Terminology and Symbols: Medical Industry

Unit: Graphic Agility

Problem Area: Industrial Applications—Terminology Symbols

Lesson: Terminology and Symbols: Medical Industry

Student Learning Objectives.

Instruction in this lesson should result in students achieving the following objectives:

1. **Use industry-standard medical terminology.**
2. **Use industry-standard medical industry symbols.**

Resources.

The following resources may be useful in teaching this lesson:

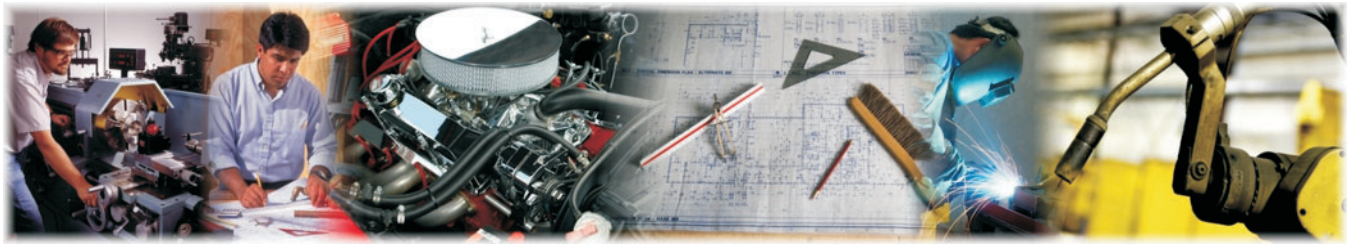
E-unit(s) corresponding to this lesson plan. CAERT, Inc. http://www.mycaert.com.

"About the ABA Standards," *United States Access Board*. Accessed Aug. 4, 2016. https://www.access-board.gov/guidelines-and-standards/buildings-and-sites/about-the-aba-standards.

Bolek, Jim, and Jamie Cowgill. "Developing a Symbol System for the Healthcare Industry," *UX*. Accessed Aug. 4, 2016. http://uxpamagazine.org/developing-a-symbol-system-for-the-healthcare-industry/.

"Building Safe, Effective Health Care Facilities: Codes and Standards," *Consulting-Specifying Engineer*. Accessed Aug. 4, 2016. http://www.csemag.com/single-article/building-safe-effective-health-care-facilities-codes-and-standards/7645355f26d5a28154a161dd3162d564.html.

Carr, Robert F. "Health Care Facilities," *WBDG*. Accessed Aug. 4, 2016. https://www.wbdg.org/design/health_care.php.



"Common Cause," *Health Facilities Management*. Accessed Aug. 4, 2016. http://www.hfmmagazine.com/display/HFM-news-article.dhtml?dcrPath=/templatedata/HF_Common/NewsArticle/data/HFM/Magazine/2014/Feb/0214HFM_FEA_CompOps.

"Glossary of Terms Commonly Used in Health Care," *AcademyHealth*. Accessed Aug. 4, 2016. http://www.academyhealth.org/files/publications/glossary.pdf.

"Universal Symbols for Health Care," *Hablamos Juntos*. Accessed Aug. 4, 2016. http://www.hablamosjuntos.org/signage/default.index.asp.

Equipment, Tools, Supplies, and Facilities

- ✓ Overhead or PowerPoint projector
- ✓ Visual(s) from accompanying master(s)
- ✓ Copies of sample test, lab sheet(s), and/or other items designed for duplication
- ✓ Materials listed on duplicated items
- ✓ Computers with printers and Internet access
- ✓ Classroom resource and reference materials

Key Terms. The following terms are presented in this lesson (shown in bold italics):

- billing department
- cardiology
- emergency room (ER)
- health literacy
- immunization services
- intensive care unit (ICU)
- interpreter services
- medical billing
- medical coding
- medical industry
- medical laboratory
- medical record
- obstetrics and gynecology (OB/GYN)
- outpatient services
- pediatrics
- physical therapy
- process flow diagram (PFD)
- radiology
- registration
- social services
- symbols
- wayfinding

Interest Approach. Use an interest approach that will prepare the students for the lesson. Teachers often develop approaches for their unique class and student situations. A possible approach is included here.

