifestyle or even a philosophical mindset that helps end a person's sufferings; or the state of being healed, or cured.Cytogenetics is a branch of genetics that is concerned with how the chromosomes relate to cell behaviour, particularly to their behaviour during mitosis and meiosis.[143]Cytokines are a broad and loose category of small proteins (~520 kDa) that are important in cell signaling. Cytokines are peptides, and cannot cross the lipid bilayer of cells to enter the cytoplasm.Decompression sickness is a condition caused by inert gas bubbles forming in supersaturated tissues after a reduction in ambient pressure, and either obstructing perfusion or causing local damage.Deep circumflex iliac vein is formed by the union of the venae comitantes of the deep iliac circumflex artery, and joins the external iliac vein about 2cm. above the inguinal ligament. It also receives small tributary branches from the thoracoepigastric vein[144]Deep temporal arteries The deep temporal arteries, two in number, anterior and posterior, ascend between the temporalis and the pericranium. They supply the muscle, and anastomose with the middle temporal artery. The anterior communicates with the lacrimal artery by means of small branches which perforate the zygomatic bone and great wing of the sphenoid.Definitive treatment Medical treatment generally accepted as most appropriate for the condition.Deltoid muscle is the muscle forming the rounded contour of the human shoulder. Anatomically, it appears to be made up of three distinct sets of fibers though electromyography suggests that it consists of at least seven groups that can be independently coordinated by the nervous system.[145]Dentistry also known as Dental and Oral Medicine, is a branch of medicine that consists of the study, diagnosis, prevention, and treatment of diseases, disorders, and conditions of the oral cavity, commonly in the dentition but also the oral mucosa, and of adjacent and related structures and tissues, particularly in the maxillofacial (jaw and facial) area.[146]Dermatitis also known as eczema, is a group of diseases that result in inflammation of the skin.[147] These diseases are characterized by itchiness, red skin and a rash.[147] In cases of short duration, there may be small blisters, while in long-term cases the skin may become thickened.[147] The area of skin involved can vary from small to the entire body.[147][148]Diagnosis Medical diagnosis (abbreviated Dx[149] or DS) is the process of determining which disease or condition explains a person's symptoms and signs. It is most often referred to as diagnosis with the medical context being implicit. The information required for diagnosis is typically collected from a history and physical examination of the person seeking medical care. Often, one or more diagnostic procedures, such as medical tests, are also done during the process. Sometimes posthumous diagnosis is considered a kind of medical diagnosis.Diabetes mellitus (DM), commonly known as diabetes, is a group of

metabolic disorders characterized by a high blood sugar level over a prolonged period.[150] Symptoms of high blood sugar include frequent urination, increased thirst, and increased hunger.[151] If left untreated, diabetes can cause many complications.[151] Acute complications can include diabetic ketoacidosis, hyperosmolar hyperglycemic state, or death.[152] Serious long-term complications include cardiovascular disease, stroke, chronic kidney disease, foot ulcers, and damage to the eyes.[151]Dietary reference intake (DRI), is a system of nutrition recommendations from the Institute of Medicine (IOM) of the National Academies (United States).[153]Differential diagnosis is the distinguishing of a particular disease or condition from others that present similar clinical features.[154]Digestive system The human digestive system consists of the gastrointestinal tract plus the accessory organs of digestion (the tongue, salivary glands, pancreas, liver, and gallbladder). Digestion involves the breakdown of food into smaller and smaller components, until they can be absorbed and assimilated into the body.Disease is an abnormal condition in an organism, or part of it, that negatively affects structure or function. Disease can be caused by external factors, or internal dysfunctions, such as abnormal immune responses.DysbarismEar is the organ of hearing and, in mammals, balance. In mammals, the ear is usually described as having three partsthe outer ear, the middle ear and the inner ear. The outer ear consists of the pinna and the ear canal. Since the outer ear is the only visible portion of the ear in most animals, the word "ear" often refers to the external part alone.[155] The middle ear includes the tympanic cavity and the three ossicles. The inner ear sits in the bony labyrinth, and contains structures which are key to several senses: the semicircular canals, which enable balance and eye tracking when moving; the utricle and saccule, which enable balance when stationary; and the cochlea, which enables hearing. The ears of vertebrates are placed somewhat symmetrically on either side of the head, an arrangement that aids sound localisation.Ear infection Otitis is a general term for inflammation or infection of the ear, in both humans and other animals. It is subdivided into the following:Otitis externa, external otitis, or "swimmer's ear", involves the outer ear and ear canal. In external otitis, the ear hurts when touched or pulled.Otitis media, or middle ear infection, involves the middle ear. In otitis media, the ear is infected or clogged with fluid behind the ear drum, in the normally air-filled middle-ear space. This very common childhood infection sometimes requires a surgical procedure called myringotomy and tube insertion.Otitis interna, or labyrinthitis, involves the inner ear. The inner ear includes sensory organs for balance and hearing. When the inner ear is inflamed, vertigo is a common symptom.Elbow is the visible joint between the upper and lower parts of the arm. It includes prominent landmarks such as the olecranon, the elbow pit, the lateral and medial epicondyles, and the elbow joint. The elbow joint[156] is the synovial hinge joint[157] between the humerus in the upper arm and the radius and ulna in the forearm which allows the forearm and hand to be moved towards and away from the body.[158]Embryology is the branch of biology that studies the prenatal development of gametes (sex cells), fertilization, and development of embryos and fetuses. Additionally, embryology encompasses the study of congenital disorders that occur before birth, known as teratology.[159]Emergency medicine also known as accident and emergency medicine, is the medical specialty concerned with the care of illnesses or injuries requiring immediate medical attention. Emergency physicians care for unscheduled and undifferentiated patients of all ages. As first-line providers, their primary responsibility is to initiate resuscitation and stabilization and to start investigations and interventions to diagnose and treat illnesses in the acute phase.Endocrine system is a chemical messenger system comprising feedback loops of hormones released by internal glands of an organism directly into the circulatory system, regulating distant target organs. In humans, the major endocrine glands are the thyroid gland and the adrenal glands. In vertebrates, the hypothalamus is the neural control center for all endocrine systems. The study of the endocrine system and its disorders is known as endocrinology. Endocrinology is a branch of internal medicine.[160]Endocrinology is a branch of biology and medicine dealing with the endocrine system, its diseases, and its specific secretions known as hormones. It is also concerned with the integration of developmental events proliferation, growth, and differentiation, and the psychological or behavioral activities of metabolism, growth and development, tissue function, sleep, digestion, respiration, excretion, mood, stress, lactation, movement, reproduction, and sensory perception caused by hormones. Specializations include behavioral endocrinology[161][162][163] and comparative endocrinology.Epidemiology is the study and analysis of the distribution (who, when, and where), patterns and determinants of health and disease conditions in defined populations. It is a cornerstone of public health, and shapes policy decisions and evidence-based practice by identifying risk factors for disease and targets for preventive healthcare. Epidemiologists help with study design, collection, and statistical analysis of data, amend interpretation and dissemination of results (including peer review and occasional systematic review). Epidemiology has helped develop methodology used in clinical research, public health studies, and, to a lesser extent, basic research in the biological sciences.[164]Epiglottis is a leaf-shaped flap in the throat that prevents food from entering the windpipe and the lungs. It stands open during breathing, allowing air into the larynx. During swallowing, it closes to prevent aspiration of food into the lungs, forcing the swallowed liquids or food to go along the esophagus toward the stomach instead. It is thus the valve that diverts passage to either the trachea or the esophagus.Epilepsy is a group of neurological disorders characterized by recurrent epileptic seizures.[165][166] Epileptic seizures are episodes that can vary from brief and nearly undetectable periods to long periods of vigorous shaking.[167] These episodes can result in physical injuries, including occasionally broken bones.[167] In epilepsy, seizures have a tendency to recur and, as a rule, have no immediate underlying cause.[165] Isolated seizures that are provoked by a specific cause such as poisoning are not deemed to represent epilepsy.[168]Erectile dysfunction (ED), also called impotence, is the type of sexual dysfunction in which the penis fails to become or stay erect during sexual activity. It is the most common sexual problem in men.[169] Through its connection to self-image and to problems in sexual relationships, erectile dysfunction can cause psychological harm.Erector spinae muscles The erector spinae or spinal erectors is a set of muscles that straighten and rotate the back.Esophagus The esophagus, (American English) or oesophagus (British English; see spelling differences) (/sfs/), informally known as the food pipe or gullet, is an organ in vertebrates through which food passes, aided by peristaltic contractions, from the pharynx to the stomach. The esophagus is a fibromuscular tube, about 25cm (10in) long in adults, which travels behind the trachea and heart, passes through the diaphragm and empties into the uppermost region of the stomach. During swallowing, the epiglottis tilts backwards to prevent food from going down the larynx and lungs.Extensor pollicis brevis muscle In human anatomy, the extensor pollicis brevis is a skeletal muscle on the dorsal side of the forearm. It lies on the medial side of, and is closely connected with, the abductor pollicis longus.Extensor pollicis et indicis communis muscle In human anatomy, the extensor pollicis et indicis communis is an aberrant muscle in the posterior compartment of forearm. It was first described in 1863.[170] The muscle has a prevalence from 0.5% to 4%.[171]Extensor pollicis longus muscle In human anatomy, the extensor pollicis longus muscle (EPL) is a skeletal muscle located dorsally on the forearm. It is much larger than the extensor pollicis brevis, the origin of which it partly covers and acts to stretch the thumb together with this muscle.External carotid artery is a major artery of the head and neck. It arises from the common carotid artery when it splits into the external and internal carotid artery. External carotid artery supplies blood to the face and neck.[104]External iliac artery The external iliac arteries are two major arteries which bifurcate off the common iliac arteries anterior to the sacroiliac joint of the pelvis.External iliac vein The external iliac veins are large veins that connect the femoral veins to the common iliac veins. Their origin is at the inferior margin of the inguinal ligaments and they terminate when they join the internal iliac veins (to form the common iliac veins). Both external iliac veins are accompanied along their course by external iliac arteries.External jugular vein receives the greater part of the blood from the exterior of the cranium and the deep parts of the face, being formed by the junction of the posterior division of the retromandibular vein with the posterior auricular vein.Eye The human eye is a sense organ that reacts to light and allows vision. Rod and cone cells in the retina are photoreceptive cells which are able to detect visible light and convey this information to the brain. Eyes signal information which is used by the brain to elicit the perception of color, shape, depth, movement, and other features. The eye is part of the sensory nervous system. Similar to the eyes of other mammals, the human eye's non-image-forming photosensitive ganglion cells in the retina receive light signals which affect adjustment of the size of the pupil, regulation and suppression of the hormone melatonin, and entrainment of the circadian rhythm.[172]Eye surgery Face is the front of an animal's head that features three of the head's sense organs, the eyes, nose, and mouth, and through which animals express many of their emotions.[173][174] The face is crucial for human identity, and damage such as scarring or developmental deformities affects the psyche adversely.[173]Fallopian tube The fallopian tubes, also known as uterine tubes or salpinges (singular salpinx), are tubes that stretch from the uterus to the ovaries, and are part of the female reproductive system. The fertilized egg passes through the fallopian tubes from the ovaries of female mammals to the uterus. The fallopian tube is simple columnar epithelium with hair-like extensions called cilia which carry the fertilized egg. In other animals, the equivalent of a fallopian tube is an oviduct.Fellowship (medicine) is the period of medical training, in the United States and Canada, that a physician, dentist, or veterinarian may undertake after completing a specialty training program (residency). During this time (usually more than one year), the physician is known as a fellow. Fellows are capable of acting as an attending physician or a consultant physician in the specialist field in which they were trained, such as Internal Medicine or Pediatrics. After completing a fellowship in the relevant sub-specialty, the physician is permitted to practice without direct supervision by other physicians in that sub-specialty, such as Cardiology or Oncology.Female reproductive system is made up of the internal and external sex organs that function in reproduction of new offspring. In humans, the female reproductive system is immature at birth and develops to maturity at puberty to be able to produce gametes, and to carry a foetus to full term. The internal sex organs are the uterus, fallopian tubes, and ovaries. The uterus or womb accommodates the embryo which develops into the foetus. The uterus also produces vaginal and uterine secretions which help the transit of sperm to the fallopian tubes. The ovaries produce the ova (egg cells). The external sex organs are also known as the genitals and these are the organs of the vulva including the labia, clitoris, and vaginal opening. The vagina is connected to the uterus at the cervix.[175]Femoral artery is a large artery in the thigh and the main arterial supply to the thigh and leg. It enters the thigh from behind the inguinal ligament as the continuation of the external iliac artery.Femoral nerve is a nerve in the thigh that supplies skin on the upper thigh and inner leg, and the muscles that extend the knee.Femoral vein In the human body, the femoral vein is a blood vessel that accompanies the femoral artery in the femoral sheath. It begins at the adductor hiatus (an opening in the adductor magnus muscle) and is a continuation of the popliteal vein. It ends at the inferior margin of the inguinal ligament, where it becomes the external iliac vein. The femoral vein bears valves which are mostly bicuspid and whose number is variable between individuals and often between left and right leg.[176]Femur The femur, or thigh bone, is the proximal bone of the hindlimb in tetrapod vertebrate, the largest bone of the human body. The head of the femur articulates with the acetabulum in the pelvic bone forming the hip joint, while the distal part of the femur articulates with the tibia and kneecap, forming the knee joint.Fibromyalgia Fibrous joint Fibula Finger First aid Flat bone Foot Forearm Forehead Frontal bone Frontal nerve Is the largest branch of the ophthalmic nerve (V1), itself a branch of the trigeminal nerve (CN V).[177] The frontal nerve branches from the ophthalmic nerve immediately before entering the superior orbital fissure. In then travels superolateral to the annulus of Zinn between the lacrimal nerve and inferior ophthalmic vein. After entering the orbit it travels anteriorly between the roof periosteum and the levator palpebrae superioris. Midway between the apex and base of the orbit it divides into two branches, the supratrochlear nerve and supraorbital nerve. The two branches of the frontal nerve provide sensory innervation to the skin of the forehead, mucosa of the frontal sinus, and the skin of the upper eyelid.Frontalis muscle Gallbladder In vertebrates, the gallbladder is a small hollow organ where bile is stored and concentrated before it is released into the small intestine. In humans, the pear-shaped gallbladder lies beneath the liver, although the structure and position of the gallbladder can vary significantly among animal species. It receives and stores bile, produced by the liver, via the common hepatic duct and releases it via the common bile duct into the duodenum, where the bile helps in the digestion of fats.Gamete is a haploid cell that fuses with another haploid cell during fertilization in organisms that reproduce sexually.