NC Department of Health and Human Services

NC Nurse Aide I Curriculum

Module AA

Measurement

July 2019

Objectives (1)

- **Identify the structure and function of the cardiovascular and respiratory systems.**
- **Define body temperature and associated terminology.**
- **List equipment needed to measure pulse, respirations, blood pressure, temperature, intake of fluids, output, height, and weight**

Objectives (2)

- **Compare and contrast the various thermometers used to measure temperature**
- **Label components of select equipment used to measure blood pressure, height, and weight**

Objectives (3)

- Compare and contrast normal and abnormal findings of the following measurements: pulse, respirations, blood pressure, and temperature
- Locate sites used to measure pulse, respirations, blood pressure and temperature

Objectives (4)

- Describe the nurse aide's role in the care of residents who have not achieved fluid balance – edema and dehydration
- Explain how to use equipment that measures blood pressure, temperature, intake of fluids, output, height, and weight

Objectives (5)

- Differentiate units of measurement nurse aides use during the care of residents – millimeters of mercury (mm Hg), degrees Fahrenheit, ounces, milliliters (mL), cubic centimeters (cc), inches, and feet
- Convert ounces to milliliters and inches to feet/inches

Module AA Measurement
Vital Signs

Vital Signs

- Show how well vital organs are functioning
- Include temperature, pulse, respiration, and blood pressure
- Also called TPR & BP

Vital Signs – Importance

- Changes can indicate resident's condition worsening
- Can reflect response to medication and/or treatment
- Value of a vital sign may be basis for a medication
- Accuracy when taking vital signs is crucial
- Report abnormal vital signs immediately to nurse and per facility policy

The 5th Vital Sign – Pain

- Facilities may consider pain the 5th vital sign; considered as important as other vital signs
- Pain is subjective and reported to health care provider by resident
- Pain is whatever the resident says it is

NCDHHS/DHSR/HCPEC | Module AA Measurement | July 2019 10

Respiratory System

The breathing in of oxygen into the lungs and breathing out of carbon dioxide from the body

NCDHHS/DHSR/HCPEC | Module AA Measurement | July 2019 11

Structure and Function – Lungs

- Location in the respiratory system where exchange of oxygen and carbon dioxide occur
- Left lung, 2 lobes; right lung 3 lobes

NCDHHS/DHSR/HCPEC | Module AA Measurement | July 2019 12

Respiration

- Process that supplies oxygen to cells and removes carbon dioxide from cells
- Involves
  - Inspiration (inhalation) – breathing in oxygen; chest rises
  - Expiration (exhalation) – breathing out carbon dioxide; chest falls
- Each respiration = 1 inspiration and 1 expiration
- Respiratory rate (or respirations) – the number of inspirations (inhalations) the person takes in a minute

Respiratory Site

Watch the chest rise and fall; count the chest rises (inspirations) only

Respiration Values – Normal

- Called eupnea
- Between 12 and 20 breaths/minute
- Regular
- Quiet
- Both sides of chest equal

Document

Respiration Values – Abnormal

- **Bradypnea – less than 12 breaths/minute**
- **Tachypnea – more than 20 breaths/minute**
- **Apnea – 0**
- **Hypoventilation**
- **Hyperventilation**
- **Dyspnea**
- **Cheynes-Stokes**

Document and notify nurse

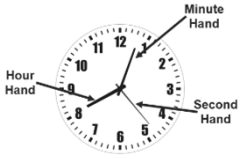
Counting Respirations – Equipment

- **Analog watch with second hand**
- **Note pad and pen**

Analog Watch

- **A watch that has moving hands and typically marked with numbers 1 – 12**
- **Has an hour hand, minute hand, and second hand**

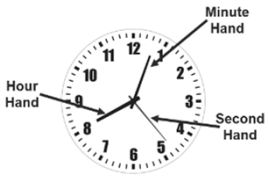
Nurse aide uses the second hand to count respirations and pulse rate



Analog Watch – 60 Seconds (1)

When counting respirations for 60 seconds:

while watching the second hand, start counting and stop counting on the same number



Using an Analog Watch – Practice (1)

Counting respirations for 60 seconds:

"Start"	"Stop"
Second hand on 3	Second hand on ?
Second hand on 6	Second hand on ?
Second hand on 10	Second hand on ?
Second hand on 12	Second hand on ?
Second hand on 8	Second hand on ?
Second hand on 1	Second hand on ?

Observation and Documentation

- **Nurse aide counts respirations for 60 seconds**
- **1 respiration = 1 inspiration (chest rising)**
- **While watching second hand of watch, nurse aide starts and stops counting on same number**
- **Document on record if respirations are normal**
- **Document on record and notify nurse if respirations are abnormal**

Stealth Respirations

Check respirations right after checking pulse (without moving hand from wrist)

Why?