> *Explain how important it is to clearly communicate information in drafting and designing healthcare facilities. Show an example of a medical facility plan, and note the different areas and symbols. Emphasize how important it is to use universal and clearly communicated terms and symbols in medical facilities. Then remind them who will be reading and interpreting their drawings and documents: patients, contractors, and construction engineers.*

CONTENT SUMMARY AND TEACHING STRATEGIES

Objective 1: Use industry-standard medical terminology.

Anticipated Problem: What are industry-standard medical industry terms?

I. Medical industry terminology

A. The ***medical industry*** is a business trade comprised of providers of diagnostic, preventive, remedial, and therapeutic services: laboratories, drug research, health management services, clinics and hospitals, wellness centers, rehabilitation, and physical therapy services, dialysis units, hospices, memory care centers, etc. General design considerations for medical facilities include security and safety, patient privacy, common terminology, and symbols.

1. Security and safety are paramount in medical settings. Design considerations monitored by medical staff and technology professionals include:
   a. Camera monitoring
   b. Phone and intercom options
   c. Access controls (e.g., card key and biometric)
2. Patient privacy is a primary consideration by medical facility designers. For example:
   a. Limiting sightlines during care or medical procedures
   b. Limiting the number of windows between rooms (or curtaining, addition of blinds, etc.)
   c. Health Insurance Portability and Accountability Act (HIPAA) guidelines prohibit the display of full patient names on room doors to protect privacy. Bedside screens and workstations are utilized in a manner to protect privacy as well.

3. Several common and universal terms are used in the drafting and design of medical facilities. The terms are associated with programmed areas or spaces that require design consideration. Aside from patients and healthcare facility personnel (e.g., doctors, nurses, physician assistants, medical assistants, lab technicians, and CNAs), the following entities must understand and use common healthcare terminology:
    a. Hospitals and clinics
    b. Health insurance providers
    c. Pharmaceutical companies
    d. Healthcare management companies
    e. Nursing home and extended care facilities
    f. Orthopedic and other outpatient facilities
    g. Manufacturers of professional and home health products
    h. Public health departments (local, state, national, and international)
    i. Other private, public, and voluntary organizations (e.g., Red Cross)

B. Medical industry terminology [NOTE: This terminology listing is limited to common clinic and hospital terminology.]
    1. A ***medical record*** is a chronological document of a single patient's medical history, physical findings, test results, procedures, and any therapeutic or medical care provided. The record details are across time within one particular healthcare provider's jurisdiction.
    2. A ***medical laboratory*** is a medical facility in which patient tests and research projects are conducted and chemicals and medications are prepared. Labs are often attached to medical institutions and universities. The labs receive samples from medical practitioners, insurance companies, clinical research sites, and other health clinics for analysis. Medical laboratories require access to a shipping and receiving dock and should be near medical personnel.
    3. A ***billing department*** is a division that prepares a medical invoice and manages billing reports and collection activities. It provides clients with copies of reports and collates financial information across other billing departments to document all accounts. The billing department requires space in all medical industries. ***Medical billing*** is the process of submitting and following up on coded health insurance claims. ***Medical coding*** is the process of translating a diagnosis to a universal alphanumeric code shared with healthcare and insurance providers.
    4. ***Registration*** is the location in which patient information is recorded; insurance is verified; admissions are executed; transfers are conducted; and discharges are made. The healthcare designer must provide direct access for reception, admitting, and discharging patients in medical facilities. Registration and reception areas are located in the main lobby near the entrance with ramp and adequate door openings.
    5. ***Interpreter services*** are areas of a healthcare facility that provide medical interpretation and translation, including sign language for deaf and/or hard-of-hearing patients and family and translation services for limited English profi-

cient (LEP) individuals. The department includes staff, interns, agency interpreters, video conference, and telephone interpreters who link health literacy to all those entering the facility.

   a. ***Health literacy*** is the degree to which individuals have the capacity to obtain, process, and understand basic health information and services needed to make appropriate health decisions (U.S. Department of Health and Human Services).
   b. Interpreter services require a communal location and access to the registration area.

