RESIDENTIAL AND INSTITUTIONAL ENVIRONMENT

Facts

- Every family and individual has a basic right to a decent home and a suitable living environment.

Realization of a decent home in a suitable living environment requires:
- Clean air
- Pure water and food
- Adequate shelter
- Unpolluted land
- Freedom from excessive noise and odors
- Adequate recreational and neighborhood facilities
- Convenient community services in an environment that provides safety, comfort, and privacy

- APHA (American Public Health Association) appraisal method for measuring housing quality was developed by the Committee on the Hygiene of Housing between 1944 and 1950.

APHA appraisal method:
- Attempts to minimize/eliminate individual opinion to arrive at numerical value
- May be compared with results in other cities
- Grouped under Facilities, Maintenance, and Occupancy
- Rating is based on a penalty system
- Theoretical maximum score is 600
- Score of zero indicates a perfect score
- **Score of 200 or greater indicates unfit conditions**

Conditions constituting basic deficiency include:
- Over 1.5 persons per room
- Number of occupants equals or exceeds 2 times the number of sleeping rooms plus 2
- **Less than 40 square feet of sleeping area per person (crowding)**
- Installed bath lacking, shared with other dwelling unit, or outside structure
- Water supply outside dwelling unit
- Outside window lacking in any room unit
- No installed electric lighting

- **A trained Sanitarian can inspect about 10 dwelling units per day. For every 4 inspectors, there should be one trained field supervisor, three office clerks, and one office supervisor.**

Environmental sanitation and hygiene indices:

- Cost estimates for rehabilitation of selected buildings and foot survey **(re-inspect)** should be made to confirm administrative judgment and decisions **before any major action is taken**

NEEDS (Neighborhood Environmental Evaluation and Decision System)

- 5 stages
- Provides rapid and reliable measure of neighborhood quality

Basic health principles of housing and its environment:

- Living unit and structure
  - Human factors
  - Sanitation and maintenance
  - Safety and injury prevention
- Residential environment
  - Community of individual facilities
  - Quality of the environment
  - Environmental control programs

Outline of a housing program:

- Establishment of a committee(s)
- Identification of the problem
- Informing the community
- Designation of a board or commission
- Appropriation of adequate funds
- Appraisal and designation of areas
- Preparation and adoption of an enforceable housing code and other regulations
- Institution of a systematic and planned code enforcement program
- Concurrent provision and upgrading
- Provision of new and rehabilitated housing units
- Aid in securing financial and technical assistance
- Evaluation of progress made and continual adjustment

Enforcement procedure:

- Education and persuasion
  - New releases and informational bulletins
  - Inspection
  - Notification
  - Re-inspection
  - Second notification
  - Third notification
- Legal action as last resort
  - Informational hearings
  - Administrative hearings

    - Pre-trial hearings
    - Summonses

Structural safety:
- **Building must be able to support two and half to four times the loads and stresses to which it is or may be subjected**
- Water-repellent floor with sanitary cove base or its equivalent is necessary
- Must have window or skylight not less than 10% of the floor area, with at least 45% “openable” providing adequate light and ventilation
- Ventilation system may be approved in lieu of a window or skylight

- **Every room occupied for sleeping purposes shall contain at least 70 square feet of floor space for one person and 50 square feet for each additional person.**

- For backflow prevention, terminate the water supply inlet or faucet with **air gap of twice the diameter of the pip**e above the flood-level rim of the fixture.

- Indirect waste piping should discharge to an open-water supplies sink or receptacle so that the end of the waste pipe terminates **at least 2 inches above the rim** of the sink or receptacle, which is directly connected to the drainage system.

- Most urban dwellers spend as much as 80–90% of their time indoors, including transportation vehicles.

Primary types in indoor air quality problems are:
- Inadequate ventilation (52%)
- Contamination from inside the building (17%)
- Contamination from outside the building (11%)
- Microbiological contamination (5%)
- Contamination from building fabrics (3%)
- Unknown (12%)

Sick building syndrome:
- Eliminate VOCs
- Up HVAC air exchange
- Eliminate allergens and mold

- **A study showed a 45% increase in respiratory infection in energy-efficient buildings.**

- Young children, the elderly, and people suffering from respiratory diseases will be the first to show signs of discomfort from indoor air contamination.