[178] Gametes are an organism's reproductive cells, also referred to as sex cells.[179]Ganglion is a group of neuron cell bodies in the peripheral nervous system. In the somatic nervous system this includes dorsal root ganglia and trigeminal ganglia among a few others. In the autonomic nervous system there are both sympathetic and parasympathetic ganglia which contain the cell bodies of postganglionic sympathetic and parasympathetic neurons respectively.Gastrocnemius muscle (plural gastrocnemii) is a superficial two-headed muscle that is in the back part of the lower leg of humans. It runs from its two heads just above the knee to the heel, a three joint muscle (knee, ankle and subtalar joints). The muscle is named via Latin, from Greek (gaster) 'belly' or 'stomach' and (knm) 'leg', meaning 'stomach of leg' (referring to the bulging shape of the calf).Gastroenterology Gastroenterology[180] is the branch of medicine focused on the digestive system and its disorders. Diseases affecting the gastrointestinal tract, which include the organs from mouth into anus, along the alimentary canal, are the focus of this speciality.Gastrointestinal tract The gastrointestinal tract, (GI tract, GIT, digestive tract, digestion tract, alimentary canal) is the tract from the mouth to the anus which includes all the organs of the digestive system in humans and other animals. Food taken in through the mouth is digested to extract nutrients and absorb energy, and the waste expelled as feces. The mouth, esophagus, stomach and intestines are all part of the gastrointestinal tract. Gastrointestinal is an adjective meaning of or pertaining to the stomach and intestines. A tract is a collection of related anatomic structures or a series of connected body organs.Gene therapy (also called human gene transfer) is a medical field which focuses on the utilization of the therapeutic delivery of nucleic acids into a patient's cells as a drug to treat disease.[181][182]General surgery is a surgical specialty that focuses on abdominal contents including esophagus, stomach, small intestine, large intestine, liver, pancreas, gallbladder, appendix and bile ducts, and often the thyroid gland (depending on local referral patterns). They also deal with diseases involving the skin, breast, soft tissue, trauma, Peripheral artery disease and hernias and perform endoscopic procedures such as gastroscopy and colonoscopy.Genetics is a branch of biology concerned with the study of genes, genetic variation, and heredity in organisms.[183][184][185]Genitourinary system The genitourinary system, or urogenital system, are the organs of the reproductive system and the urinary system.[186] These are grouped together because of their proximity to each other, their common embryological origin and the use of common pathways, like the male urethra. Also, because of their proximity, the systems are sometimes imaged together.[187]Geriatrics or geriatric medicine,[188] is a specialty that focuses on health care of elderly people.[189] It aims to promote health by preventing and treating diseases and disabilities in older adults.[190] There is no set age at which patients may be under the care of a geriatrician, or geriatric physician, a physician who specializes in the care of elderly people. Rather, this decision is determined by the individual patient's needs, and the availability of a specialist. It is important to note the difference between geriatrics, the care of aged people, and gerontology, which is the study of the aging process itself. The term geriatrics comes from the Greek geron meaning "old man", and iatros meaning "healer". However, geriatrics is sometimes called medical gerontology.Gonad A gonad, sex gland, or reproductive gland[191] is a mixed gland that produces the gametes (sex cells) and sex hormones of an organism. In the female of the species the reproductive cells are the egg cells, and in the male the reproductive cells are the sperm.[192] The male gonad, the testicle, produces sperm in the form of spermatozoa. The female gonad, the ovary, produces egg cells. Both of these gametes are haploid cells. Some hermaphroditic animals have a type of gonad called an ovotestis.Gout is a form of inflammatory arthritis characterized by recurrent attacks of a red, tender, hot, and swollen joint.[193][194] Pain typically comes on rapidly, reaching maximal intensity in less than 12 hours.[195] The joint at the base of the big toe is affected in about half of cases.[196] It may also result in tophi, kidney stones, or urate nephropathy.[195]Gracilis muscle is the most superficial muscle on the medial side of the thigh. It is thin and flattened, broad above, narrow and tapering below.Great saphenous vein (GSV, alternately "long saphenous vein"; /sfins/) is a large, subcutaneous, superficial vein of the leg. It is the longest vein in the body, running along the length of the lower limb, returning blood from the foot, leg and thigh to the deep femoral vein at the femoral triangle.The guarding reflex in the urinary system is the gradual tightening of the external urethral sphincter, which prevents urine from exiting the bladder as the bladder fills and pressure on the sphincter increases. At low levels of pressure this occurs unconsciously.[197]Gynaecology or gynecology (see spelling differences) is the medical practice dealing with the health of the female reproductive system. Almost all modern gynaecologists are also obstetricians (see obstetrics and gynaecology). In many areas, the specialities of gynaecology and obstetrics overlap. The term means "the science of women".[198] Its counterpart is andrology, which deals with medical issues specific to the male reproductive system.Hand A hand is a prehensile, multi-fingered appendage located at the end of the forearm or forelimb of primates. The human hand normally has five digits: four fingers plus one thumb;[199][200] these are often referred to collectively as five fingers, however, whereby the thumb is included as one of the fingers.[199][201][202] It has 27 bones, not including sesmoid bones, the number of which varies between people,[203] 14 of which are the phalanges (proximal, intermediate and distal) of the fingers and thumb. The metacarpal bones connect the fingers and the carpal bones of the wrist. Each human hand has five metacarpals[204] and eight carpal bones.Hand surgery deals with both surgical and non-surgical treatment of conditions and problems that may take place in the hand or upper extremity (commonly from the tip of the hand to the shoulder)[205] including injury and infection.[206] Hand surgery may be practiced by graduates of general surgery, orthopedic surgery and plastic surgery.[205] Chiroplasty, or cheiroplasty, is plastic surgery of the hands.[207][208]Head In human anatomy, the head is at the top of the human body. It supports the face and is maintained by the skull, which itself encloses the brain. The human head consists of a fleshy outer portion, which surrounds the bony skull. The brain is enclosed within the skull. There are 22 bones in the human head. The head rests on the neck, and the seven cervical vertebrae support it. The human head typically weighs between 2.3 and 5 kilograms (5.1 and 11.0lb) The face is the anterior part of the head, containing the eyes, nose, and mouth. On either side of the mouth, the cheeks provide a fleshy border to the oral cavity. The ears sit to either side of the head.Health as defined by the World Health Organization (WHO), is "a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity."[209][210] This definition has been subject to controversy, as it may have limited value for implementation.[211][212][213] Health may be defined as the ability to adapt and manage physical, mental and social challenges throughout life.[214]Health care Health care, health-care, or healthcare is the maintenance or improvement of health via the prevention, diagnosis, treatment, recovery, or cure of disease, illness, injury, and other physical and mental impairments in people. Health care is delivered by health professionals and allied health fields. Physicians and physician associates are a part of these health professionals. Dentistry, pharmacy, midwifery, nursing, medicine, optometry, audiology, psychology, occupational therapy, physical therapy, athletic training and other health professions are all part of health care. It includes work done in providing primary care, secondary care, and tertiary care, as well as in public health.Hearing Heart Heel Hematemesis-Hematology Hematoma-Hematuria-Hemodialysis-Hemolysis-Hemopathy-Hemoperfusion-Hemophilia-Hemoptysis-Hemorrhoid-Hyperhydrosis-High blood pressure Hyperkalemia-Hip bone Histology Homeostasis Hormone Hospice Hospital Hospital medicine Human back Human body Human brain Human digestive system Human eye Human head Human mouth Human musculoskeletal system Human nose Human reproductive system Human skeleton Humerus Hydrocele Hypersalivation Hypertension Iliac artery, common The common iliac arteries are two large arteries that originate from the aortic bifurcation at the level of the fourth lumbar vertebra. They end in front of the sacroiliac joint, one on either side, and each bifurcates into the external and internal iliac arteries.Iliac artery, external The external iliac arteries are two major arteries which bifurcate off the common iliac arteries anterior to the sacroiliac joint of the pelvis. They proceed anterior and inferior along the medial border of the psoas major muscles. They exit the pelvic girdle posterior and inferior to the inguinal ligament about one third laterally from the insertion point of the inguinal ligament on the pubic tubercle at which point they are referred to as the femoral arteries.[215] The external iliac artery is usually the artery used to attach the renal artery to the recipient of a kidney transplant.Ilium (plural ilia), is the uppermost and largest part of the hip bone, and appears in most vertebrates including mammals and birds, but not bony fish. All reptiles have an ilium except snakes, although some snake species have a tiny bone which is considered to be an ilium.[216] The ilium of the human is divisible into two parts, the body and the wing; the separation is indicated on the top surface by a curved line, the arcuate line, and on the external surface by the margin of the acetabulum.Immune system is a network of biological processes that protects an organism against disease. It detects and responds to a wide variety of pathogens, from viruses to parasitic worms, as well as objects such as wood splinters, distinguishing them from the organism's own healthy tissue. Many species have two major subsystems of the immune system. The innate immune system provides a preconfigured response to broad groups of situations and stimuli. The adaptive immune system provides a tailored response to each stimulus by learning to recognize molecules it has previously encountered. Both use molecules and cells to perform their functions.Immunohistochemistry Immunology is a branch of biology[217] that covers the study of immune systems[218] in all organisms.[219] Immunology charts, measures, and contextualizes the physiological functioning of the immune system in states of both health and diseases; malfunctions of the immune system in immunological disorders (such as autoimmune diseases, hypersensitivities,[220] immune deficiency,[221] and transplant rejection[222]); and the physical, chemical, and physiological characteristics of the components of the immune system in vitro,[223] in situ, and in vivo.[224] Immunology has applications in numerous disciplines of medicine, particularly in the fields of organ transplantation, oncology, rheumatology, virology, bacteriology, parasitology, psychiatry, and dermatology.Iliac vein, common In human anatomy, the common iliac veins are formed by the external iliac veins and internal iliac veins. The left and right common iliac veins come together in the abdomen at the level of the fifth lumbar vertebra,[225] forming the inferior vena cava. They drain blood from the pelvis and lower limbs. Both common iliac veins are accompanied along their course by common iliac arteries.Iliac vein, deep circumflex Iliac vein, external Iliac vein, internal Index finger Infectious diseases (medical specialty) Inferior oblique muscle Inferior thyroid artery Inferior vena cava Influenza Inspection (medicine) Integumentary system Intensive care medicine Internal carotid artery Internal iliac vein Internal jugular vein Internal medicine Internship (medicine) Interventional cardiology Interventional radiology Ischium Jaundice- also known as icterus, is a yellowish or greenish pigmentation of the skin and whites of the eyes due to high bilirubin levels.[226][227] It is commonly associated with itchiness.[228] The feces may be pale and the urine dark.[229] Jaundice in babies occurs in over half in the first week following birth and does not pose a serious threat in most.[226][227] If bilirubin levels in babies are very high for too long, a type of brain damage, known as kernicterus, may occur.[230]Jaw The jaw is any opposable articulated structure at the entrance of the mouth, typically used for grasping and manipulating food. The term jaws is also broadly applied to the whole of the structures constituting the vault of the mouth and serving to open and close it and is part of the body plan of humans and most animals.Jejunum- is the second part of the small intestine in humans and most higher vertebrates, including mammals, reptiles, and birds. Its lining is specialised for the absorption by enterocytes of small nutrient molecules which have been previously digested by enzymes in the duodenum.Joint A joint or articulation (or articular surface) is the connection made between bones in the body which link the skeletal system into a functional whole.[231][232][233] They are constructed to allow for different degrees and types of movement. Some joints, such as the knee, elbow, and shoulder, are self-lubricating, almost frictionless, and are able to withstand compression and maintain heavy loads while still executing smooth and precise movements.[233] Other joints such as sutures between the bones of the skull permit very little movement (only during birth) in order to protect the brain and the sense organs.[233] The connection between a tooth and the jawbone is also called a joint, and is described as a fibrous joint known as a gomphosis. Joints are classified both structurally and functionally.[234]Jugular vein The jugular veins are veins that take deoxygenated blood from the head back to the heart via the superior vena cava.Keratogenesis The production of horny cells in the epidermis.[235]Keratopathy-Kidney The kidneys are two reddish-brown bean-shaped organs found in vertebrates. They are located on the left and right in the retroperitoneal space, and in adult humans are about 12 centimetres (4+12 inches) in length.[236][237] They receive blood from the paired renal arteries; blood exits into the paired renal veins. Each kidney is attached to a ureter, a tube that carries excreted urine to the bladder.Knee In humans and other primates, the knee joins the thigh with the leg and consists of two joints: one between the femur and tibia (tibiofemoral joint), and one between the femur and patella (patellofemoral joint).[238] It is the largest joint in the human body.[239] The knee is a modified hinge joint, which permits flexion and extension as well as slight internal and external rotation. The knee is vulnerable to injury and to the development of osteoarthritis.Korsakoff syndrome- (KS)[240] is an amnestic disorder caused by thiamine (vitamin B1) deficiency typically associated with prolonged use of alcohol.[241] The syndrome and psychosis are named after Sergei Korsakoff, the Russian neuropsychiatrist who discovered it during the late 19th century. This neurological disorder is caused by a lack of thiamine in the brain, and is also exacerbated by the neurotoxic effects of alcohol. When Wernicke encephalopathy accompanies Korsakoff syndrome the combination is called WernickeKorsakoff syndrome; however, a recognized episode of Wernicke encephalopathy is not always obvious.Large intestine The large intestine, also known as the large bowel or colon, is the last part of the gastrointestinal tract and of the digestive system in vertebrates. Water is absorbed here and the remaining waste material is stored as feces before being removed by defecation.