6. ***Social services*** are a range of public assistance aids provided by governmental or private organizations to enhance patient wellness. Social workers (of all descriptions) in hospitals and medical centers provide frontline services to patients with conditions spanning the entire healthcare continuum. Hospital social workers help patients and their families understand a particular illness. Social service workers require a convenient location in which to work that must be in proximity to patient rooms.
7. The ***emergency room (ER)*** is a department and medical specialty for treating patients in need of acute (critical) and trauma care. The department's patients arrive without appointment and are often aided by EMS (e.g., paramedics), police, or fire personnel. Because of the immediate nature of emergency treatment services, the ER is located on the ground floor of medical facilities with easy access and ample parking for patients and emergency vehicles. The ER is open 24 hours per day and requires excellent lighting, diagnostic equipment, and transport services (e.g., ambulance and helicopter).
8. ***Radiology*** is a department that includes services for diagnostic radiology (e.g., x-ray), interventional radiology, ultrasound, vascular laboratory, cross-sectional imaging (CT scan), magnetic resonance imaging (MRIs), nuclear medicine, and radiation oncology. All modern medical facilities include a radiology department (imaging) that requires a specific set of design considerations. Aside from a safe, highly secure, and pleasant environment for staff and patients, the department design must accommodate:
   a. Large, heavy, and noisy technical medical equipment
   b. Extensive infrastructure requirements
   c. Extensive shielding requirements
9. ***Pediatrics*** is the branch of medicine dealing with infants, children, and adolescents (birth to age 18) and their associated diseases (e.g., infections, cancers, organ diseases, genetic and congenital conditions) and injuries. ***Obstetrics and gynecology (OB/GYN)*** is a department that provides medical and surgical care to women; these doctors have expertise in pregnancy, childbirth, and disorders of the reproductive system. Pediatrics and OB/GYN require a specified department or location in the medical facility that includes fetal monitoring, ultrasound examination, and routine gynecological care. OB/GYN facilities are located adjacent to or near lactation services, registered dieticians, and genetic counseling and testing. The pediatric department—and some

aspects of OB/GYN departments—require space for women, infants and young patients, and pediatric medicine and care that include:

a. Toned-down lighting (related to eye development) and acoustics (accommodations to subdue noise)
b. Privacy (for parent and family visits)
c. Positive distractions (e.g., artwork, tactile graphics, windows, and play areas)
d. Infection-control design often via maintenance considerations for "touch points" (e.g., doors, switches, bed rails, chair arms, phones, and call buttons)
e. Furnishings (e.g., compactness to maximize use of space, flexible to serve more than one purpose, and adaptable for a variety of patients)
f. Surfaces as seamless as possible (especially in surgical, public areas, and patient rooms)

10. The ***intensive care unit (ICU)*** is an area of a hospital or healthcare facility that cares for seriously ill patients. These seriously ill patients are cared for by specially trained staff—an integrated group of medical professionals. For example, ICU patient rooms typically include additional clear floor area (as compared to a typical hospital patient's room) to allow for special services equipment, imaging, lifting devices, EKG, dialysis, etc. Rule of thumb: Single-patient rooms should have an ideal clearance of no less than 4 feet at the head and foot of the bed and no less than 6 feet on each side of the standard critical care bed. Additional space is required for staff and family functions. The integrative nature of the ICU requires design for four major areas of the department: patient care, clinical support, unit support, and family support.
    a. Patient care (patient rooms and adjacent area have primary role of patient care; single rooms are preferred when judging patient safety and to increase sleep quality.)
    b. Clinical support (direct patient care; inpatient rooms and adjacent areas)
    c. Unit support (administrative, materials management, and staff)
    d. Family support (family and visitor areas)
11. ***Immunization services*** are areas that administer vaccines and provide laboratory testing for a range of infections. These areas are usually remotely located (far away) from common areas and patient care areas. Some immunization centers are walk-in, and some are by appointment only.
12. ***Cardiology*** is the study and treatment of heart disorders, such as heart disease and cardiovascular conditions. Cardiology departments and hospitals focus on patient care and safety and the following design considerations:
    a. Minimization of wait time and transfer
    b. Ease of wayfindings (e.g., outdoor signs, directions, indoor signs, and symbols) and use of work-flow diagrams during design
    c. Private rooms with electronic medical records, with specially-designed beds that accommodate x-ray without patient movement; all rooms within "sight" of nurses and/or support personnel