Checking Respirations – Example #1

- **Nurse aide begins counting respirations when the second hand is on 4 and stops counting respirations when the second hand lands on _____**
- **Nurse aide counts 16 chest rises in 60 seconds**
- **16 is the number the nurse aide would document**

Checking Respirations – Example #2

- **Nurse aide begins counting respirations when the second hand is on 10 and stops counting respirations when the second hand lands on _____**
- **Nurse aide counts 24 chest rises in 60 seconds**
- **24 is the number the nurse aide would document**
- **Nurse aide would notify the nurse; why?**

Cardiovascular System

Also called the circulatory system and is the continuous movement of blood though the body

Structure and Function – Blood Vessels (1)

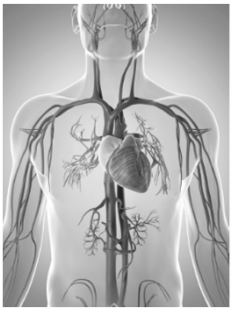
The transportation system of the cardiovascular (circulatory) system

- **Veins – carry blood with waste products away from cells and to heart**
- **Arteries – carry blood with oxygen and nutrients away from heart and to cells**

Structure and Function – Blood Vessels (2)

Pulse – the beat of the heart felt at an artery, as a wave of blood passes through the artery

- **Pulse rate**
- **Pulse rhythm**
- **Pulse force**



Pulse Sites

- Temporal
- Carotid
- Apical
- Brachial
- Radial
- Pedal

Radial Pulse Site

- Typically used to take pulse during routine vital signs checks
- Does not expose resident
- Located on thumb side of wrist
- First 2 or 3 fingers used; never use thumb

Pulse Values

Normal = between 60 and 100 beats per minute; regular and strong (document)

Abnormal pulse (document and notify nurse)

- Bradycardia – less than 60 beats/minute
- Tachycardia – more than 100 beats/minutes
- Irregular pulse rhythm
- Weak in strength

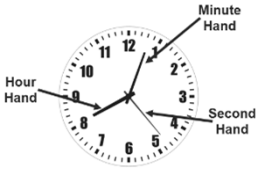
Counting Pulse – Equipment

- Analog watch with second hand
- Note pad and pen

Analog Watch – 60 Seconds (2)

When counting pulse for 60 seconds:

while watching the second hand, start counting and stop counting on the same number



Using an Analog Watch – Practice (2)

Counting pulse for 60 seconds:

"Start"	"Stop"
Second hand on 2	Second hand on ?
Second hand on 5	Second hand on ?
Second hand on 12	Second hand on ?
Second hand on 10	Second hand on ?
Second hand on 4	Second hand on ?
Second hand on 6	Second hand on ?

Checking Pulse and Documentation

- Nurse aide counts pulse rate for 60 seconds
- While watching second hand of watch, nurse aide starts and stops counting on same number
- Document on record if pulse is normal
- Document on record and notify nurse if pulse is abnormal

Checking Pulse – Example #1

- Nurse aide begins counting pulse rate when second hand is on 4 and stops counting pulse rate when the second hand lands on _____
- Nurse aide counts a pulse rate of 82 in 60 seconds
- 82 is the number the nurse aide would document

Checking Pulse – Example #2

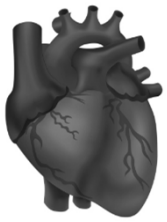
- Nurse aide begins counting pulse rate when second hand is on 10 and stops counting pulse rate when the second hand lands on _____
- Nurse aide counts a pulse rate of 109 in 60 seconds
- 109 is the number the nurse aide would document
- Nurse aide would notify the nurse; why?

Structure and Function – Heart (1)

The pump of the cardiovascular (circulatory) system

Consists of 4 chambers:

- **Right and left atria, and**
- **Right and left ventricles**

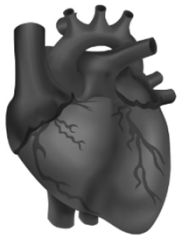


Structure and Function – Heart (2)

2 phases

(1) Working phase (systole) heart is pumping blood to body; top number of blood pressure reading and

(2) Resting phase (diastole) heart fills with blood; bottom number of a blood pressure reading



Structure and Function – Heart (3)

Blood pressure – the amount of force exerted by the blood against the walls of the artery

- **Top number is the systolic pressure; the pressure when the heart contracts and pumps blood out**
- **Bottom number is the diastolic pressure; when the heart rests as the heart fills with blood**

Blood Pressure (1)

Important indicator of health status; shows how well heart is working; can change from minute to minute depending on:

- **The activity of the resident**
- **Lifestyle choices**
- **Reaction to stress**
- **Acute injury or emergency**
- **Medications**

*Blood Pressure (2)

Genetic factors affect blood pressure

- **Age**
- **Gender**
- **Race**

*Blood Pressure Site

Brachial artery and upper arm – most often used by the nurse aide when checking blood pressure

The Blood Pressure Value

Measured in millimeters of mercury (mm Hg)
Recorded as a fraction

120 (systolic)
80 (diastolic)

Pronounced as 120 over 80

Normal Blood Pressure Ranges

- **Systolic – 90 mm Hg to 119 mm Hg**
- **Diastolic – 60 mm Hg to 79 mg Hg**

Document on record

Abnormal Blood Pressure Ranges

- **Elevated blood pressure**
  - **Systolic – 120 mm Hg to 129 mm Hg AND**
  - **Diastolic – below 80 mm Hg**
- **Hypertension**
  - **Systolic – 130 mm Hg or higher OR**
  - **Diastolic – 80 mm Hg or higher**
- **Hypotension**
  - **Systolic – less than 90 mm Hg**
  - **Diastolic – less than 60 mm Hg**

Always document on the record and report abnormal blood pressures to nurse

Using What You Have Learned

Using factors effecting blood pressure and normal/abnormal values for blood pressure, evaluate the health of individuals on the next 3 slides

Example #1

- **BP = 116/72**
- **A 64-year old female**
- **Weighs 130 pounds**
- **She has finished baking an apple pie**
- **She doesn't smoke or drink**

Example #2

- **BP = 162/86**
- **A 72-year old male**
- **Weighs 260 pounds**
- **He just ate a couple of hot dogs and potato chips for lunch and is on his 4th beer**
- **He just sent his son to the store for more cigarettes**

Example #3

- BP = 180/94
- A 22-year old male
- Weighs 170 pounds
- He just wrecked his brand new truck
- He has a broken leg
- He is on a stretcher in the back of an ambulance

Blood Pressure

The nurse aide uses 3 senses when checking a blood pressure

- Seeing – watches needle's movement in relation to numbers on the manometer
- Hearing – using the stethoscope, listens for changes in blood flow in the brachial artery
- Touching – controls inflation and deflation of cuff using thumb and index finger

Checking Blood Pressure – Equipment

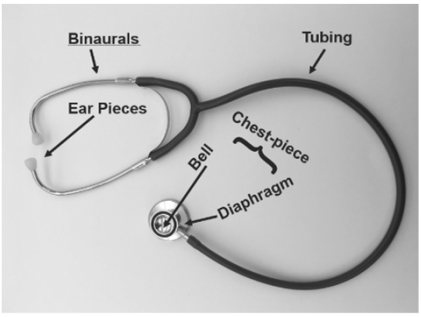
- Stethoscope
- Sphygmomanometer, also known as blood pressure cuff (BP cuff)
- Alcohol wipes
- Note pad and pen

The Stethoscope

- Instrument used to listen to heart and lung sounds
- For blood pressure checks, used to listen to sounds in brachial artery
- May be single-head (with diaphragm only) or dual-head (with diaphragm and bell)

NCDHHS/DHSR/HCPEC | Module AA Measurement | July 2019 52

Stethoscope – Parts



NCDHHS/DHSR/HCPEC | Module AA Measurement | July 2019 53

Stethoscope – Ear Pieces

- Always clean before and after use with alcohol wipes
- Insert ear pieces into ears so they point forward toward the nose
- Should fit snugly in ears

NCDHHS/DHSR/HCPEC | Module AA Measurement | July 2019 54

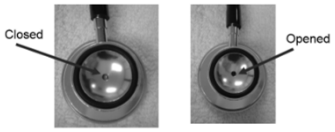
Dual-head Stethoscope – Diaphragm

Before using dual-head stethoscope to take blood pressure, determine which side of chest-piece is active; to check blood pressure, diaphragm needs to be active

NCDHHS/DHSR/HCPEC | Module AA Measurement | July 2019 55

Two Ways to Check for Active Diaphragm

#1 After inserting ear pieces into ears, tap diaphragm lightly to determine if tap is heard; if tap not heard, rotate chest-piece at tubing, and repeat the tap
#2 If chest-piece has an indicator dot, rotate chest-piece so indicator dot is closed



NCDHHS/DHSR/HCPEC | Module AA Measurement | July 2019 56

Diaphragm Concepts

- **Always clean diaphragm with alcohol wipes**
- **Warm diaphragm before making contact with resident**
- **To use diaphragm, apply enough pressure to make seal against brachial artery**