[242]Laryngeal prominence The Adam's apple, or laryngeal prominence, colloquially known as the neck triangle, is the lump or protrusion in the human neck formed by the angle of the thyroid cartilage surrounding the larynx seen especially in males.Laryngeal ventricle (also called the ventricle of the larynx, laryngeal sinus, or Morgagni's sinus)[243] is a fusiform fossa, situated between the vestibular and vocal folds on either side, and extending nearly their entire length. There is also a sinus of Morgagni in the pharynx.Laryngospasm Ligament is the fibrous connective tissue that connects bones to other bones.Lips are a visible body part at the mouth of many animals, including humans. Lips are soft, movable, and serve as the opening for food intake and in the articulation of sound and speech. Human lips are a tactile sensory organ, and can be an erogenous zone when used in kissing and other acts of intimacy.Little finger or pinky finger, also known as the fifth digit, or pinkie, is the most ulnar and smallest finger of the human hand, opposite the thumb, and next to the ring finger.Liver is an organ only found in vertebrates which detoxifies various metabolites, synthesizes proteins and produces biochemicals necessary for digestion and growth.[244][245][246] In humans, it is located in the right upper quadrant of the abdomen, below the diaphragm. Its other roles in metabolism include the regulation of glycogen storage, decomposition of red blood cells, and the production of hormones.[246]Long bone Lumbar vertebrae Lung Lung cancer Lupus erythematosus Lymph Lymphatic system Lymphatic vessel Lymph node Lymphocyte Lymphoma - Cancer of the lymphatic system.Major depressive disorder (MDD), also known simply as depression, is a mental disorder characterized by at least two weeks of pervasive low mood. Low self-esteem, loss of interest in normally enjoyable activities, low energy, and pain without a clear cause are common symptoms.[247] Those affected may also occasionally have delusions or hallucinations.[247] Some people have periods of depression separated by years, while others nearly always have symptoms present.[248] Major depression is more severe and lasts longer than sadness, which is a normal part of life.[248]Male reproductive system Mammary gland Mandible The mandible, lower jaw or jawbone is the largest, strongest and lowest bone in the human face.[249] It forms the lower jaw and holds the lower teeth in place. The mandible sits beneath the maxilla. It is the only movable bone of the skull (discounting the ossicles of the middle ear).[250]Masseter muscle In human anatomy, the masseter is one of the muscles of mastication. Found only in mammals, it is particularly powerful in herbivores to facilitate chewing of plant matter.[251] The most obvious muscle of mastication is the masseter muscle, since it is the most superficial and one of the strongest.Maternal-fetal medicine (MFM), also known as perinatology, is a branch of medicine that focuses on managing health concerns of the mother and fetus prior to, during, and shortly after pregnancy.Maxilla in vertebrates, is the upper fixed (not fixed in Neopterygii) bone of the jaw formed from the fusion of two maxillary bones. In humans, the upper jaw includes the hard palate in the front of the mouth.[252][253] The two maxillary bones are fused at the intermaxillary suture, forming the anterior nasal spine. This is similar to the mandible (lower jaw), which is also a fusion of two mandibular bones at the mandibular symphysis. The mandible is the movable part of the jaw.MCAT Medical College Admission Test.Medical biology Medical classification A medical classification is a list of standardized codes used in the process of medical coding and medical billing.Medical coding The practice of assigning statistical codes to medical statements, such as those made during a hospital stay. Closely related to medical billing.Medical College Admission Test (MCAT), is a computer-based standardized examination for prospective medical students in the United States, Australia,[254] Canada, and Caribbean Islands. It is designed to assess problem solving, critical thinking, written analysis and knowledge of scientific concepts and principles.Medical device is any device intended to be used for medical purposes. Medical devices benefit patients by helping health care providers diagnose and treat patients and helping patients overcome sickness or disease, improving their quality of life. Significant potential for hazards are inherent when using a device for medical purposes and thus medical devices must be proved safe and effective with reasonable assurance before regulating governments allow marketing of the device in their country. As a general rule, as the associated risk of the device increases the amount of testing required to establish safety and efficacy also increases. Further, as associated risk increases the potential benefit to the patient must also increase.Medical diagnosis (abbreviated Dx[149] or DS) is the process of determining which disease or condition explains a person's symptoms and signs. It is most often referred to as diagnosis with the medical context being implicit. The information required for diagnosis is typically collected from a history and physical examination of the person seeking medical care. Often, one or more diagnostic procedures, such as medical tests, are also done during the process. Sometimes posthumous diagnosis is considered a kind of medical diagnosis.Medical ethics Medical history Medical imaging Medical laboratory Medical research Medical school Medical sign Medical speciality Medication Medulla oblongata Metacarpal bones Metatarsal bones Microbiology Middle finger Middle temporal artery Molecular biology Mouth Muscle Muscular system Musculoskeletal system Nail A nail is a claw-like keratinous plate at the tip of the fingers and toes in most primates. Nails correspond to claws found in other animals. Fingernails and toenails are made of a tough protective protein called alpha-keratin which is found in the hooves, hair, claws and horns of vertebrates.[255]Nanobiotechnology Nanobiotechnology, bionanotechnology, and nanobiology are terms that refer to the intersection of nanotechnology and biology.[256] Given that the subject is one that has only emerged very recently, bionanotechnology and nanobiotechnology serve as blanket terms for various related technologies.Nasal cavity is a large, air-filled space above and behind the nose in the middle of the face. The nasal septum divides the cavity into two cavities,[177] also known as fossae.[257] Each cavity is the continuation of one of the two nostrils. The nasal cavity is the uppermost part of the respiratory system and provides the nasal passage for inhaled air from the nostrils to the nasopharynx and rest of the respiratory tract. The paranasal sinuses surround and drain into the nasal cavity.Nasopharynx The upper portion of the pharynx, the nasopharynx, extends from the base of the skull to the upper surface of the soft palate.[258] It includes the space between the internal nares and the soft palate and lies above the oral cavity. The adenoids, also known as the pharyngeal tonsils, are lymphoid tissue structures located in the posterior wall of the nasopharynx. Waldeyer's tonsillar ring is an annular arrangement of lymphoid tissue in both the nasopharynx and oropharynx. The nasopharynx is lined by respiratory epithelium that is pseudostratified, columnar, and ciliated.Navel The navel (clinically known as the umbilicus, colloquially known as the belly button) is a protruding, flat, or hollowed area on the abdomen at the attachment site of the umbilical cord.[259] All placental mammals have a navel.Nephrology is a specialty of medicine that concerns with study of the kidneys, specifically normal kidney function and kidney disease, the preservation of kidney health, and the treatment of kidney disease, from diet and medication to renal replacement therapy (dialysis and kidney transplantation).Nerve is an enclosed, cable-like bundle of nerve fibres called axons, in the peripheral nervous system. A nerve transmits electrical impulses and is the basic unit of the peripheral nervous system. A nerve provides a common pathway for the electrochemical nerve impulses called action potentials that are transmitted along each of the axons to peripheral organs or, in the case of sensory nerves, from the periphery back to the central nervous system. Each axon within the nerve is an extension of an individual neuron, along with other supportive cells such as some Schwann cells that coat the axons in myelin.Nervous system is a highly complex part of an animal that coordinates its actions and sensory information by transmitting signals to and from different parts of its body. The nervous system detects environmental changes that impact the body, then works in tandem with the endocrine system to respond to such events.[260]Neurology is a branch of medicine dealing with disorders of the nervous system. Neurology deals with the diagnosis and treatment of all categories of conditions and disease involving the central and peripheral nervous systems (and their subdivisions, the autonomic and somatic nervous systems), including their coverings, blood vessels, and all effector tissue, such as muscle.[261] Neurological practice relies heavily on the field of neuroscience, the scientific study of the nervous system.Neuroscience (or neurobiology), is the scientific study of the nervous system.[262] It is a multidisciplinary science that combines physiology, anatomy, molecular biology, developmental biology, cytology, mathematical modeling, and psychology to understand the fundamental and emergent properties of neurons and neural circuits.[263][264][265][266][267]Neurosurgery or neurological surgery, is the medical specialty concerned with the prevention, diagnosis, surgical treatment, and rehabilitation of disorders which affect any portion of the nervous system including the brain, spinal cord, central and peripheral nervous system, and cerebrovascular system.[268]Nose The human nose is the most protruding part of the face. It bears the nostrils and is the first organ of the respiratory system. It is also the principal organ in the olfactory system. The shape of the nose is determined by the nasal bones and the nasal cartilages, including the nasal septum which separates the nostrils and divides the nasal cavity into two. On average the nose of a male is larger than that of a female.Nuclear medicine is a medical specialty involving the application of radioactive substances in the diagnosis and treatment of disease. Nuclear medicine imaging, in a sense, is "radiology done inside out" or "endoradiology" because it records radiation emitting from within the body rather than radiation that is generated by external sources like X-rays. In addition, nuclear medicine scans differ from radiology, as the emphasis is not on imaging anatomy, but on the function. For such reason, it is called a physiological imaging modality. Single photon emission computed tomography (SPECT) and positron emission tomography (PET) scans are the two most common imaging modalities in nuclear medicine.[269]Nutrition is the science that interprets the nutrients and other substances in food in relation to maintenance, growth, reproduction, health and disease of an organism. It includes ingestion, absorption, assimilation, biosynthesis, catabolism and excretion.[270]Oblique muscle of auricle The oblique muscle of auricle (oblique auricular muscle or Tod muscle[271]) is an intrinsic muscle of the outer ear. The oblique muscle of auricle is placed on the cranial surface of the pinna. It consists of a few fibers extending from the upper and back part of the concha to the convexity immediately above it.[272]Obstetrics is the field of study concentrated on pregnancy, childbirth and the postpartum period. As a medical specialty, obstetrics is combined with gynecology under the discipline known as obstetrics and gynecology (OB/GYN), which is a surgical field.[273]Obstetrics and gynaecology Obstetrics and gynaecology (British English) or obstetrics and gynecology (American English) is the medical specialty that encompasses the two subspecialties of obstetrics (covering pregnancy, childbirth, and the postpartum period) and gynecology (covering the health of the female reproductive system vagina, uterus, ovaries, and breasts). It is commonly abbreviated as OB-GYN or OB/GYN in US English, and as obs and gynae or O&G in British English.Occipital bone is a cranial dermal bone and the main bone of the occiput (back and lower part of the skull). It is trapezoidal in shape and curved on itself like a shallow dish. The occipital bone overlies the occipital lobes of the cerebrum. At the base of skull in the occipital bone, there is a large oval opening called the foramen magnum, which allows the passage of the spinal cord.Ocular surgery Olfaction or the sense of smell,[274] is the process of creating the perception of smell.[275] It occurs when an odor binds to a receptor within the nose, transmitting a signal through the olfactory system. Olfaction has many purposes, including detecting hazards, pheromones, and plays a role in taste.Oncology is a branch of medicine that deals with the prevention, diagnosis, and treatment of cancer. A medical professional who practices oncology is an oncologist.[276]Ophthalmology is a branch of medicine and surgery which deals with the diagnosis and treatment of eye disorders.[277] An ophthalmologist is a specialist in ophthalmology.[278] The credentials include a degree in medicine, followed by additional four to five years of ophthalmology residency training. Ophthalmology residency training programs may require a one-year pre-residency training in internal medicine, pediatrics, or general surgery. Additional specialty training (or fellowship) may be sought in a particular aspect of eye pathology.[279] Ophthalmologists are allowed to use medications to treat eye diseases, implement laser therapy, and perform surgery when needed.[280] Ophthalmologists may participate in academic research on the diagnosis and treatment for eye disorders.[281]Optometry is a health care profession that involves examining the eyes and applicable visual systems for defects or abnormalities as well as prescribing the correction of refractive error with glasses or contact lenses and the treatment of eye diseases.Organ is a group of tissues with similar functions. Plant life and animal life rely on many organs that co-exist in organ systems.[282]Oral and maxillofacial surgery is a surgical specialty focusing on reconstructive surgery of the face, facial trauma surgery, the oral cavity, head and neck, mouth, and jaws, as well as facial cosmetic surgery.Orbicularis oculi muscle Orbicularis oris muscle Orthopedic surgery Ossicles Otitis Otorhinolaryngology Ovary Palate is the roof of the mouth in humans and other mammals. It separates the oral cavity from the nasal cavity.[283] A similar structure is found in crocodilians, but in most other tetrapods, the oral and nasal cavities are not truly separated. The palate is divided into two parts, the anterior, bony hard palate and the posterior, fleshy soft palate (or velum).[284][285]Palliative care (derived from the Latin root palliare, or "to cloak") is an interdisciplinary medical caregiving approach aimed at optimizing quality of life and mitigating suffering among people with serious, complex illness.[286] Within the published literature, many definitions of palliative care exist; most notably, the World Health Organization describes palliative care as "an approach that improves the quality of life of patients and their families facing the problems associated with life-threatening illness, through the prevention and relief of suffering by means of early identification and impeccable assessment and treatment of pain and other problems, physical, psychosocial, and spiritual."[287] In the past, palliative care was a disease specific approach, but today the World Health Organization takes a more broad approach, that the principles of palliative care should be applied as early as possible to any chronic and ultimately fatal illness.[288]Palpation is the process of using one's hands to check the body, especially while perceiving/diagnosing a disease or illness.[289]Pancreas is an organ of the digestive system and endocrine system of vertebrates. In humans, it is located in the abdomen behind the stomach and functions as a gland. The pancreas has both an endocrine and a digestive exocrine function. As an endocrine gland, it functions mostly to regulate blood sugar levels, secreting the hormones insulin, glucagon, somatostatin, and pancreatic polypeptide. As a part of the digestive system, it functions as an exocrine gland secreting pancreatic juice into the duodenum through the pancreatic duct. This juice contains bicarbonate, which neutralizes acid entering the duodenum from the stomach; and digestive enzymes, which break down carbohydrates, proteins, and fats in food entering the duodenum from the stomach.Papillary - In oncology, papillary refers to neoplasms with projections ("papillae", from Latin, 'nipple') that have fibrovascular cores.Parasitology is the study of parasites, their hosts, and the relationship between them. As a biological discipline, the scope of parasitology is not determined by the organism or environment in question but by their way of life. This means it forms a synthesis of other disciplines, and draws on techniques from fields such as cell biology, bioinformatics, biochemistry, molecular biology, immunology, genetics, evolution and ecology.Parathyroid glands are small endocrine glands in the neck of humans and other tetrapods. Humans usually have four parathyroid glands, located on the back of the thyroid gland in variable locations. The parathyroid gland produces and secretes parathyroid hormone in response to a low blood calcium, which plays a key role in regulating the amount of calcium in the blood and within the bones.Parkinson's disease Patella Pathology Pectineus muscle Pectoralis major muscle Pectoralis minor muscle Pediatrics Pelvis Penis Percussion (medicine) Peripheral nervous system Peripheral vision Phalanx bone Pharmacology Pharynx Physician Physical examination Physiology Pineal gland Pituitary gland Placenta Plastic surgery Plexus A branching network of vessels or nerves.Pons Posterior tibial artery Preventive healthcare Prognosis Prostate Psychiatry Pubis Pulmonary artery Pulmonary circulation Pulmonary vein Pulmonology Pulse Quadriplegia Tetraplegia, also known as quadriplegia, is paralysis caused by illness or injury that results in the partial or total loss of use of all four limbs and torso; paraplegia is similar but does not affect the arms. The loss is usually sensory and motor, which means that both sensation and control are lost. The paralysis may be flaccid or spastic.Radial artery In human anatomy, the radial artery is the main artery of the lateral aspect of the forearm.Radial nerve is a nerve in the human body that supplies the posterior portion of the upper limb. It innervates the medial and lateral heads of the triceps brachii muscle of the arm, as well as all 12 muscles in the posterior osteofascial compartment of the forearm and the associated joints and overlying skin. It originates from the brachial plexus, carrying fibers from the ventral roots of spinal nerves C5, C6, C7, C8 & T1.