d. Decentralized nursing and supportive care (e.g., numerous stations within close proximity to patient rooms; supply storage areas adjacent to the stations)
e. Location adjacent to respiratory therapy, pharmacy, and lab
f. Accommodation of high-end digital monitors secured through a privacy network
g. Accommodation of family and visitors
h. Ample and spacious staff lounge areas
i. Education for outpatient services
j. Aesthetics and environmental atmosphere (e.g., artwork and sculptures, high ceilings, and natural light)

13. ***Outpatient services*** are locations where patients receive medical treatment without being admitted to a hospital. Outpatients do not stay overnight, so the facility design does not need to include "hotel functions," and the cost to construct is far less than that for a hospital with overnight patients. For example, fire code design is less stringent. In addition, mechanical and electrical design is simpler in outpatient services areas than in a hospital with "hotel functions." Outpatient services design considerations include the use of modular concepts to reconfigure spaces as needed and include:
    a. Easy to find and visible at or visibly marked from the hospital entrance
    b. Accessibility (e.g., compliant with the Americans with Disabilities Act and meet the General Services Administration Accessibility Standards if built with federal funds)
    c. Therapeutic and aesthetic environmental details (e.g., natural lighting, access to windows, durable and "non-institutional" materials and furnishings, privacy considerations via sound proofing and insulation) [See the Veteran's Affairs Interior Design Manual for New Construction and Renovations of Hospitals and Clinics at https://www.wbdg.org/ccb/browse_doc.php?d=3786.]
    d. Security and safety (e.g., protection of clinic property and assets including drugs, patients, violent or unstable patients, and potential terrorism target)
    e. Sustainability (e.g., energy, water, and waste)
    f. Efficient travel distance to frequently used spaces
    g. Closely located support service spaces (e.g., pharmacy, radiology, and physical therapy)
    h. Use of clean and sanitary building, furnishing, and detailing materials (e.g., durable, antimicrobial finishes for doorframes, and chairs)
14. ***Physical therapy*** is a branch of rehabilitative health that treats injury and surgery after effects, deformity, stroke, sciatica, etc. by methods such as massage, heat treatment, and exercise rather than by drugs or surgery. Design considerations are similar to those for outpatient services.

Teaching Strategy: *Use VM–A to review. Invite a local architectural firm that designs and/or builds for the medical industry to give a presentation about common design*

considerations for medical facilities. Then have a class discussion about how important it is to use medical terms accurately while working with the medical industry. Display a sample hospital and an outpatient clinic blueprint, and point out the location of departments within each facility. Lead a discussion of the logic behind the placement of each medical facility department, program area, or service. For example, the ER is typically located on the ground floor. What would explain this location?

Objective 2: Use industry-standard medical industry symbols.

Anticipated Problem: What are industry-standard medical symbols?

II. Symbols in the medical industries

A. According to the U.S. Department of Health and Human Services, health literacy is the degree to which people have the ability to obtain, process, and understand basic health information and services needed to make appropriate health decisions. Interpreter services require a communal access location.

1. Healthcare facilities must accommodate multiple first languages, limited reading levels, various vision abilities, and numerous mobility challenges and still get people where they want/need to go. Universal healthcare symbols are helpful in this endeavor.
2. ***Wayfinding*** is the method for providing consistent information in overt and obvious ways, to guide people to a destination. Wayfinding includes:
   a. Directional maps and signage that is easily read/interpreted and can be multilingual
   b. Architectural clues: landmarks, artwork, and floor pattern changes
   c. Interior design clues (e.g., color, pattern, and texture for a specific area)
   d. Clearly marked patient rooms (in compliance with HIPAA and security protocols allow)

B. ***Symbols*** are graphic images or letters that represent and communicate details and/or materials for a medical department or service. Symbols and geometries are used to represent devices, medical equipment, and wayfinding and how they are inter-connected in a sequence. These symbols can be abstract graphics or physical simulations of the actual equipment.