NCDHHS/DHSR/HCPEC | Module AA Measurement | July 2019 57

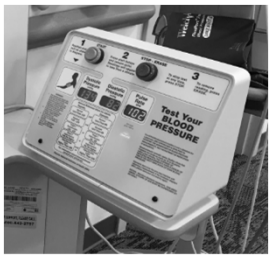
Blood Pressure Cuff – 2 Types

Manual (Aneroid)

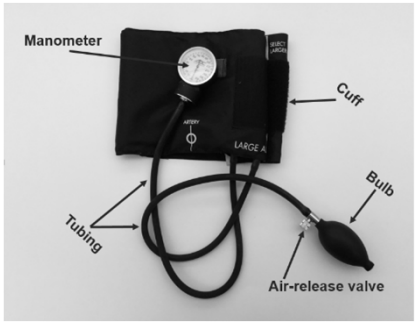
Electronic (Digital)

Electronic (Digital)

- No stethoscope needed
- After BP cuff is placed on arm, button is pressed causing cuff to inflate/deflate automatically
- BP reading is displayed



Aneroid BP Cuff – Parts

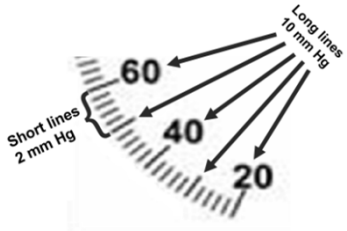


Manometer (1)

Marked with long and short lines and has a needle

- **Long lines mark 10 mm Hg**
- **Short lines mark 2 mm Hg**

Manometer (2)

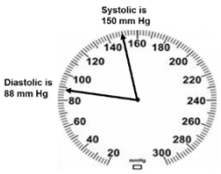


Manometer (3)

When checking blood pressure, the needle drops from a higher number to a lower number, so nurse aide will be counting backwards

Example of Blood Pressure Reading

- Systolic is 150 mm Hg
- Diastolic is 88 mm Hg
- BP is written down as 150/88
- BP is pronounced as "150 over 88"



Cuff (1)

After wrapping the cuff around the bare upper arm

- The cuff inflates and puts pressure on the brachial artery
- As cuff deflates, BP is determined

Cuff (2)

- Cuffs come in child-sized, small, regular, and extra-large
- Important to choose correct size

Cuff (3)

- Typically has 1 or 2 arrows (left arm/right arm) on cuff which align with brachial artery
- Cuff positioned/wrapped at least an inch above the elbow
- Cuff or stethoscope should not be placed over clothing

Tubing

- Made of rubber
- Two tubes connect the:
  (#1) Cuff to the manometer and
  (#2) Cuff to the handheld inflation bulb

Inflation Bulb with Air-release Valve (1)

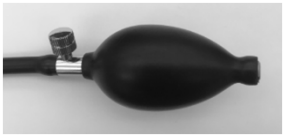
To inflate cuff, turn air-release valve clockwise to close valve; then squeeze the bulb; remember thumb goes up, needle goes up

Inflation Bulb with Air-release Valve (2)

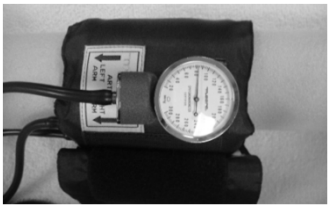
To deflate cuff and open valve, turn air-release valve counterclockwise with the thumb and index finger in a slow and controlled manner; remember thumb goes down, needle goes down

Inflation Bulb with Air-release Valve (3)

- **Inflate cuff to between 160 mm Hg to 180 mm Hg**
- **If beat is heard immediately, deflate the cuff; wait 30 – 60 seconds; inflate cuff to no more than 200 mm Hg**



Inflation Bulb with Air-release Valve (4)



Goal: learn how to inflate the cuff and how to deflate the cuff in a slow, controlled manner

Blood Pressure – Nevers

- Do not take blood pressure on an arm with an IV, dialysis shunt, or other medical device
- Avoid taking blood pressure on a side that has been injured or burned, is paralyzed, has a cast, or has had a mastectomy

Orthostatic Hypotension

Abnormal low blood pressure that occurs when resident suddenly stands up; complaint of feeling weak, dizzy, faint and seeing spots before the eyes

May be a complication from being on bed rest

Orthostatic Hypotension – Process

Throughout process, check to see if resident is feeling weak, dizzy, faint, or seeing spots

- BP checked while lying down, record on note pad
- Have resident sit up, wait 2 minutes, check BP, record on note pad
- Have resident stand up, wait 2 minutes, check BP, record on note pad
- Record/report to nurse

Orthostatic Hypotension – Prevention

- Per care plan, increase activity in stages
- Before standing, while sitting on side of bed (dangling), have resident cough/deep breathe and move legs back-and-forth in circles, 1 to 5 minutes
- Ask resident to report weakness, dizziness, faintness and seeing spots
- May need 2 people