[290]Radiology is the medical discipline that uses medical imaging to diagnose and treat diseases within the body.Radius The radius, or radial bone, is one of the two large bones of the forearm, the other being the ulna. It extends from the lateral side of the elbow to the thumb side of the wrist and runs parallel to the ulna. The ulna is usually slightly longer than the radius, but the radius is thicker. Therefore, the radius is considered to be the larger of the two. It is a long bone, prism-shaped and slightly curved longitudinally.Rectum is the final straight portion of the large intestine in humans and some other mammals, and the gut in others. The adult human rectum is about 12 centimetres (4.7in) long,[291] and begins at the rectosigmoid junction, the end of the sigmoid colon, at the level of the third sacral vertebra or the sacral promontory depending upon what definition is used.[292] Its caliber is similar to that of the sigmoid colon at its commencement, but it is dilated near its termination, forming the rectal ampulla. It terminates at the level of the anorectal ring (the level of the puborectalis sling) or the dentate line, again depending upon which definition is used.[292] In humans, the rectum is followed by the anal canal which is about 4 centimetres (1.6in) long, before the gastrointestinal tract terminates at the anal verge. The word rectum comes from the Latin rectum intestinum, meaning straight intestine.Rectus abdominis muscle also known as the abdominal muscle, is a paired muscle running vertically on each side of the anterior wall of the human abdomen, as well as that of some other mammals. There are two parallel muscles, separated by a midline band of connective tissue called the linea alba. It extends from the pubic symphysis, pubic crest and pubic tubercle inferiorly, to the xiphoid process and costal cartilages of ribs V to VII superiorly.[293] The proximal attachments are the pubic crest and the pubic symphysis. It attaches distally at the costal cartilages of ribs 5-7 and the xiphoid process of the sternum.[294]Rectus femoris muscle is one of the four quadriceps muscles of the human body. The others are the vastus medialis, the vastus intermedius (deep to the rectus femoris), and the vastus lateralis. All four parts of the quadriceps muscle attach to the patella (knee cap) by the quadriceps tendon. The rectus femoris is situated in the middle of the front of the thigh; it is fusiform in shape, and its superficial fibers are arranged in a bipenniform manner, the deep fibers running straight (Latin: rectus) down to the deep aponeurosis. Its functions are to flex the thigh at the hip joint and to extend the leg at the knee joint.[295]Red blood cell The most common type of blood cell and the vertebrate's principal means of delivering oxygen to the body tissues via blood flow through the circulatory system. Red blood cells take up oxygen in the lungs and release it into tissues while squeezing through the body's capillaries.Renal artery Renal vein Reproductive system Residency (medicine) Respiratory system Rheumatology Rib cage Ring finger Sacrum The sacrum (plural: sacra or sacrums[296]), in human anatomy, is a large, triangular bone at the base of the spine that forms by the fusing of sacral vertebrae S1S5 between 18 and 30years of age.[297]Salivary gland The salivary glands in mammals are exocrine glands that produce saliva through a system of ducts. Humans have three paired major salivary glands (parotid, submandibular, and sublingual), a pair of seromucous tubarial glands (discovered in 2020) as well as hundreds of minor salivary glands.[298] Salivary glands can be classified as serous, mucous or seromucous (mixed).Saphenous nerve (long or internal saphenous nerve) is the largest cutaneous branch of the femoral nerve. It is a strictly sensory nerve, and has no motor function.Saphenous vein, great Saphenous vein, small Sartorius muscle Scalp Scapula Sciatic nerve Scrotum Sebaceous gland Seminal vesicle Sensory nervous system Sensory processing Serratus anterior muscle Serratus posterior inferior muscle Serratus posterior superior muscle Skeletal muscle Skin Skull Small intestine Small saphenous vein Smooth muscle tissue Special senses Specialty (medicine) Spinal cord Spinal nerve Sole Soleus muscle Spleen Sports medicine Sternohyoid muscle Sternum Stomach Striated muscle tissue Subclavian artery Subcutaneous tissue Superficial temporal artery Superior oblique muscle Superior thyroid artery Superior vena cava Surgery Sweat gland Symptom Synovial bursa Synovial joint Synovial membrane Systemic lupus erythematosus Systems biology Tarsus In the human body, the tarsus is a cluster of seven articulating bones in each foot situated between the lower end of the tibia and the fibula of the lower leg and the metatarsus. It is made up of the midfoot (cuboid, medial, intermediate, and lateral cuneiform, and navicular) and hindfoot (talus and calcaneus).Taste The gustatory system or sense of taste is the sensory system that is partially responsible for the perception of taste (flavor).[299] Taste is the perception produced or stimulated when a substance in the mouth reacts chemically with taste receptor cells located on taste buds in the oral cavity, mostly on the tongue. Taste, along with smell (olfaction) and trigeminal nerve stimulation (registering texture, pain, and temperature), determines flavors of food and other substances. Humans have taste receptors on taste buds and other areas including the upper surface of the tongue and the epiglottis.[300][301] The gustatory cortex is responsible for the perception of taste.Teeth Temple Temporal arteries, deep Temporal artery, middle Temporal artery, superficial Temporal muscle Tendon Tensor fasciae latae muscle Testicle Thigh Thoracic diaphragm Thorax Throat Thumb Thymus Thyroid Thyroid artery, inferior Thyroid artery, superior Thyroid ima artery Tibia Tibialis anterior muscle Tibialis posterior muscle Tissue Toe Toll-like receptor Tongue Toxicology Trachea Trapezius muscle Triceps brachii muscle Ulna is a long bone found in the forearm that stretches from the elbow to the smallest finger, and when in anatomical position, is found on the medial side of the forearm. It runs parallel to the radius, the other long bone in the forearm. The ulna is usually slightly longer than the radius, but the radius is thicker. Therefore, the radius is considered to be the larger of the two.Ulnar artery is the main blood vessel, with oxygenated blood, of the medial aspects of the forearm. It arises from the brachial artery and terminates in the superficial palmar arch, which joins with the superficial branch of the radial artery. It is palpable on the anterior and medial aspect of the wrist.Ulnar nerve In human anatomy, the ulnar nerve is a nerve that runs near the ulna bone. The ulnar collateral ligament of elbow joint is in relation with the ulnar nerve. The nerve is the largest in the human body unprotected by muscle or bone, so injury is common.[302] This nerve is directly connected to the little finger, and the adjacent half of the ring finger, innervating the palmar aspect of these fingers, including both front and back of the tips, perhaps as far back as the fingernail beds.Ureter The ureters are tubes made of smooth muscle that propel urine from the kidneys to the urinary bladder. In the human adult, the ureters are usually 2030cm (812in) long and around 34mm (0.120.16in) in diameter. The ureter is lined by urothelial cells, a type of transitional epithelium, and has an additional smooth muscle layer in third closest to the bladder that assists with peristalsis.Urethra The urethra is a tube that connects the urinary bladder to the urinary meatus for the removal of urine from the body of both females and males. In human females and other primates, the urethra connects to the urinary meatus above the vagina, whereas in marsupials, the female's urethra empties into the urogenital sinus.[303] Females use their urethra only for urinating, but males use their urethra for both urination and ejaculation.[304] The external urethral sphincter is a striated muscle that allows voluntary control over urination.[305] The internal sphincter, formed by the involuntary smooth muscles lining the bladder neck and urethra, receives its nerve supply by the sympathetic division of the autonomic nervous system.[306] The internal sphincter is present both in males and females.[307][308][309]Urinary bladder The urinary bladder, or simply bladder, is a hollow muscular organ in humans and other vertebrates that stores urine from the kidneys before disposal by urination. In the human the bladder is a hollow muscular, and distensible organ that sits on the pelvic floor. Urine enters the bladder via the ureters and exits via the urethra. The typical human bladder will hold between 300 and 500 ml (10.14 and 16.91 fl oz) before the urge to empty occurs, but can hold considerably more.[310][311]Urinary system The urinary system, also known as the renal system or urinary tract, consists of the kidneys, ureters, bladder, and the urethra. The purpose of the urinary system is to eliminate waste from the body, regulate blood volume and blood pressure, control levels of electrolytes and metabolites, and regulate blood pH. The urinary tract is the body's drainage system for the eventual removal of urine.[312] The kidneys have an extensive blood supply via the renal arteries which leave the kidneys via the renal vein. Each kidney consists of functional units called nephrons. Following filtration of blood and further processing, wastes (in the form of urine) exit the kidney via the ureters, tubes made of smooth muscle fibres that propel urine towards the urinary bladder, where it is stored and subsequently expelled from the body by urination (voiding). The female and male urinary system are very similar, differing only in the length of the urethra.[313]Urology also known as genitourinary surgery, is the branch of medicine that focuses on surgical and medical diseases of the male and female urinary-tract system and the male reproductive organs. Organs under the domain of urology include the kidneys, adrenal glands, ureters, urinary bladder, urethra, and the male reproductive organs (testes, epididymis, vas deferens, seminal vesicles, prostate, and penis).Uterus The uterus or womb is a major female hormone-responsive secondary sex organ of the reproductive system in humans and most other mammals. In the human, the lower end of the uterus, the cervix, opens into the vagina, while the upper end, the fundus, is connected to the fallopian tubes. It is within the uterus that the fetus develops during gestation. In the human embryo, the uterus develops from the paramesonephric ducts which fuse into the single organ known as a simplex uterus. The uterus has different forms in many other animals and in some it exists as two separate uteri known as a duplex uterus.Vaccine is a biological preparation that provides active acquired immunity to a particular disease. A vaccine typically contains an agent that resembles a disease-causing microorganism and is often made from weakened or killed forms of the microbe, its toxins, or one of its surface proteins. The agent stimulates the body's immune system to recognize the agent as a threat, destroy it, and to further recognize and destroy any of the microorganisms associated with that agent that it may encounter in the future. Vaccines can be prophylactic (to prevent or ameliorate the effects of a future infection by a natural or "wild" pathogen), or therapeutic (e.g., vaccines against cancer, which are being investigated).[314][315][316][317]Vagina In mammals, the vagina is the elastic, muscular part of the female genital tract. In humans, it extends from the vulva to the cervix. The outer vaginal opening is normally partly covered by a membrane called the hymen. At the deep end, the cervix (neck of the uterus) bulges into the vagina. The vagina allows for sexual intercourse and birth. It also channels menstrual flow (menses), which occurs in humans and closely related primates as part of the monthly menstrual cycle.Vas deferens also called ductus deferens, is part of the male reproductive system of many vertebrates; these ducts transport sperm from the epididymis to the ejaculatory ducts in anticipation of ejaculation. It is a partially coiled tube which exits the abdominal cavity through the inguinal canal.Vastus intermedius muscle arises from the front and lateral surfaces of the body of the femur in its upper two-thirds, sitting under the rectus femoris muscle and from the lower part of the lateral intermuscular septum. Its fibers end in a superficial aponeurosis, which forms the deep part of the quadriceps femoris tendon.Vastus lateralis muscle Vastus medialis Vein Vena cava, inferior Vena cava, superior Ventricle Ventricle system Venule Vertebral column Virology is the study of viral submicroscopic, parasitic particles of genetic material contained in a protein coat[318][319] and virus-like agents. It focuses on the following aspects of viruses: their structure, classification and evolution, their ways to infect and exploit host cells for reproduction, their interaction with host organism physiology and immunity, the diseases they cause, the techniques to isolate and culture them, and their use in research and therapy. Virology is considered to be a subfield of microbiology or of medicine.Visual acuity (VA), commonly refers to the clarity of vision, but technically rates an examinee's ability to recognize small details with precision. Visual acuity is dependent on optical and neural factors, i.e., (1) the sharpness of the retinal image within the eye, (2) the health and functioning of the retina, and (3) the sensitivity of the interpretative faculty of the brain.[320]Visual cortex The visual cortex of the brain is the area of the cerebral cortex that processes visual information. It is located in the occipital lobe. Sensory input originating from the eyes travels through the lateral geniculate nucleus in the thalamus and then reaches the visual cortex. The area of the visual cortex that receives the sensory input from the lateral geniculate nucleus is the primary visual cortex, also known as visual area 1 (V1), Brodmann area 17, or the striate cortex. The extrastriate areas consist of visual areas 2, 3, 4, and 5 (also known as V2, V3, V4, and V5, or Brodmann area 18 and all Brodmann area 19).[321]Visual field test is an eye examination that can detect dysfunction in central and peripheral vision which may be caused by various medical conditions such as glaucoma, stroke, pituitary disease, brain tumours or other neurological deficits. Visual field testing can be performed clinically by keeping the subject's gaze fixed while presenting objects at various places within their visual field. Simple manual equipment can be used such as in the tangent screen test or the Amsler grid. When dedicated machinery is used it is called a perimeter.Visual perception is the ability to interpret the surrounding environment using light in the visible spectrum reflected by the objects in the environment. This is different from visual acuity, which refers to how clearly a person sees (for example "20/20 vision"). A person can have problems with visual perceptual processing even if they have 20/20 vision.Vital signs (also known as vitals) are a group of the four to six most important medical signs that indicate the status of the body's vital (life-sustaining) functions. These measurements are taken to help assess the general physical health of a person, give clues to possible diseases, and show progress toward recovery.[322][323] The normal ranges for a person's vital signs vary with age, weight, gender, and overall health.[324] There are four primary vital signs: body temperature, blood pressure, pulse (heart rate), and breathing rate (respiratory rate), often notated as BT, BP, HR, and RR. However, depending on the clinical setting, the vital signs may include other measurements called the "fifth vital sign" or "sixth vital sign". Vital signs are recorded using the LOINC internationally accepted standard coding system.[325][326]Vitamin D is a group of fat-soluble secosteroids responsible for increasing intestinal absorption of calcium, magnesium, and phosphate, and many other biological effects.