1. The Society for Experiential Graphic Design (SEGD) at https://segd.org/sites/default/files/14_segd_healthcare_symbols_art_0.pdf displays the set of 28 universal healthcare symbols recognized across the medical industry. The SEGD universal healthcare symbols were tested for wayfinding in four hospitals with the following result:
   a. More than 75 percent of those tested rated the symbols more effective than text. Specifically, symbols were judged easier to see and understand and were preferred by those who did not read English.
   b. More than 80 percent of hospital staff interviewed indicated that the symbols would make giving directions to patients and visitors easier.

2. A ***process flow diagram (PFD)*** is a simplified sketch that uses symbols to identify instruments and vessels and to describe the primary flow path through a medical or other healthcare-related process.

> **Teaching Strategy:** *Use VM–B and VM–C. Students can view healthcare symbols at https://segd.org/sites/default/files/14_segd_healthcare_symbols_art_0.pdf. Have students visit https://en.wikipedia.org/wiki/Process_flow_diagram and decipher the meaning of each process flow diagram symbol. Some are piping; some are valve; and others are instrumentation symbols. Assign LS–A.*

Review/Summary.

Use the student learning objectives to summarize the lesson. Have students explain the content associated with each objective. Student responses can be used in determining which objectives need to be reviewed or taught from a different angle. Questions at the ends of chapters in the textbook may be used in the Review/Summary.

Application.

Use the included visual master(s) and lab sheet(s) to apply the information presented in the lesson.

Evaluation.

Evaluation should focus on student achievement of the objectives for the lesson. Various techniques can be used, such as student performance on the application activities. A sample written test is provided.

Answers to Sample Test:

Part One: Matching

1. f
2. e
3. b
4. d
5. c
6. a

Part Two: True/False

1. T
2. F
3. T
4. T
5. F
6. F

Part Three: Short Answer

Answers will vary but would include a list of 10 medical industry symbols accompanied by the drawing of a universal symbol (as found at https://segd.org/sites/default/files/14_segd_healthcare_symbols_art_0.pdf) or an original graphic symbol.

Sample Test

Name _____

Terminology and Symbols: Medical Industry

Part One: Matching

Instructions: **Match the term with the correct definition.**

a. intensive care unit (ICU)
b. medical industry
c. pediatrics
d. outpatient services
e. physical therapy
f. registration

_____1. The location where patient information is recorded; insurance is verified; admissions are executed; transfers are conducted; and discharges are made

_____2. A branch of rehabilitative health that treats injury and surgery after effects, deformity, stroke, sciatica, etc. by methods such as massage, heat treatment, and exercise rather than by drugs or surgery

_____3. An area comprised of providers of diagnostic, preventive, remedial, and therapeutic services

_____4. The location where patients receive medical treatment without being admitted to a hospital

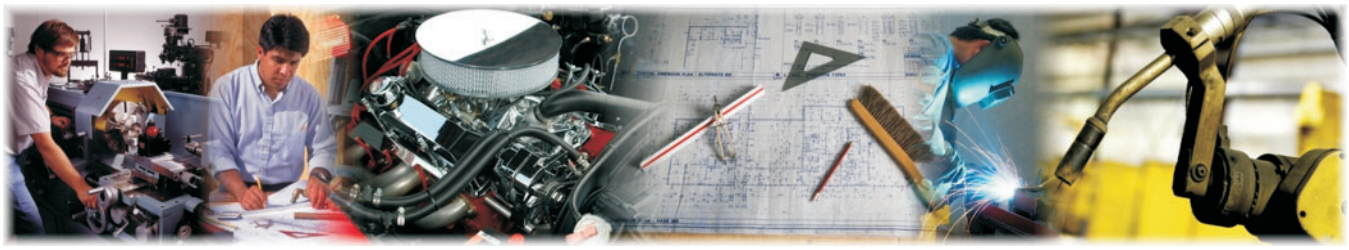
_____5. The branch of medicine dealing with infants, children, and adolescents (birth to age 18) and their associated diseases and injuries