Radon (and its alpha-emitting decay products):

- Major portion of the biologically-significant dose associated with natural background radiation
- Hazard association with radon is related to concentration and time of exposure
- **Should not exceed 2–5 pCi/l indoors**
- Contamination in existing dwelling can be reduced by preventing entry or removing
- Can be reduced by
  - **Closing and caulking all cracks, joints, and openings of the structure in the basement or in contact with the ground or in the flooring above the crawl space**
  - Tightly covering open drains and sumps

Formaldehyde:

- Colorless gas
- May cause extreme discomfort and contact dermatitis indoors
- Odor can be detected at less than 1 ppm
- Sources are
  - Resins and glues to bond particle board and plywood
  - Urea-formaldehyde foam insulation
  - Permanent press fabric
  - Embalming fluid
  - Drugs
  - Disinfectants
  - Cosmetics
  - Chemicals used in pathology and anatomy laboratories
  - Chemicals used in the manufacture of automobiles
  - Furniture
  - Paper
  - Electrical equipment
  - Beauty products in a cosmetology salon (hair treatments, etc…)
  - Materials used in mobile homes and prefabricated housing
- **Minimum ventilation of 5 air changes per hour required**

Thermal and moisture requirements:

- EPA recommends relative humidity of 30–50% for homes
- **Indoor relative humidity of 60% or higher would cause excessive condensation and greater mildew, corrosion, and decay**
- Humidity above 70% promote germination and growth of fungal spores

Venting of heating units:

- The **high moisture in vent gases condenses inside a chimney forming sulfuric acid**, which attacks lime in the mortar, leaching it out, and creating leaks and destruction of the chimney
- Flue/vent extended at least 3 ft above flat roofs or 2 ft above the highest part of the wall parapets and peaked roof ridges will be reasonably free from downdrafts

- An opening of 100–200 square inches will usually provide sufficient fresh air under ordinary household conditions
- Connection between the furnace or stove and chimney should be tight fitting and slope up to the chimney at least ¼ in/ft

Mobile home parks:

- Mobile homes are “transportable, single-family dwelling units”
- “Manufactured relocatable living unit”
- **Minimum spacing of 10 feet required**

Institutions:

- Communities unto themselves
- Possibilities for transmission of illnesses associated with air, water, food, and contact are increased
- Provide ideal environment for spread of communicable diseases
- **Schools should allow 25–30 square feet per student classroom space**
- **If a school suspects radon, ground-level <u>classrooms</u> should be monitored**

Hospitals:

- **Nosocomial infection = hospital-acquired infection**
  - Urinary tract is most frequent site of infection
  - Contributing factors are
    - Older patients with chronic disease
    - Increase in high-risk patients and surgical procedures such as organ transplants and open-heart surgery
    - Innovations in diagnostic and therapeutic procedures
    - Inadequate disinfection or sterilization of respiratory therapy and other equipment
  - Prevention measures include
    - Hygienic medical, nursing, and staff practices (e.g., hand washing)
    - Equipment sterilization
    - Food, water, plumbing, air, laundering, linen handling, and housekeeping sanitation
    - Prevention of overcrowding
    - Minimization of movement of patients and hospital personnel from point to point
    - Avoidance of antibiotic use when possible
    - Establishment of a representative infection control committee
- **Hospital laundry wash-water temperatures must be a minimum of 160 to 167°F for 25 minutes**

Hospital wastes:

- Vacuum cleaners are problematic…cause particulates in air
- Only about 15% of all hospital wastes are infectious
- **Infectious and pathological wastes (e.g., disposable needles, syringes, scalpels) are best disposed of via incineration and autoclaving followed by**

compaction or shredding
    - Recommendations to equal or exceed air quality standards include temperature of 2,000°F with 2 seconds residence time and secondary chamber temperature of 1,800°F
- Chemotherapy and pathological wastes are incinerated
- Autoclaved wastes are disposed of in a landfill or incinerator
- General hospital and kitchen wastes can usually be disposed of through the community waste collection system
- Liquid infectious wastes may be carefully poured to a drain connected to a sanitary sewer
- **The usual method for the disposal of *low-level* radioactive solid waste is by storage until decayed, followed by disposal with the general waste**

Prisons:
- Known causes of prison unrest and illness include
    - Food poisoning
    - Poor and insufficient food
    - Vermin infestation
    - Inadequate work and recreational programs
    - Overcrowding
- **Should allow for 60 square feet per person**
- **Prisoners required to shower twice per week**
- **Prisoners required to change clothes twice per week**
- **Prisoners should be fed twice per day**
- A prison is a **complete community**
- Prisoners **should be guaranteed adequate recreation and work**
- **Max water temp for hand washing in jail is 120 F**

Day care centers:
- Enteric and respiratory disease transmission via the fecal-oral route and by intimate contact is more common among children in a day-care center
- Multiple pathogen infection is not uncommon
- Diarrhea in day cares can be prevented by hygiene, hand washing, food sanitation, separation of ill children, education of staff and management in disease transmission and prevention