[327][328] In humans, the most important compounds in this group are vitamin D3 (also known as cholecalciferol) and vitamin D2 (ergocalciferol).[327][328][329]Vitrectomy is a surgery to remove some or all of the vitreous humor from the eye. Anterior vitrectomy entails removing small portions of the vitreous humor from the front structures of the eyeoften because these are tangled in an intraocular lens or other structures. Pars plana vitrectomy is a general term for a group of operations accomplished in the deeper part of the eye, all of which involve removing some or all of the vitreous humorthe eye's clear internal jelly.Vitreous body Vulva Waist is the part of the abdomen between the rib cage and hips. On people with slim bodies, the waist is the narrowest part of the torso. The waistline refers to the horizontal line where the waist is narrowest, or to the general appearance of the waist.Wart Warts are typically small, rough, hard growths that are similar in color to the rest of the skin. They typically do not result in other symptoms, except when on the bottom of the feet, where they may be painful. While they usually occur on the hands and feet, they can also affect other locations.[330] One or many warts may appear. They are not cancerous.[331]Weber test is a screening test for hearing performed with a tuning fork.[332][333] It can detect unilateral (one-sided) conductive hearing loss (middle ear hearing loss) and unilateral sensorineural hearing loss (inner ear hearing loss). The test is named after Ernst Heinrich Weber (17951878). Conductive hearing ability is mediated by the middle ear composed of the ossicles: the malleus, the incus, and the stapes. Sensorineural hearing ability is mediated by the inner ear composed of the cochlea with its internal basilar membrane and attached cochlear nerve (cranial nerve VIII). The outer ear consisting of the pinna, ear canal, and ear drum or tympanic membrane transmits sounds to the middle ear but does not contribute to the conduction or sensorineural hearing ability save for hearing transmissions limited by cerumen impaction (wax collection in the ear canal). The Weber test has had its value as a screening test questioned in the literature.[334][335]WernickeKorsakoff syndrome (WKS) is the combined presence of Wernicke encephalopathy (WE) and alcoholic Korsakoff syndrome. Due to the close relationship between these two disorders, people with either are usually diagnosed with WKS as a single syndrome. It mainly causes vision changes, ataxia and impaired memory.[336]Wernicke's area also called Wernicke's speech area, is one of the two parts of the cerebral cortex that are linked to speech, the other being Broca's area. It is involved in the comprehension of written and spoken language, in contrast to Broca's area, which is involved in the production of language. It is traditionally thought to reside in Brodmann area 22, which is located in the superior temporal gyrus in the dominant cerebral hemisphere, which is the left hemisphere in about 95% of right-handed individuals and 60% of left-handed individuals.Whiplash is a non-medical term describing a range of injuries to the neck caused by or related to a sudden distortion of the neck[337] associated with extension,[338] although the exact injury mechanisms remain unknown. The term "whiplash" is a colloquialism. "Cervical accelerationdeceleration" (CAD) describes the mechanism of the injury, while the term "whiplash associated disorders" (WAD) describes the injury sequelae and symptoms.White blood cell White blood cells (WBCs), also called leukocytes or leucocytes, are the cells of the immune system that are involved in protecting the body against both infectious disease and foreign invaders. All white blood cells are produced and derived from multipotent cells in the bone marrow known as hematopoietic stem cells. Leukocytes are found throughout the body, including the blood and lymphatic system.[30]White matter refers to areas of the central nervous system (CNS) that are mainly made up of myelinated axons, also called tracts.[339] Long thought to be passive tissue, white matter affects learning and brain functions, modulating the distribution of action potentials, acting as a relay and coordinating communication between different brain regions.[340]Working memory is a cognitive system with a limited capacity that can hold information temporarily.[341] Working memory is important for reasoning and the guidance of decision-making and behavior.[342][343] Working memory is often used synonymously with short-term memory, but some theorists consider the two forms of memory distinct, assuming that working memory allows for the manipulation of stored information, whereas short-term memory only refers to the short-term storage of information.[342][344] Working memory is a theoretical concept central to cognitive psychology, neuropsychology, and neuroscience.Wrist In human anatomy, the wrist is variously defined as 1) the carpus or carpal bones, the complex of eight bones forming the proximal skeletal segment of the hand;[345][346] (2) the wrist joint or radiocarpal joint, the joint between the radius and the carpus[346] and; (3) the anatomical region surrounding the carpus including the distal parts of the bones of the forearm and the proximal parts of the metacarpus or five metacarpal bones and the series of joints between these bones, thus referred to as wrist joints.[347][348] This region also includes the carpal tunnel, the anatomical snuff box, bracelet lines, the flexor retinaculum, and the extensor retinaculum. As a consequence of these various definitions, fractures to the carpal bones are referred to as carpal fractures, while fractures such as distal radius fracture are often considered fractures to the wrist.Xanthoma A xanthoma (pl. xanthomas or xanthomata) (condition: xanthomatosis), from Greek (xanths)'yellow', is a deposition of yellowish cholesterol-rich material that can appear anywhere in the body in various disease states.[349] They are cutaneous manifestations of lipidosis in which lipids accumulate in large foam cells within the skin.[349] They are associated with hyperlipidemias, both primary and secondary types.Yaws is a tropical infection of the skin, bones and joints caused by the spirochete bacterium Treponema pallidum pertenue.[350][351] The disease begins with a round, hard swelling of the skin, 2 to 5 centimeters in diameter.[350] The center may break open and form an ulcer.[350] This initial skin lesion typically heals after three to six months.[352] After weeks to years, joints and bones may become painful, fatigue may develop, and new skin lesions may appear.[350] The skin of the palms of the hands and the soles of the feet may become thick and break open.[352] The bones (especially those of the nose) may become misshapen.[352] After five years or more large areas of skin may die, leaving a scar.[350]Yellow fever is a viral disease of typically short duration.[353] In most cases, symptoms include fever, chills, loss of appetite, nausea, muscle pains particularly in the back, and

headaches.[353] Symptoms typically improve within five days.[353] In about 15% of people, within a day of improving the fever comes back, abdominal pain occurs, and liver damage begins causing yellow skin.[353][354] If this occurs, the risk of bleeding and kidney problems is increased.[353]Zellweger spectrum disorders are a group of rare
disorders that create the same disease process.[355] The subdivisions of this spectrum are hyperpipecolic acidemia, Infantile Refsum disease, neonatal adrenoleukodystrophy (NALD), and Zellweger syndrome. It can also be referred to as Peroxisomal Biogenesis Disorders, Zellweger Syndrome Spectrum, NALD, Cerebrohepatorenal Syndrome, and
ZSS.[356] It can affect many body organs, including the kidneys, eyes, and hearing.[357] It is named after Hans Zellweger.Zika virus (ZIKV) (pronounced /zik/ or /zk/[358][359]) is a member of the virus family Flaviviridae.[360] It is spread by daytime-active Aedes mosquitoes, such as A. aegypti and A. albopictus.[360] Its name comes from the Ziika
Forest of Uganda, where the virus was first isolated in 1947.[361] Zika virus shares a genus with the dengue, yellow fever, Japanese encephalitis, and West Nile viruses.[361] Since the 1950s, it has been known to occur within a narrow equatorial belt from Africa to Asia. From 2007 to 2016[update], the virus spread eastward, across the Pacific Ocean
to the Americas, leading to the 20152016 Zika virus epidemic.[362]Zoonosis A zoonosis (plural zoonoses, or zoonotic diseases) is an infectious disease caused by a pathogen (an infectious agent, such as a bacterium, virus, parasite or prion) that has jumped from a non-human animal (usually a vertebrate) to a human.[363][364][365] Typically, the first
infected human transmits the infectious agent to at least one other human, who, in turn, infects others.Zygomatic bone In the human skull, the zygomatic bone (cheekbone or malar bone) is a paired irregular bone which articulates with the maxilla, the temporal bone, the sphenoid bone and the frontal bone. It is situated at the upper and lateral part
of the face and forms the prominence of the cheek, part of the lateral wall and floor of the orbit, and parts of the temporal fossa and the infratemporal fossa. It presents a malar and a temporal surface; four processes (the frontosphenoidal, orbital, maxillary, and temporal), and four borders.Zonular dialysis Deficient support of the lenticular capsule of
the eye by the Zonules of Zinn.[366]List of medical roots, suffixes and prefixesList of bones of the human skeletonList of nerves of the human bodyList of skeletal muscles of the human bodyAnatomical terms of locationAnatomical terminologyList of diseasesMedical College Admission Test^ "Aarskog-Scott syndrome". Genetics Home Reference.
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long as the number of items is not huge (suprathreshold)] does not need involvement of dorsolateral prefrontal cortex (D'Esposito et al. 1999, Eldreth et al. 2006, Smith & Jonides 1999). Imaging studies show frontal activation only in ventrolateral prefrontal cortex for memory maintenance that is not suprathreshold.WM and short-term memory also
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memory may be impaired in ADHD, the most common childhood psychiatric disorder seen in clinical settings... ADHD can be conceptualized as a disorder of executive function; specifically, ADHD is characterized by reduced ability to exert and maintain cognitive control of behavior. Compared with healthy individuals, those with ADHD have
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original video podcast covers it allnow ondemand.Watch Now Florence Nightingale said, Let us never consider ourselves finished nurses. But beyond mastering bedside skills, Australian nurses must also be legal and ethical compasses, their practice guided by strict regulations and unwavering principles.Down Under, the nursing landscape boasts
over 500,000 professionals caring for diverse populations.Yet, this complex system thrives on a meticulously constructed framework.From national laws like the Health Practitioner Regulation National Law to state-specific nursing acts, nurses operate within a web of legal obligations.Breaches can have dire consequences, from disciplinary action to
civil lawsuits.But law is just one star in this constellation.The Australian Nursing and Midwifery Federation (ANMF) sets the ethical North Star, outlining a Code of Professional Conduct.This code is the nurses moral compass, guiding their interactions with patients, colleagues, and the wider community.It demands respect for autonomy, informed
consent, and cultural sensitivity.So, why are these aspects so crucial? Because Aussie nurses hold immense power.They make life-altering decisions, handle sensitive information, and wield potentially harmful tools.Ensuring they navigate this power ethically and legally safeguards not only patients but also the integrity of the entire nursing
profession.Next, well delve deeper into specific legal and ethical challenges faced by Australian nurses, equipping you with the knowledge to navigate this vital sphere.Stay tuned! Read: Internship Insights: Becoming an Aussie Paramedic In Australia, the legal and ethical aspects of nursing are of utmost importance. Nurses need to understand and
comply with the legal requirements to ensure the delivery of safe and ethical healthcare services.This blog section discusses the legal aspects of Australian nursing, including registration and licensing requirements, the scope of practice, and the legal responsibilities and liabilities of nurses. The National Board of Nursing oversees the registration
process for nurses in Australia. Nurses are required to fulfill Continuing Professional Development (CPD) requirements. The National Board of Nursing is responsible for regulating the nursing profession in Australia.Nurses must go through a registration process overseen by this board in order to practice nursing in the country.This process includes
meeting specific education and training criteria to ensure that nurses possess the necessary knowledge and skills to provide quality care to patients.In addition to initial registration, nurses in Australia are also required to engage in Continuing Professional Development (CPD) activities.These activities aim to enhance nurses knowledge and
competency throughout their careers and ensure that they stay up-to-date with the latest advancements in healthcare. The Nursing and Midwifery Board of Australia (NMBA) sets standards and guidelines for Australian nurses. Nursing policies and procedures play a crucial role in ensuring legal compliance. The Nursing and Midwifery Board of
Australia (NMBA) sets standards and guidelines that define the scope of practice for nurses in the country.These standards and guidelines outline the expectations and requirements for nurses in terms of their professional conduct, ethical responsibilities, and clinical competence.By adhering to these standards, nurses can ensure that they provide
safe and effective care to their patients while maintaining their professional integrity.Nursing policies and procedures also play a crucial role in ensuring legal compliance and defining the scope of practice for nurses.These policies and procedures guide nurses in their day-to-day activities and provide a framework for decision-making, ultimately
aiming to protect the rights and well-being of patients. Australian nurses have a duty of care towards their patients. Documentation and record-keeping are essential requirements for nurses. Nurses must know how to handle medical errors and deal with negligence claims. Australian nurses have legal responsibilities that they must fulfill in their
practice.One of the primary responsibilities is the duty of care towards their patients.This duty requires nurses to provide care that is within their scope of practice, is evidence-based, and meets the standards of care expected in their profession.Documentation and record-keeping are essential requirements for nurses in their legal
responsibilities.Accurate and thorough documentation ensures continuity of care, allows for effective communication among healthcare professionals, and provides legal protection in case of disputes or claims.In the unfortunate event of medical errors or negligence claims, nurses must know how to handle such situations appropriately.It is crucial for
nurses to understand their obligations, seek support from their healthcare team, and follow established protocols to ensure the best possible outcome for patients and themselves.Overall, understanding and adhering to the legal aspects of nursing in Australia is vital for nurses to provide safe and ethical care to patients.By following the registration
and licensing requirements, abiding by the scope of practice, and fulfilling their legal responsibilities, nurses can maintain their professional integrity and contribute to the overall well-being of the healthcare system. Read: Aussie Paramedics: Career Growth Prospects Discover More: Australian Med Techs: Career Growth Paths Code of Ethics for
Nurses in Australia: A set of guidelines that outline the professional standards and conduct expected of nurses in Australia. Ethical principles and values guiding nursing practice: Principles like beneficence, non-maleficence, autonomy, and justice shape nurses ethical decision-making. In Australian nursing, ethics plays a crucial role in guiding
professional conduct and decision-making.The Code of Ethics for Nurses in Australia serves as a primary resource, setting the standards and expectations for nursing practice.It encompasses key principles like beneficence, which refers to promoting the well-being of patients, and non-maleficence, which emphasizes avoiding harm to
patients.Furthermore, ethical dilemmas frequently arise in nursing practice.Nurses often have to make difficult decisions regarding the allocation of limited resources, such as deciding which patients receive certain treatments or interventions.These situations require careful consideration and balancing of various ethical principles. Examples of
common ethical dilemmas faced by Australian nurses: Allocating scarce resources, maintaining patient confidentiality, and balancing patient autonomy with their best interests. Approaches for resolving ethical dilemmas: Nurses can use ethical frameworks, seek support from colleagues, consult with ethics committees, and prioritize patient advocacy.