_____6. An area of a hospital or healthcare facility that cares for seriously ill patients

Part Two: True/False

Instructions: **Write *T* for true or *F* for false.**

_____1. Medical laboratories require access to a shipping and receiving dock while being conveniently located to medical personnel.



_____2. The cardiology department is usually located far away from common areas and patient care areas.

_____3. Due to the immediate nature of the treatment services, the ER is located on the ground floor of medical facilities with easy access and wayfinding as well as ample parking for patients and emergency vehicles.

_____4. Fire code design is less stringent. Mechanical and electrical design is simpler in outpatient services areas than in a hospital with "hotel functions."

_____5. The rule of thumb in single-patient immunization rooms should have an ideal clearance of no less than 4 feet at the head and foot of the bed and no less than 6 feet on each side of the standard bed.

_____6. Health literacy is the method for providing consistent information in overt and obvious ways to guide a person to a destination.

Part Three: Short Answer

Instructions: **Answer the following.**

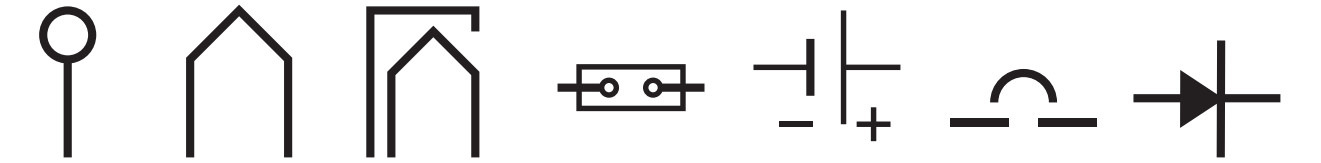
List 10 common medical symbols. Draw the appropriate universal or a representative graphic for each.

MEDICAL INDUSTRY

The medical industry has providers of diagnostic, preventive, remedial, and therapeutic services: laboratories, drug research, health management services, clinics and hospitals, wellness centers, rehabilitation and physical therapy services, dialysis units, hospices, memory care centers, etc.

ELECTRICAL SYMBOLS

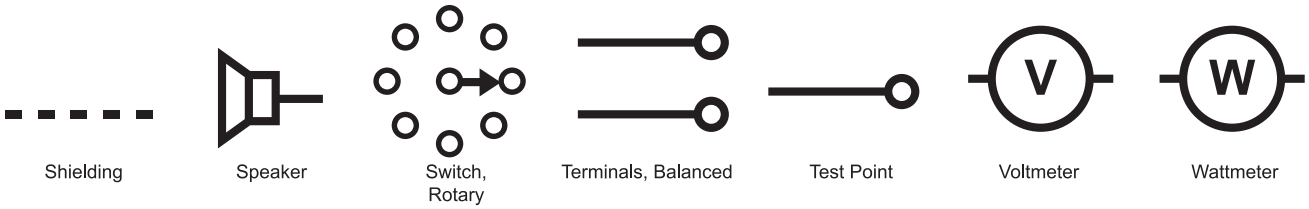
Ammeter | And Gate | Antenna | Attenuator | Attenuator, Variable | Battery | Capacitor, Feedthrough



Cathode, Cold | Cathode, Directly Heated | Cathode, Indirectly Heated | Cavity Resonator | Cell | Circuit Breaker | Diode, General

Diode, Light-Emitting | Diode, Photosensitive | Diode, Pin | Female Contact | Fuse | Galvanometer | Diode, General

Integrated Circuit | Inverter | Lamp, Neon | Male Contact | Microphone | Outlet | Probe, Radio Frequency



Shielding | Speaker | Switch, Rotary | Terminals, Balanced | Test Point | Voltmeter | Wattmeter

LIGHTING RECOMMENDATIONS

Think about the lighting recommendations you would make for different areas of a hospital, a medical facility, a research lab, or a pharmaceutical manufacturing site. What type of lighting and how many foot candles of illumination are required in this surgery suite? How about the registration desk?