Body Temperature

Amount of heat created by the body; balance between the amount of heat produced and the heat lost; typically stable

Produced – when cells use food for energy
Lost – through skin, breathing, urine, and stool

Body Temperature – Terminology

- Fever – elevated temperature
- Febrile – with a fever
- Afebrile – without a fever
- Thermometer – device to measure body temperature
- Fahrenheit and Centigrade

Factors Affecting Temperature

- Age
- Illness
- Stress
- Environment
- Exercise
- Time of day

Sites

- Mouth (oral)
- Rectum (rectal)
- Armpit (axilla)
- Ear (tympanic)
- Temporal (forehead)

Important to check with nurse or care plan to see what type of thermometer is used

When NOT to Take an Oral Temperature

- Unconscious
- Recent facial/mouth surgery
- Recent injury to face
- Sores/redness/mouth pain
- Confused/agitated
- History of seizure
- Using oxygen
- Mouth-breather
- Feeding tube

When NOT to Take a Rectal Temperature

- Has diarrhea
- Has rectal problem
- Has heart disease
- Recent rectal surgery
- Is confused or agitated

Temperature Values (1)

- Oral
  - Baseline – 98.6°F
  - Normal range – 97.6°F to 99.6°F
- Rectal
  - Baseline – 99.6°F
  - Normal range – 98.6°F to 100.6°F
- Axillary
  - Baseline – 97.6°F
  - Normal range – 96.6°F to 98.6°F

Temperature Values (2)

- Tympanic membrane
  - Baseline – 98.6°F
  - Normal range – 97.6°F to 99.6°F
- Temporal
  - Baseline – 98.6°F
  - Normal range – 97.6°F to 99.6°F

Types of Thermometers

- Digital – oral, rectal, axillary
- Electronic – oral, rectal, axillary
- Tympanic – ear
- Temporal – forehead
- Non-mercury, liquid-filled glass (oral – green tipped; rectal – red tipped)

NCDHHS/DHSR/HCPEC | Module AA Measurement | July 2019 85

Digital Thermometer

- Oral, rectal, or axillary
- Displays results digitally within 2 – 60 seconds; beeps or flashes when done
- Battery-operated
- Requires a disposable sheath

NCDHHS/DHSR/HCPEC | Module AA Measurement | July 2019 86

Electronic Thermometer

- Oral, rectal, or axillary
- Have oral/axillary and rectal probes; requires probe cover
- Displays results digitally 2 – 60 seconds; beeps or flashes when done
- Battery-operated; stored in recharging device

NCDHHS/DHSR/HCPEC | Module AA Measurement | July 2019 87

Tympanic Thermometer

- Ear
- Registers temperature in seconds
- May need practice to operate accurately

Temporal Thermometer

- Measures heat from skin over the forehead, specifically over temporal artery
- Done by a stroke or scan over the area
- Registers within 3 seconds
- Noninvasive

Non-mercury, Liquid-filled Glass Thermometer – Equipment

Oral

Rectal

Non-mercury, Liquid-filled Glass Thermometer

- Oral, rectal, or axillary
- Color-coded; blue or green for oral; red for rectal
- Takes a long time to register
- Nurse aide must read at eye level after it registers temperature; held at stem
- Most use Fahrenheit scale to measure temperature

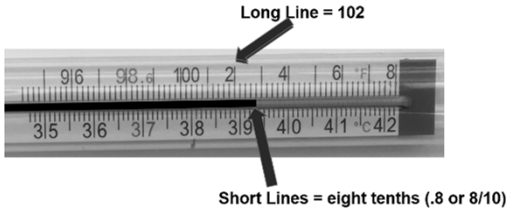
Non-mercury, Liquid-filled Glass Thermometer – Reading

For Fahrenheit readings (the top numbers):

- The long line represents 1 degree
- The short line represents two tenths (2/10) of 1 degree

Example of an Oral Temperature Reading

Temperature = 102.8°



Module AA Measurement
Intake of Foods/Fluids and Output

Fluid Balance (1)

- Living things need water to survive
- Adults need about 1500 mL of water intake daily to survive
- Adults need about 2000 to 2500 mL for normal fluid balance

Hydration – having the right amount of water in the body's tissues

Fluid Balance (2)

- Body takes in water by drinking fluids and eating foods
- Body loses water by way of urine, bowel movement, vomitus, sweat, and breathing out; plus drainage from wounds or liquids from stomach suctioning