To navigate such ethical challenges, nurses can employ a range of approaches. Ethical frameworks, such as the four principles approach or the process of ethical reasoning, provide a structured way to analyze dilemmas. Seeking the support and input of colleagues, consulting with ethics committees, and prioritizing patient advocacy are other strategies for resolving ethical dilemmas. Legal and ethical requirements for protecting patient information: Australian nurses must adhere to privacy laws, maintain confidentiality, and only share information on a need-to-know basis. Importance of informed consent and autonomy in nursing care: Nurses must obtain informed consent from patients before providing treatments or procedures, respecting their autonomy and right to make decisions about their healthcare. Maintaining patient confidentiality and privacy is another important ethical aspect in Australian nursing.Nurses must adhere to both legal and ethical requirements to protect patient information.This involves respecting patient privacy, ensuring the security and confidentiality of medical records, and only disclosing information on a need-to-know basis.Additionally, informed consent and patient autonomy play a vital role in nursing care.Nurses must obtain informed consent from patients before providing any form of treatment or procedure.Informed consent involves providing patients with sufficient information about their condition, treatment options, potential risks, and benefits.Respecting patient autonomy means acknowledging their right to make decisions about their healthcare, even if nurses may disagree with their choices.In review, ethical aspects are integral to Australian nursing practice.Nurses must be familiar with the Code of Ethics for Nurses in Australia and abide by its principles.Moreover, they should be prepared to navigate ethical dilemmas using various approaches and prioritize patient confidentiality, privacy, informed consent, and autonomy in their daily practice.By upholding ethical standards, nurses can ensure the provision of high-quality and patient-centered care. Read: Continual Learning for Australian Paramedics Utilitarianism: Making decisions based on the greatest overall happiness and benefits for the majority. Deontology: Focusing on following ethical principles and duties, regardless of the outcomes. Virtue ethics: Emphasizing the development of moral character and acting in line with virtues. Ethical decision-making is a vital aspect of nursing practice in Australia.Nurses often encounter complex situations where they need to navigate the moral terrain and make choices that align with professional standards, legal obligations, and patient welfare.To guide and structure the decision-making process, nurses employ different ethical frameworks.Utilitarianism, one commonly used framework, suggests that decisions should be based on the greatest good for the greatest number of people.This means considering the potential outcomes of each option and selecting the one that maximizes overall happiness and benefits for the majority.In nursing, this can involve weighing the potential benefits and risks of different interventions or treatments to determine what will serve the patients best interests.Deontology, on the other hand, prioritizes adherence to ethical principles and duties.Nurses following this framework make decisions based on the belief that certain actions are inherently right or wrong, regardless of their consequences.For example, respecting a patients autonomy and confidentiality are key ethical duties for nurses that should not be compromised, even if it may lead to challenging outcomes.Virtue ethics focus on the individual nurses moral character and the development of virtues, like honesty, compassion, and integrity.Nurses approaching decision-making from a virtue ethics perspective aim to act in line with these virtues.For instance, a nurse may prioritize empathy and compassion when dealing with a terminally ill patient, striving to provide comfort and support beyond merely medical care. Ethical dilemmas? Aussie nurses have a compass. Its a five-step system, sharp as a scalpel. First, they define the beast the ethical issue at hand. No ambiguity allowed. Unlock your potential with tailored career consulting. Get clear, actionable steps designed for your success. Start now! Get Started Next, information gathering. Legal codes, patient values, even cultural nuances all tossed in the mix. Now, they weigh their options. Benefits, harms, risks each meticulously dissected. Choice made? Time for action. Communication, collaboration, patient advocacy the nurse orchestra in perfect harmony. But its not over. Reflection is key. Did the decision land softly? Lessons learned, character honed. This system, fueled by ethical frameworks, is the nurses secret weapon. Utilitarianism, deontology, virtue ethics all dance to find the most ethical waltz. From identifying the foe to reflecting on the aftermath, this five-step process ensures Aussie nurses navigate ethical minefields with grace and skill. Their patients, their profession, everyone benefits. So, the next time you see a nurse gliding through the hospital halls, remember theyre not just healers. Theyre ethical ninjas, wielding a well-honed compass, ensuring the best care for all. Read: Paramedics and Public Health in Australia Recap of the importance of legal and ethical aspects in Australian nursing. Call to action for nurses to stay updated on regulations and ethical practices. Final thoughts on the impact of legal and ethical considerations on patient care and professional growth. In closing, understanding the legal and ethical aspects of nursing is crucial in Australian healthcare. These aspects safeguard patients rights, promote professional accountability, and ensure the delivery of high-quality care. Nurses must actively stay updated on the ever-changing regulations and ethical practices to ensure compliance and provide optimal care to their patients. By continuously learning and adapting, nurses can navigate complex legal and ethical dilemmas confidently. The impact of legal and ethical considerations on patient care and professional growth cannot be underestimated. Adhering to legal frameworks and ethical guidelines not only protects patients but also fosters professional development and enhances the nursing professions reputation. Ultimately, nurses play a vital role in maintaining ethical standards and upholding the law in healthcare settings. As frontline caregivers, they must advocate for both the rights of their patients and the integrity of the profession. Your career is worth more than a generic template. Let us craft a resume and cover letter that showcase your unique strengths and help you secure that dream job. Get Hired Nurses prioritize legal and ethical aspects in daily practice, ensuring safe, compassionate, patient-centered care.This commitment leads to improved patient outcomes and promotes a culture of excellence in the nursing profession. Introduction The landscape of Australian healthcare is vast and intricate, encompassing various facets that contribute to the overall Introduction Cultural competence in nursing refers to the ability to provide care that is sensitive and appropriate to Introduction Divergence defines rural and urban nursing, each setting posing distinct challenges and opportunities for healthcare practitioners. In Introduction Mental health nursing plays a crucial role in providing quality care to individuals in Australia. It addresses Hannah Dunn , Lecturer and advanced nurse practitioner, Buckinghamshire New University, High Wycombe, England Why you should read this article: To refresh your understanding of the four principles of biomedical ethics To understand how these principles are linked to the standards in the Nursing and Midwifery Council Code To enhance your knowledge of the use of ethics in decision-making in nursing Nurses are regularly confronted with moral questions and ethical dilemmas in their practice, for example where a patients decisions about their treatment conflict with the nurses own views. While the standards contained in the Nursing and Midwifery Council The Code: Professional Standards of Practice and Behaviour for Nurses, Midwives and Nursing Associates provide nurses with an overarching framework to guide practice, it is important that nurses understand the four main principles that underpin ethical care autonomy, beneficence, non-maleficence and justice. This article examines these four principles and how they relate to nurses ethical decision-making. The author also explores how nurses ethics were tested by the coronavirus disease 2019 (COVID-19) pandemic. Having an awareness of ethical decision-making can enhance nurses practice by providing them with a theoretical framework for treating patients with dignity and respect. Nursing Standard. doi: 10.7748/ns.2024.e12346 Correspondence hannah.dunn2@bnu.ac.uk Conflict of interest None declared Dunn H (2024) Ethical decision-making: exploring the four main principles in nursing. Nursing Standard. doi: 10.7748/ns.2024.e12346Peer reviewThis article has been subject to external double-blind peer review and checked for plagiarism using automated software Published online: 22 July 2024 Want to read more? As a library, NLM provides access to scientific literature. Inclusion in an NLM database does not imply endorsement of, or agreement with, the contents by NLM or the National Institutes of Health. Learn more: PMC Disclaimer | PMC Copyright Notice . 2020 Jun 4;30(1):1728. doi: 10.1159/000509119An overview of ethics and clinical ethics is presented in this review. The 4 main ethical principles, that is beneficence, nonmaleficence, autonomy, and justice, are defined and explained. Informed consent, truth-telling, and confidentiality spring from the principle of autonomy, and each of them is discussed. In patient care situations, not infrequently, there are conflicts between ethical principles (especially between beneficence and autonomy). A four-pronged systematic approach to ethical problem-solving and several illustrative cases of conflicts are presented. Comments following the cases highlight the ethical principles involved and clarify the resolution of these conflicts. A model for patient care, with caring as its central element, that integrates ethical aspects (intertwined with professionalism) with clinical and technical expertise desired of a physician is illustrated.Keywords: Ethics, Confidentiality, Autonomy, Informed consent, Professionalism, Integrated patient care modelMain principles of ethics, that is beneficence, nonmaleficence, autonomy, and justice, are discussed.Autonomy is the basis for informed consent, truth-telling, and confidentiality.A model to resolve conflicts when ethical principles collide is presented.Cases that highlight ethical issues and their resolution are presented.A patient care model that integrates ethics, professionalism, and cognitive and technical expertise is shown.A defining responsibility of a practicing physician is to make decisions on patient care in different settings. These decisions involve more than selecting the appropriate treatment or intervention.Ethics is an inherent and inseparable part of clinical medicine [1] as the physician has an ethical obligation (i) to benefit the patient, (ii) to avoid or minimize harm, and to (iii) respect the values and preferences of the patient. Are physicians equipped to fulfill this ethical obligation and can their ethical skills be improved? A goal-oriented educational program [2] (Table 1) has been shown to improve learner awareness, attitudes, knowledge, moral reasoning, and confidence [3, 4].Goals of ethics education To appreciate the ethical dimensions of patient care To understand ethical principles of medical profession To have competence in core ethical behavioral skills (Obtaining informed consent, assessing decision-making capacity, discussing resuscitation status and use of life-sustaining treatments, advanced care planning, breaking bad news and effective communication) To know the commonly encountered ethical issues in general and in one's specialty To have competence in analyzing and resolving ethical problems To appreciate cultural diversity and its impact on ethicsEthics is a broad term that covers the study of the nature of morals and the specific moral choices to be made. Normative ethics attempts to answer the question, Which general moral norms for the guidance and evaluation of conduct should we accept, and why? [5]. Some moral norms for right conduct are common to human kind as they transcend cultures, regions, religions, and other group identities and constitute common morality (e.g., not to kill, or harm, or cause suffering to others, not to steal, not to punish the innocent, to be truthful, to obey the law, to nurture the young and dependent, to help the suffering, and rescue those in danger). Particular morality refers to norms that bind groups because of their culture, religion, profession and include responsibilities, ideals, professional standards, and so on. A pertinent example of particular morality is the physician's accepted role to provide competent and trustworthy service to their patients. To reduce the vagueness of accepted role, physician organizations (local, state, and national) have codified their standards. However, complying with these standards, it should be understood, may not always fulfill the moral norms as the codes have often appeared to protect the profession's interests more than to offer a broad and impartial moral viewpoint or to address issues of importance to patients and society [6].A number of deplorable abuses of human subjects in research, medical interventions without informed consent, experimentation in concentration camps in World War II, along with salutary advances in medicine and medical technology and societal changes, led to the rapid evolution of bioethics from one concerned about professional conduct and codes to its present status with an extensive scope that includes research ethics, public health ethics, organizational ethics, and clinical ethics.Hereafter, the abbreviated term, ethics, will be used as I discuss the principles of clinical ethics and their application to clinical practice.Beneficence, nonmaleficence, autonomy, and justice constitute the 4 principles of ethics. The first 2 can be traced back to the time of Hippocrates to help and do no harm, while the latter 2 evolved later. Thus, in Percival's book on ethics in early 1800s, the importance of keeping the patient's best interest as a goal is stressed, while autonomy and justice were not discussed. However, with the passage of time, both autonomy and justice gained acceptance as important principles of ethics. In modern times, Beauchamp and Childress' book on Principles of Biomedical Ethics is a classic for its exposition of these 4 principles [5] and their application, while also discussing alternative approaches.The principle of beneficence is the obligation of physician to act for the benefit of the patient and supports a number of moral rules to protect and defend the right of others, prevent harm, remove conditions that will cause harm, help persons with disabilities, and rescue persons in danger. It is worth emphasizing that, in distinction to nonmaleficence, the language here is one of positive requirements. The principle calls for not just avoiding harm, but also to benefit patients and to promote their welfare. While physicians' beneficence conforms to moral rules, and is altruistic, it is also true that in many instances it can be considered a payback for the debt to society for education (often subsidized by governments), ranks and privileges, and to the patients themselves (learning and research).Nonmaleficence is the obligation of a physician not to harm the patient. This simply stated principle supports several moral rules do not kill, do not cause pain or suffering, do not incapacitate, do not cause offense, and do not deprive others of the goods of life. The practical application of nonmaleficence is for the physician to weigh the benefits against burdens of all interventions and treatments, to eschew those that are inappropriately burdensome, and to choose the best course of action for the patient. This is particularly important and pertinent in difficult end-of-life care decisions on withholding and withdrawing life-sustaining treatment, medically administered nutrition and hydration, and in pain and other symptom control. A physician's obligation and intention to relieve the suffering (e.g., refractory pain or dyspnea) of a patient by the use of appropriate drugs including opioids override the foreseen but unintended harmful effects or outcome (doctrine of double effect) [7, 8].The philosophical underpinning for autonomy, as interpreted by philosophers Immanuel Kant (17241804) and John Stuart Mill (18061873), and accepted as an ethical principle, is that all persons have intrinsic and unconditional worth, and therefore, should have the power to make rational decisions and moral choices, and each should be allowed to exercise his or her capacity for self-determination [9]. This ethical principle was affirmed in a court decision by Justice Cardozo in 1914 with the epigrammatic dictum, Every human being of adult years and sound mind has a right to determine what shall be done with his own body [10].Autonomy, as is true for all 4 principles, needs to be weighed against competing moral principles, and in some instances may be overridden; an obvious example would be if the autonomous action of a patient causes harm to another person(s). The principle of autonomy does not extend to persons who lack the capacity (competence) to act autonomously; examples include infants and children and incompetence due to developmental, mental or physical disorder. Health-care institutions and state governments in the US have policies and procedures to assess incompetence. However, a rigid distinction between incapacity to make health-care decisions (assessed by health professionals) and incompetence (determined by court of law) is not of practical use, as a clinician's determination of a patient's lack of decision-making capacity based on physical or mental disorder has the same practical consequences as a legal determination of incompetence [11].Detractors of