LS–A

Name _____

The Design of a Medical Facility

Purpose

The purpose of this activity is to learn about the medical industry and how design and drafting is used in the layout of its program and allocated spaces.

Objectives

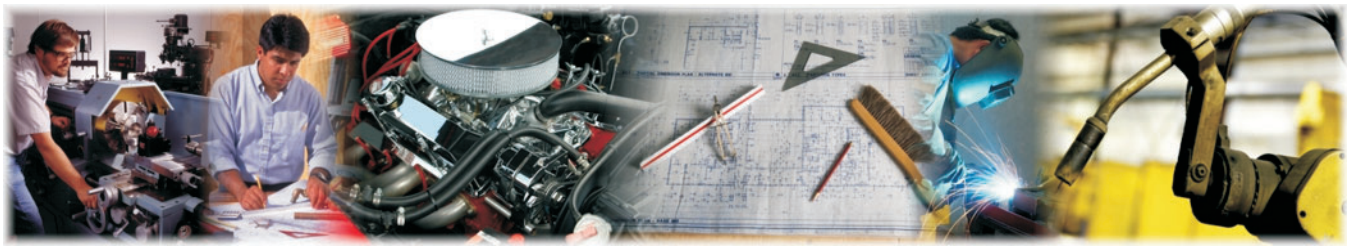
1. Research an existing medical facility.
2. Select symbols to represent program areas and services in the medical facility.
3. Draw a floor plan of one level of a medical facility.
4. Label all the services and programmed spaces with the appropriate symbol.
5. Write a brief one- or two-paragraph description of the design considerations for placement of program areas and services.

Materials

- lab sheet
- paper
- writing utensil
- device with Internet access

Procedure

1. Work in small teams to complete this lab sheet.
2. Research an existing medical facility. To conduct your research, you may:
   a. Plan a trip to a nearby medical center, clinic, or hospital or review the site map and floor plans. While at the site, ask the building manager for permission to sketch the



locations of all services provided in the facility. [NOTE: Focus on one level of the facility, preferably the ground floor.]

b. Review the Sutter Santa Rosa Regional Hospital, Santa Rosa, CA, site map and floor plans at http://www.suttersantarosa.org/newhospital/about/UCU.html.

c. Your instructor may provide you with a basic healthcare facility plan or another website with a site and floor plan.

3. Using the sketch you made at a local healthcare facility, the Sutter Santa Rosa Regional Hospital, or another plan provided by your instructor, create a list of the services and program areas for which you would assign a symbol. Create a list on a separate document.

   a. Adjacent to each service or program area, assign a symbol. You may use the universal symbols shown at https://segd.org/sites/default/files/14_segd_healthcare_symbols_art_0.pdf, or your team may create a symbol to represent each program area or service.

   b. Then draw (hand sketch or CAD document) a plan that locates all the services and programmed spaces with the appropriate symbol your team designated for each. This drawing or sketch does not need to be to scale.

   c. Finally, write a brief one- or two-paragraph description of the design considerations for placement of program areas and services. (For example, you may indicate that, "The registration area of the hospital is near the interpreter services to ensure that insurance forms and patient history is accurate." "The ER is conveniently located with ample parking for emergency vehicles and patient vehicles.") Write your description on your paper.

4. Present your drawing with symbols to the class, and provide a description of the symbols you selected. Then read the description of services and program-area relationships.

5. Turn in your completed lab sheet and drawings to your instructor.

The Design of a Medical Facility

Find an existing medical facility blueprint or floor plan for student use with the lab sheet. For example, you may have a local health facility floor plan available for classroom use. If not, the Colorado State University Health Center floor plans (several floors and elevations) are available at https://www.fm.colostate.edu/sites/default/files/Medical%20Center%20Program%20Plan.pdf.