Death can occur if the body has too much or too little water in the tissues

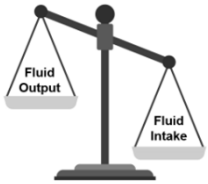
Intake and Output

- Intake (also called input) – the amount of fluid taken in by the body
- Output – the amount of fluid lost from the body
- Intake and output are typically seen together and commonly abbreviated (I&O)

For fluid balance to occur fluid intake roughly equals fluid output

Fluid Balance Not Achieved – Edema

- Fluid intake is greater than fluid output, edema occurs
- Body tissues swell with water
- May occur from heart or kidney disease

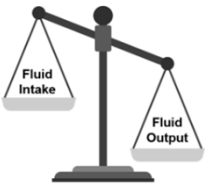


Edema – Nurse Aide's Role

- Obtain accurate weights per order
- Increase pillows per resident's request
- Restrict fluids per doctor's order
- Measure and record I&O accurately, if ordered
- Observe for and report signs/symptoms

Fluid Balance Not Achieved - Dehydration

- Fluid intake is less than fluid output, dehydration occurs
- Body tissues are lacking in water
- May occur from vomiting, diarrhea, fever, or simply refusing to drink fluids



Dehydration – Nurse Aide's Role

- Determine preferences of fluids and offer
- Assure water pitcher and cup within reach
- Measure and record I&O, if ordered
- Force fluids, if ordered
- Observe for/report signs and symptoms

I&O

- Ordered by the doctor; found on care plan and directive from nurse
- Typically calculated at end of each shift; totaled every 24-hours
- Documented on a facility-specific form
- Calculations and totals based on the milliliter (mL)

The Milliliter (mL)

- A unit of measure in the metric system
- Fluids measured using the milliliter (mL)
- Another unit of measure used in healthcare is called the cubic centimeter (cc); should use the mL instead of cc when documenting
- 1 milliliter is equal to 1 cubic centimeter
- Most people familiar with the teaspoon; there are 5 mL or 5 cc in a teaspoon

The Graduate

- Accurate measuring device for fluids when resident is on I&O
- Fluid for I&O is measured/ documented in milliliters (mL)
- Measure fluid at eye-level on flat surface
- If both intake and output to be measured with the graduate, two separate graduates used and labeled

Units of Measure for the Graduate

- The C.C. (cubic centimeter) side of the measurement scale is used in health care
- Recall 1 C.C. on the graduate = 1 milliliter (mL)

Shortest line represents either 25 cc/mL or 75 cc/mL
Longest lines represent multiples of 50 cc/mL

Measuring I&O – Importance

- Evaluates fluid balance
- Evaluates kidney function
- Planning and evaluating medical treatment
- Carrying out special fluid orders
- Helps prevent or detect complications from fluid intake
- Fluid intake is factor that reflects nutritional status

Fluids Considered as Intake

- Liquids that the resident drinks
- Semi-liquid foods that the resident eats
- Other fluids including intravenous (IV) fluids and tube feedings that nurse is responsible for maintaining and measuring

Fluids – Liquids

- Water
- Milk
- Coffee
- Tea
- Juices
- Soups
- Soft drinks

Fluids – Semi-liquid Foods

- Milkshakes
- Ice cream
- Sherbet
- Custard
- Pudding
- Gelatin
- Popsicles




NCDHHS/DHSR/HCPEC | Module AA Measurement | July 2019 109

Providing Drinking Water

- Residents need fresh drinking water
- Before providing water, check with care plan or nurse
- Follow facility's procedure regarding time schedule and process

NCDHHS/DHSR/HCPEC | Module AA Measurement | July 2019 110

Providing Drinking Water – Concepts

- Ensure resident's name and room number are labeled on ice pitcher
- Check for cracks and chips in water pitcher and cup; make sure they are clean
- Never touch inside or rim
- Never take resident's used water pitcher directly to ice machine
- Never scoop ice with water pitcher
- Always place ice into the water pitcher first

NCDHHS/DHSR/HCPEC | Module AA Measurement | July 2019 111

Special Fluid Orders

- In order to maintain fluid balance, the doctor may order amount of fluid a resident must drink a day
  - Encourage fluids – increased fluids
  - Restrict fluids – limited fluids
  - Nothing by mouth (NPO) – no fluids (or food)
  - Thickened liquids – all fluids are thickened
- Located on the care plan
- Nurse aide must measure and record intake very carefully

Determining Oral Fluids as Intake

- To determine intake, nurse aide must know serving sizes of containers that fluids are served in a facility; typically found on I&O sheet
- Two methods
  - Measures
  - Using fractions
- Follow facility policy and/or procedure when determining intake of fluids during and between meals

Typical Serving Sizes of Liquids

Water glass = 240 mL
Tea glass = 180 mL
Juice glass = 120 mL
Milk carton = 240 mL
Coffee cup = 240 mL
Soft drink can = 360 mL
Gelatin = 120 mL
Soup bowl = 180 mL