the principle of autonomy question the focus on the individual and propose a broader concept of relational autonomy (shaped by social relationships and complex determinants such as gender, ethnicity and culture) [12]. Even in an advanced western country such as United States, the culture being inhomogeneous, some minority populations hold views different from that of the majority white population in need for full disclosure, and in decisions about life support (preferring a family-centered approach) [13].Resistance to the principle of patient autonomy and its derivatives (informed consent, truth-telling) in non-western cultures is not unexpected. In countries with ancient civilizations, rooted beliefs and traditions, the practice of paternalism (this term will be used in this article, as it is well-entrenched in ethics literature, although parentalism is the proper term) by physicians emanates mostly from beneficence. However, culture (a composite of the customary beliefs, social forms, and material traits of a racial, religious or social group) is not static and autonomous, and changes with other trends over passing years. It is presumptuous to assume that the patterns and roles in physician-patient relationships that have been in place for a half a century and more still hold true. Therefore, a critical examination of paternalistic medical practice is needed for reasons that include technological and economic progress, improved educational and socioeconomic status of the populace, globalization, and societal movement towards emphasis on the patient as an individual, than as a member of a group. This needed examination can be accomplished by research that includes well-structured surveys on demographics, patient preferences on informed consent, truth-telling, and role in decision-making.Respecting the principle of autonomy obliges the physician to disclose medical information and treatment options that are necessary for the patient to exercise self-determination and supports informed consent, truth-telling, and confidentiality.The requirements of an informed consent for a medical or surgical procedure, or for research, are that the patient or subject (i) must be competent to understand and decide, (ii) receives a full disclosure, (iii) comprehends the disclosure, (iv) acts voluntarily, and (v) consents to the proposed action.The universal applicability of these requirements, rooted and developed in western culture, has met with some resistance and a suggestion to craft a set of requirements that accommodate the cultural mores of other countries [14]. In response and in vigorous defense of the 5 requirements of informed consent, Angell wrote, There must be a core of human rights that we would wish to see honored universally, despite variations in their superficial aspects The forces of local custom or local law cannot justify abuses of certain fundamental rights, and the right of self-determination on which the doctrine of informed consent is based, is one of them [15].As competence is the first of the requirements for informed consent, one should know how to detect incompetence. Standards (used singly or in combination) that are generally accepted for determining incompetence are based on the patient's inability to state a preference or choice, inability to understand one's situation and its consequences, and inability to reason through a consequential life decision [16].In a previously autonomous, but presently incompetent patient, his/her previously expressed preferences (i.e., prior autonomous judgments) are to be respected [17]. Incompetent (non-autonomous) patients and previously competent (autonomous), but presently incompetent patients would need a surrogate decision-maker. In a non-autonomous patient, the surrogate can use either a substituted judgment standard (i.e., what the patient would wish in this circumstance and not what the surrogate would wish), or a best interests standard (i.e., what would bring the highest net benefit to the patient by weighing risks and benefits). Snyder and Sulmasy [18], in their thoughtful article, provide a practical and useful option when the surrogate is uncertain of the patient's preference(s), or when patient's preferences have not kept abreast of scientific advances. They suggest the surrogate use substituted interests, that is, the patient's authentic values and interests, to base the decision.Truth-telling is a vital component in a physician-patient relationship; without this component, the physician loses the trust of the patient. An autonomous patient has not only the right to know (disclosure) of his/her diagnosis and prognosis, but also has the option to forgo this disclosure. However, the physician must know which of these 2 options the patient prefers.In the United States, full disclosure to the patient, however grave the disease is, is the norm now, but was not so in the past. Significant resistance to full disclosure was highly prevalent in the US, but a marked shift has occurred in physicians' attitudes on this. In 1961, 88% of physicians surveyed indicated their preference to avoid disclosing a diagnosis [19]; in 1979, however, 98% of surveyed physicians favored it [20]. This marked shift is attributable to many factors that include with no order of importance implied educational and socioeconomic progress, increased accountability to society, and awareness of previous clinical and research transgressions by the profession.Importantly, surveys in the US show that patients with cancer and other diseases wish to have been fully informed of their diagnoses and prognoses. Providing full information, with tact and sensitivity, to patients who want to know should be the standard. The sad consequences of not telling the truth regarding a cancer include depriving the patient of an opportunity for completion of important life-tasks: giving advice to, and taking leave of loved ones, putting financial affairs in order, including division of assets, reconciling with estranged family members and friends, attaining spiritual order by reflection, prayer, rituals, and religious sacraments [21, 22].In contrast to the US, full disclosure to the patient is highly variable in other countries [23]. A continuing pattern in non-western societies is for the physician to disclose the information to the family and not to the patient. The likely reasons for resistance of physicians to convey bad news are concern that it may cause anxiety and loss of hope, some uncertainty on the outcome, or belief that the patient would not be able to understand the information or may not want to know. However, this does not have to be a binary choice, as careful understanding of the principle of autonomy reveals that autonomous choice is a right of a patient, and the patient, in exercising this right, may authorize a family member or members to make decisions for him/her.Physicians are obligated not to disclose confidential information given by a patient to another party without the patient's authorization. An obvious exception (with implied patient authorization) is the sharing necessary of medical information for the care of the patient from the primary physician to consultants and other health-care teams. In the present-day modern hospitals with multiple points of tests and consultants, and the use of electronic medical records, there has been an erosion of confidentiality. However, individual physicians must exercise discipline in not discussing patient specifics with their family members or in social gatherings [24] and social media. There are some noteworthy exceptions to patient confidentiality. These include, among others, legally required reporting of gunshot wounds and sexually transmitted diseases and exceptional situations that may cause major harm to another (e.g., epidemics of infectious diseases, partner notification in HIV disease, relative notification of certain genetic risks, etc.).Justice is generally interpreted as fair, equitable, and appropriate treatment of persons. Of the several categories of justice, the one that is most pertinent to clinical ethics is distributive justice. Distributive justice refers to the fair, equitable, and appropriate distribution of health-care resources determined by justified norms that structure the terms of social cooperation [25]. How can this be accomplished? There are different valid principles of distributive justice. These are distribution to each person (i) an equal share, (ii) according to need, (iii) according to effort, (iv) according to contribution, (v) according to merit, and (vi) according to free-market exchanges. Each principle is not exclusive, and can be, and are often combined in application. It is easy to see the difficulty in choosing, balancing, and refining these principles to form a coherent and workable solution to distribute medical resources.Although this weighty health-care policy discussion exceeds the scope of this review, a few examples on issues of distributive justice encountered in hospital and office practice need to be mentioned. These include allotment of scarce resources (equipment, tests, medications, organ transplants), care of uninsured patients, and allotment of time for outpatient visits (equal time for every patient? based on need or complexity? based on social and or economic status?). Difficult as it may be, and despite the many constraining forces, physicians must accept the requirement of fairness contained in this principle [26]. Fairness to the patient assumes a role of primary importance when there are conflicts of interests. A flagrant example of violation of this principle would be when a particular option of treatment is chosen over others, or an expensive drug is chosen over an equally effective but less expensive one because it benefits the physician, financially, or otherwise.Each one of the 4 principles of ethics is to be taken as a prima facie obligation that must be fulfilled, unless it conflicts, in a specific instance, with another principle. When faced with such a conflict, the physician has to determine the actual obligation to the patient by examining the respective weights of the competing prima facie obligations based on both content and context. Consider an example of a conflict that has an easy resolution: a patient in shock treated with urgent fluid-resuscitation and the placement of an indwelling intravenous catheter caused pain and swelling. Here the principle of beneficence overrides that of nonmaleficence. Many of the conflicts that physicians face, however, are much more complex and difficult. Consider a competent patient's refusal of a potentially life-saving intervention (e.g., instituting mechanical ventilation) or request for a potentially life-ending action (e.g., withdrawing mechanical ventilation). Nowhere in the arena of ethical decision-making is conflict as pronounced as when the principles of beneficence and autonomy collide.Beneficence has enjoyed a historical role in the traditional practice of medicine. However, giving it primacy over patient autonomy is paternalism that makes a physician-patient relationship analogous to that of a father/mother to a child. A father/mother may refuse a child's wishes, may influence a child by a variety of ways nondisclosure, manipulation, deception, coercion etc., consistent with his/her thinking of what is best for the child. Paternalism can be further divided into soft and hard.In soft paternalism, the physician acts on grounds of beneficence (and, at times, nonmaleficence) when the patient is nonautonomous or substantially nonautonomous (e.g., cognitive dysfunction due to severe illness, depression, or drug addiction) [27]. Soft paternalism is complicated because of the difficulty in determining whether the patient was nonautonomous at the time of decision-making but is ethically defensible as long as the action is in concordance with what the physician believes to be the patient's values. Hard paternalism is action by a physician, intended to benefit a patient, but contrary to the voluntary decision of an autonomous patient who is fully informed and competent, and is ethically indefensible.On the other end of the scale of hard paternalism is consumerism, a rare and extreme form of patient autonomy, that holds the view that the physician's role is limited to providing all the medical information and the available choices for interventions and treatments while the fully informed patient selects from the available choices. In this model, the physician's role is constrained, and does not permit the full use of his/her knowledge and skills to benefit the patient, and is tantamount to a form of patient abandonment and therefore is ethically indefensible.Faced with the contrasting paradigms of beneficence and respect for autonomy and the need to reconcile these to find a common ground, Pellegrino and Thomasma [28] argue that beneficence can be inclusive of patient autonomy as the best interests of the patients are intimately linked with their preferences from which are derived our primary duties to them.One of the basic and not infrequent reasons for disagreement between physician and patient on treatment issues is their divergent views on goals of treatment. As goals change in the course of disease (e.g., a chronic neurologic condition worsens to the point of needing ventilator support, or a cancer that has become refractory to treatment), it is imperative that the physician communicates with the patient in clear and straightforward language, without the use of medical jargon, and with the aim of defining the goal(s) of treatment under the changed circumstance. In doing so, the physician should be cognizant of patient factors that compromise decisional capacity, such as anxiety, fear, pain, lack of trust, and different beliefs and values that impair effective communication [29].The foregoing theoretical discussion on principles of ethics has practical application in clinical practice in all settings. In the resource book for clinicians, Jonsen et al. [30] have elucidated a logical and well accepted model (Table 2), along the lines of the systematic format that practicing physicians have been taught and have practiced for a long time (Chief Complaint, History of Present Illness, Past History, pertinent Family and Social History, Review of Systems, Physical Examination and Laboratory and Imaging studies). This practical approach to problem-solving in ethics involves:Clinical assessment (identifying medical problems, treatment options, goals of care)Patient (finding and clarifying patient preferences on treatment options and goals of care)Quality of life (QOL) (effects of medical problems, interventions and treatments on patient's QOL with awareness of individual biases on what constitutes an acceptable QOL)Context (many factors that include family, cultural, spiritual, religious, economic and legal).Application of principles of ethics in patient careBeneficence,Clinical assessmentnonmaleficenceNature of illness (acute, chronic, reversible, terminal)? Goals of treatment?Treatment options and probability of success for each option?Adverse effects of treatment and does benefit outweigh harm?Effects of no medical/surgical treatment?If treated, plans for limiting treatment? Stopping treatment?Respect for autonomyPatient rights and preferencesInformation given to patient on benefits and risks of treatment? Patient understood the information and gave consent?Patent mentally competent? If competent, what are his/her preferences?If patient mentally incompetent, are patient's prior preferences known? If preferences unknown, who is the appropriate surrogate?Beneficence,Quality of life (QOL)nonmaleficence,Expected QOL with and without treatment?respect for autonomyDeficits physical, mental, social may have after treatment?Judging QOL of patient who cannot express himself/herself? Who is the judge?Recognition of possible physician bias in judging QOL?Rationale to forgo life-sustaining treatment(s)?Distributive justiceExternal forces and contextConflicts of interests does physician benefit financially, professionally by ordering tests, prescribing medications, seeking consultations?Research or educational considerations that affect clinical decisions, physician orders?Conflicts of interests based on religious beliefs? Legal issues?Conflicts of interests between organizations (clinics, hospitals), 3rd party payers?Public health and safety issues?Problems in allocation of scarce resources?Using this model, the physician can identify the principles that are in conflict, ascertain by weighing and balancing what should prevail, and when in doubt, turn to ethics literature and expert opinion.There is a wide gamut of clinical patient encounters with ethical issues, and some, especially those involving end-of-life care decisions, are complex. A few cases (Case 1 is modified from resource book [30]) are presented below as they highlight the importance of understanding and weighing the ethical principles involved to arrive at an ethically right solution. Case 6 was added during the revision phase of this article as it coincided with the outbreak of Coronavirus Infectious Disease-2019 (COVID-19) that became a pandemic rendering a discussion of its ethical challenges necessary and important.A 20-year old college student living in the college hostel is brought by a friend to the Emergency Department (ED) because of unrelenting headache and fever. He appeared drowsy but was responsive and had fever (40C), and neck rigidity on examination. Lumbar puncture was done, and spinal fluid appeared cloudy and showed increased white cells; Gram stain showed Gram-positive diplococci. Based on the diagnosis of bacterial meningitis, appropriate antibiotics were begun, and hospitalization was instituted. Although initial consent for diagnosis was implicit, and consent for lumbar puncture was explicit, at this point, the patient refuses treatment without giving any reason, and insists to return to his hostel. Even after explanation by the physician as to the seriousness of his diagnosis, and the absolute need for prompt treatment (i.e., danger to life without treatment), the patient is adamant in his refusal.Comment. Because of this refusal, the medical indications and patient preferences (see Table 2) are at odds. Is it ethically right to treat against his will a patient who is making a choice that has dire consequences (disability, death) who gives no reason for this decision, and in whom a clear determination of mental incapacity cannot be made (although altered mental status may be presumed)? Here the principle of beneficence and principle of autonomy are in conflict. The weighing of factors: (1) patient may not be making a reasoned decision in his best interest because of temporary mental incapacity; and (2) the severity of life-threatening illness and the urgency to treat to save his life supports the decision in favor of beneficence (i.e., to treat).A 56-year old male lawyer and current cigarette smoker with a pack-a-day habit for more than 30 years, is found to have a solitary right upper lobe pulmonary mass 5 cm in size on a chest radiograph done as part of an insurance application. The mass has no calcification, and there are no other pulmonary abnormalities. He has no symptoms, and his examination is normal. Tuberculosis skin test is negative, and he has no history of travel to an endemic area of fungal infection. As lung cancer is the most probable and significant diagnosis to consider, and early surgical resection provides the best prospects for cure, the physician, in consultation with the thoracic surgeon, recommends bronchoscopic biopsy and subsequent resection. The patient understands the treatment plan, and the significance of not delaying the treatment. However, he refuses, and states that he does not think he has cancer; and is fearful that the surgery would kill him. Even after further explanations on the low mortality of surgery and the importance of removing the mass before it spreads, he continues to refuse treatment.Comment. Even though the physician's prescribed treatment, that is, removal of the mass that is probably cancer, affords the best chance of cure, and delay in its removal increases its chance of metastases and reaching an incurable stage the choice by this well informed and mentally competent patient should be respected. Here, autonomy prevails over beneficence. The physician, however, may not abandon the patient and is obligated to offer continued outpatient visits with advice against making decision based on fear, examinations, periodic tests, and encouragement to seek a second opinion.A 71-year-old man with very severe chronic obstructive pulmonary disease (COPD) is admitted to the intensive care unit (ICU) with pneumonia, sepsis, and respiratory failure. He is intubated and mechanically ventilated. For the past 2 years, he has been on continuous oxygen treatment and was short of breath on minimal exertion. In the past 1 year, he had 2 admissions to the ICU; on both occasions he required intubation and mechanical ventilation. Presently, even with multiple antibiotics, intravenous fluid hydration, and vasopressors, his systolic blood pressure remains below 60 mm Hg, and with high flow oxygen supplementation, his oxygen saturation stays below 80%; his arterial blood pH is 7.0. His liver enzymes are elevated. He is anuric, and over next 8 h his creatinine has risen to 5 mg/dL and continues to rise. He has drifted into a comatose state. The intensivist suggests discontinuation of vasopressors and mechanical ventilation as their continued use is futile. The patient has no advance care directives or a designated health-care proxy.Comment. The term futility is open to different definitions [31] and is often controversial, and therefore, some experts suggest the alternate term, clinically non-beneficial interventions [32]. However, in this case the term futility is appropriate to indicate that there is evidence of physiological futility (multisystem organ failure in the setting of preexisting end stage COPD, and medical interventions would not reverse the decline). It is appropriate then to discuss the patient's condition with his family with the goal of discontinuing life-sustaining interventions. These discussions should be done with sensitivity, compassion and empathy. Palliative care should be provided to alleviate his symptoms and to support the family until his death and beyond in their bereavement.A 67-year old widow, an immigrant from southern India, is living with her son and his family in Wisconsin, USA. She was experiencing nausea, lack of appetite and weight loss for a few months. During the past week, she also had dark yellow urine, and yellow coloration of her skin. She has basic knowledge of English. She was brought to a multi-specialty teaching hospital by her son, who informed the doctor that his mother has jaundice, and instructed that, if any serious life-threatening disease was found, not to inform her. He asked that all information should come to him, and if there is any cancer not to treat it, since she is older and frail. Investigations in the hospital reveals that she has pancreatic cancer, and chemotherapy, while not likely to cure, would prolong her life.Comment. In some ancient cultures, authority is given to members of the family (especially senior men) to make decisions that involve other members on marriage, job, and health care. The woman in this case is a dependent of her son, and given this cultural perspective, the son can rightfully claim to have the authority to make health-care decisions for her. Thus, the physician is faced with multiple tasks that may not be consonant. To respect cultural values [33], to directly learn the patient's preferences, to comply with the American norm of full disclosure to the patient, and to refuse the son's demands.The principle of autonomy provides the patient the option to delegate decision-making authority to another person. Therefore, the appropriate course would be to take the tactful approach of directly informing the patient (with a translator if needed), that the diagnosed disease would require decisions for appropriate treatment. The physician should ascertain whether she would prefer to make these decisions herself, or whether she would prefer all information to be given to her son, and all decisions to be made by him.A 45-year-old woman had laparotomy and cholecystectomy for abdominal pain and multiple gall stones. Three weeks after discharge from the hospital, she returned with fever, abdominal pain, and tenderness. She was given antibiotics, and as her fever continued, laparotomy and exploration were undertaken; a sponge left behind during the recent cholecystectomy was found. It was removed, the area cleansed, and incision closed. Antibiotics were continued, and she recovered without further incident and was discharged. Should the surgeon inform the patient of his error?Comment. Truth-telling, a part of patient autonomy is very much applicable in this situation and disclosure to patient is required [34, 35, 36]. The mistake caused harm to the patient (morbidity and readmission, and a second surgery and monetary loss). Although the end result remedied the harm, the surgeon is obligated to inform the patient of the error and its consequences and offer an apology. Such errors are always reported to the Operating Room Committees and Surgical Quality Improvement Committees of US Hospitals. Hospital-based risk reduction mechanisms (e.g., Risk Management Department) present in most US hospitals would investigate the incident and come up with specific recommendations to mitigate the error and eliminate them in the future. Many institutions usually make financial settlements to obviate liability litigation (fees and hospital charges waived, and/or monetary compensation made to the patient). Elsewhere, if such mechanisms do not exist, it should be reported to the hospital. Acknowledgment from the hospital, apologies from the institution and compensation for the patient are called for. Whether in US or elsewhere, a malpractice suit is very possible in this situation, but a climate of honesty substantially reduces the threat of legal claims as most patients trust their physicians and are not vindictive.The following scenario is at a city hospital during the peak of the COVID-19 pandemic: A 74-year-old woman, residing in an assisted living facility, is brought to the ED with shortness of breath and malaise. Over the past 4 days she had been experiencing dry cough, lack of appetite, and tiredness; 2 days earlier, she stopped eating and started having a low-grade fever. A test for COVID-19 undertaken by the assisted living facility was returned positive on the morning of the ED visit.She, a retired nurse, is a widow; both of her grown children live out-of-state. She has had hypertension for many years, controlled with daily medications. Following 2 strokes, she was moved to an assisted living facility 3 years ago. She recovered most of her functions after the strokes and required help only for bathing and dressing. She is able to answer questions appropriately but haltingly, because of respiratory distress. She has tachypnea (34/min), tachycardia (120/min), temperature of 101F, BP 100/60 and 90% O2 saturation (on supplemental O2 of 4 L/min). She has dry mouth and tongue and rhonchi on lung auscultation. Her respiratory rate is increasing on observation and she is visibly tiring.Another patient is now brought in by ambulance; this is a 22-year-old man living in an apartment and has had symptoms of flu for a week. Because of the pandemic, he was observing the recommended self-distancing, and had no known exposure to coronavirus. He used saline gargles, acetaminophen, and cough syrup to alleviate his sore throat, cough, and fever. In the past 2 days, his symptoms worsened, and he drove himself to a virus testing station and got tested for COVID-19; he was told that he would be notified of the results. He returned to his apartment and after a sleepless night with fever, sweats, and persistent cough, he woke up and felt drained of all strength. The test result confirmed COVID-19. He then called for an ambulance.He has been previously healthy. He is a non-smoker and uses alcohol rarely. He is a second-year medical student. He is single, and his parents and sibling live hundreds of miles away.On examination, he has marked tachypnea (>40/min), shallow breathing, heart rate of 128/min, temperature of 103F and O2 saturation of 88 on pulse oximetry. He appears drowsy and is slow to respond to questions. He is propped up to a sitting position as it is uncomfortable for him to be supine. Accessory muscles of neck and intercostals are contracting with each breath, and on auscultation, he has basilar crackles and scattered rhonchi. His O2 saturation drops to 85 and he is in respiratory distress despite nebulized bronchodilator treatment.Both of these patients are in respiratory failure, clinically and confirmed by arterial blood gases, and are in urgent need of intubation and mechanical ventilation. However, only one ventilator is available; who gets it?Comment. The decision to allocate a scarce and potentially life-saving equipment (ventilator) is very difficult as it directly addresses the question Who shall live when not everyone can live? [5]. This decision cannot be emotion-driven or arbitrary; nor should it be based on a person's wealth or social standing. Priorities need to be established ethically and must be applied consistently in the same institution and ideally throughout the state and the country. The general social norm to treat all equally or to treat on a first come, first saved basis is not the appropriate choice here. There is a consensus among clinical ethics scholars, that in this situation, maximizing benefits is the dominant value in making a decision [37]. Maximizing benefits can be viewed in 2 different ways; in lives saved or in life-years saved; they differ in that the first is non-utilitarian while the second is utilitarian. A subordinate consideration is giving priority to patients who have a better chance of survival and a reasonable life expectancy. The other 2 considerations are promoting and rewarding instrumental value (benefit to others) and the acuity of illness. Health-care workers (physicians, nurses, therapists etc.) and research participants have instrumental value as their work benefits others; among them those actively contributing are of more value than those who have made their contributions. The need to prioritize the sickest and the youngest is also a recognized value when these are aligned with the dominant value of maximizing benefits. In the context of COVID-19 pandemic, Emanuel et al. [37] weighed and analyzed these values and offered some recommendations. Some ethics scholars opine that in times of a pandemic, the burden of making a decision as to who gets a ventilator and who does not (often a life or death choice) should not be on the front-line physicians, as it may cause a severe and life-long emotional toll on them [35, 36]. The toll can be severe for nurses and other front-line health-care providers as well. As a safeguard, they propose that the decision should rest on a select committee that excludes doctors, nurses and others who are caring for the patient(s) under consideration [38].Both patients described in the case summaries have comparable acuity of illness and both are in need of mechanical ventilator support. However, in the dominant value of maximizing benefits the two patients differ; in terms of life-years saved, the second patient (22-year-old man) is ahead as his life expectancy is longer. Additionally, he is more likely than the older woman, to survive mechanical ventilation, infection, and possible complications. Another supporting factor in favor of the second patient is his potential instrumental value (benefit to others) as a future physician.Unlike the other illustrative cases, the scenario of these 2 cases, does not lend itself to a peaceful and fully satisfactory resolution. The fairness of allocating a scarce and potentially life-saving resource based on maximizing benefits and preference to instrumental value (benefit to others) is open to question. The American College of Physicians has stated that allocation decisions during resource scarcity should be made based on patient need, prognosis (determined by objective scientific measure and informed clinical judgment) and effectiveness (i.e., likelihood that the therapy will help the patient to recover), to maximize the number of patients who will recover [39].This review has covered basics of ethics founded on morality and ethical principles with illustrative examples. In the following segment, professionalism is defined, its alignment with ethics depicted, and virtues desired of a physician (inclusive term for medical doctor regardless of type of practice) are elucidated. It concludes with my vision of an integrated model for patient care.The core of professionalism is a therapeutic relationship built on competent and compassionate care by a physician that meets the expectation and benefits a patient. In this relationship, which is rooted in the ethical principles of beneficence and nonmaleficence, the physician fulfills the elements shown in Table 3. Professionalism demands placing the interest of patients above those of the physician, setting and maintaining standards of competence and integrity, and providing expert advice to society on matters of health [26, 40]. Cure of disease when possible Maintenance or improvement of functional status and quality of life (relief of symptoms and suffering) Promotion of health and prevention of disease Prevention of untimely death Education and counseling of patients (condition and prognosis) Avoidance of harm to the patient in the course of care Providing relief and support near time of death (end-of-life care)Drawing on several decades of experience in teaching and mentoring, I envisage physicians with qualities of both heart and head. Ethical and humanistic values shape the former, while knowledge (e.g., by study, research, practice) and technical skills (e.g., medical and surgical procedures) form the latter. Figure 1 is a representation of this model. Morality that forms the base of the model and ethical principles that rest on it were previously explained. Virtues are linked, some more tightly than others, to the principles of ethics. Compassion, a prelude to caring, presupposes sympathy, is expressed in beneficence. Discernment is especially valuable in decision-making when principles of ethics collide. Trustworthiness leads to trust, and is a needed virtue when patients, at their most vulnerable time, place themselves in the hands of physicians. Integrity involves the coherent integration of emotions, knowledge and aspirations while maintaining moral values. Physicians need both professional integrity and personal integrity, as the former may not cover all scenarios (e.g., prescribing ineffective drugs or expensive drugs when effective inexpensive drugs are available, performing invasive treatments or experimental research modalities without fully informed consent, any situation where personal monetary gain is placed over patient's welfare). Conscientiousness is required to determine what is right by critical reflection on good versus bad, better versus good, logical versus emotional, and right versus wrong. Integrated model of patient care.In my conceptualized model of patient care (Fig. 1), medical knowledge, skills to apply that knowledge, technical skills, practice-based learning, and communication skills are partnered with ethical principles and professional virtues. The virtues of compassion, discernment, trustworthiness, integrity, and conscientiousness are the necessary building blocks for the virtue of caring. Caring is the defining virtue for all health-care professions. In all interactions with patients, besides the technical expertise of a physician, the human element of caring (one human to another) is needed. In different situations, caring can be expressed verbally and non-verbally (e.g., the manner of communication with both physician and patient closely seated, and with unhurried, softly spoken words); a gentle touch especially when conveying bad news; a firmer touch or grip to convey reassurance to a patient facing a difficult treatment choice; to hold the hand of a patient dying alone). Thus, caring is in the center of the depicted integrated model, and as Peabody succinctly expressed it nearly a hundred years ago, The secret of the care of the patient is caring for the patient [41].The author declares that he has no conflicts of interest.

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