Determining Intake – Measures

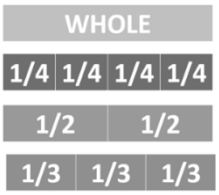
- The glass with the resident's apple juice holds 240 mL of fluid
- Using the graduate and measuring apple juice left in glass, the resident did not drink 120 mL of apple juice
- Subtracting 120 mL of apple juice the resident didn't drink from number of mL the glass holds
- Resident drank 120 mL of apple juice

Determining Intake – Fractions (1)

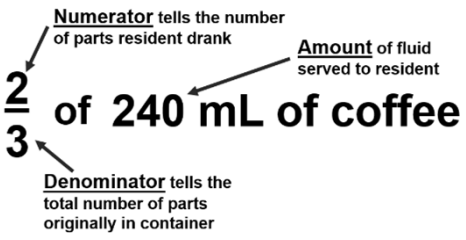
To determine fluid intake using fractions, the nurse aide needs a basic understanding of fractions in relation to a whole, which is 1

The entire bar is = 1 and includes

- 4 equal parts or 4 fourths
- 2 equal parts or 2 halves
- 3 equal parts or 3 thirds



Determining Intake – Fractions(2)



Determining Intake – Fractions (3)

- 240 mL in the resident's coffee cup
- Resident drank 2/3 cup of coffee
- Resident drank 160 mL of coffee

$$\frac{2}{3} \text{ of } 240 \text{ mL of coffee}$$

$$\frac{2}{\cancel{3}_{1}} \times \frac{\cancel{240}^{80}}{1} = \frac{160}{1} = 160 \text{ mL}$$

NCDHHS/DHSR/HCPEC | Module AA Measurement | July 2019 118

Determining Intake – Fractions (4)

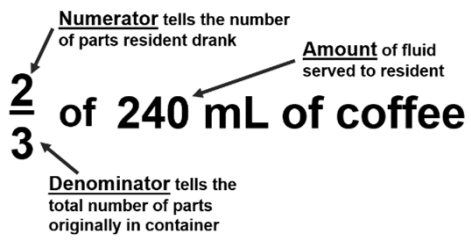
- 240 mL in the resident's coffee cup
- Resident drank 1/2 cup of coffee
- Resident drank 120 mL of coffee

$$\frac{1}{2} \text{ of } 240 \text{ mL of coffee}$$

$$\frac{1}{\cancel{2}_{1}} \times \frac{\cancel{240}^{120}}{1} = \frac{120}{1} = 120 \text{ mL}$$

NCDHHS/DHSR/HCPEC | Module AA Measurement | July 2019 119

Recall Determining Intake – Fractions



NCDHHS/DHSR/HCPEC | Module AA Measurement | July 2019 120

Determining Intake – Fractions (Quick)

$\frac{2}{3}$ of 240 mL of coffee

- Determine what 1 part of total coffee equals by dividing the total mL amount of coffee (240) by 3 = 80
- Resident drank 2 of the 3 parts of the coffee, so multiply 80 (which is 1 part) by 2 because the resident drank 2 of the 3 parts = 160
- The resident drank 160 mL of the coffee

Milliliters and Ounces

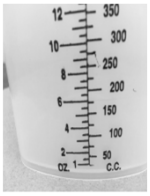
- A common conversion in health care is changing (or converting) ounces to milliliters
- 1 ounce = 30 mL
- To convert ounces to milliliters, simply multiply number of ounces by 30

Conversion Problem – Apple Juice

- 8 fluid ounces of apple juice in the glass
- 1 fluid ounce = 30 milliliters (mL)
- 8 x 30 milliliters (mL) = 240 milliliters (mL)
- 240 mL of apple juice in the glass

Milliliters and Cubic Centimeters

- Devices in health care are often marked in cubic centimeters (cc)
- A common conversion is changing (or converting) cc to milliliters (mL)
- 1 cubic centimeter (cc) = 1 milliliter (mL)
- To convert cc to mL, simply use the exact number measured



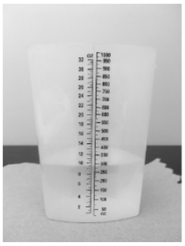
NCDHHS/DHSR/HCPEC | Module AA Measurement | July 2019 124

Conversion Problem – Grape Juice

- 120 cubic centimeters (cc) of grape juice in the glass
- 1 cc = 1 milliliter (mL)
- 120 mL of grape juice in the glass

NCDHHS/DHSR/HCPEC | Module AA Measurement | July 2019 125

Fluids Considered as Output

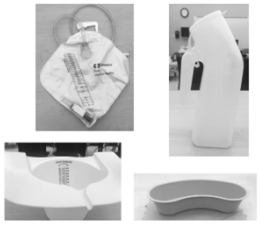


Urine
Vomitus
Diarrhea
Wound drainage
Gastric suction material

NCDHHS/DHSR/HCPEC | Module AA Measurement | July 2019 126

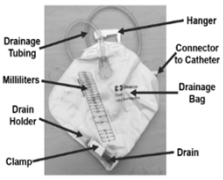
Devices That Collect Output

- Catheter bag
- Urinal
- Commode hat
- Emesis basin



Foley Catheter Bag

- Connected to indwelling (Foley) catheter which drains bladder of urine
- Emptied into a measuring device at end of shift (or sooner, if full)
- Measurement done using measuring device instead of catheter bag



Urinal

- A plastic, elongated device used by men to urinate into
- Meant for single-resident use
- As a measuring device, marked in ounces and cc (same as mL), with 100 cc (mL) increments marked lines and 50 cc (mL) unmarked lines between

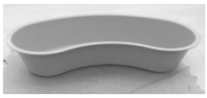
Commode Hat (Specimen Pan)

- Plastic collection container placed under commode lid
- Used when resident on bathroom privileges and
  - Is on output
  - Urine or stool specimen is ordered
- Marked in ounces and cc (same as mL); grooved edge

NCDHHS/DHSR/HCPEC | Module AA Measurement | July 2019 130

Emesis Basin

- A plastic, shallow basin shaped like a kidney that fits against resident's neck and collects body fluids
- Used
  - During mouthcare
  - When a resident is nauseated
- Marked in ounces and cc (same as mL) with 100 cc (mL) increments



NCDHHS/DHSR/HCPEC | Module AA Measurement | July 2019 131

RECALL: Units of Measure for the Graduate

- The C.C. (cubic centimeter) side of the measurement scale is used in health care
- Recall 1 C.C. on the graduate = 1 milliliter (mL)

Shortest line represents either 25 cc/mL or 75 cc/mL
Longest lines represent multiples of 50 cc/mL

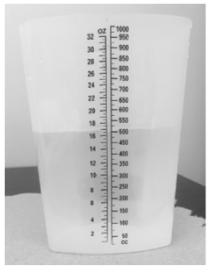
NCDHHS/DHSR/HCPEC | Module AA Measurement | July 2019 132

Measuring Urine #1

- Long line = 200 cc (mL)
- Short line = 25 cc (mL)
- Amount = 225 cc (mL)
- Document = 225 mL

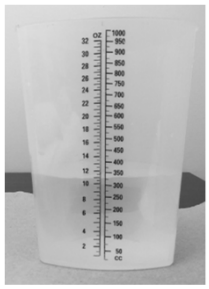
Measuring Urine #2

- Long line = 500 cc (mL)
- Amount = 500 cc (mL)
- Document = 500 mL



Measuring Urine #3

- Long line = 300 cc (mL)
- Short line = 25 cc (mL)
- Amount = 325 cc (mL)
- Document = 325 mL



Determining/Documenting Food Intake

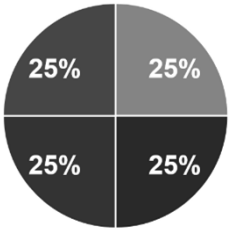
Determining Intake of Meals Accurately

Importance

- **Identifies residents at risk for or already experiencing impaired nutrition**
- **Food intake is one of the factors that reflects the resident's nutritional status**
- **Poor food intake at meals or changes in food intake that persists for multiple meals may indicate underlying problem or illness and should be reported to the nurse**
- **Much of a resident's daily fluid intake comes from meals; when resident has decreased appetite, can result in fluid/electrolyte imbalance**

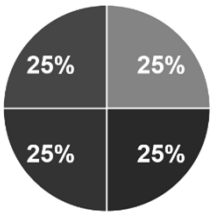
Determining Food Intake

- **Nurse aide compares amount of food eaten with amount of food served**
- **To measure food intake, nurse aide needs a basic understanding of percentages in relation to a whole, which is 100%**



Understanding Percentages of a Whole

- The entire circle = 100% and includes 4 equal parts
- Each 25% is ¼ of the whole
- 25% + 25% = 50% (or ½ of the whole)
- 25% + 25% + 25% = 75% (or ¾ of the whole)



NCDHHS/DHSR/HCPEC | Module AA Measurement | July 2019 139

Determining Food Intake (1)

Follow facility procedure regarding determining and documenting food intake, for example

- Listing exact food eaten (all of chicken, all of green beans, ½ of mashed potatoes, ¼ of biscuit, all of pie)
- Using specific words (all, good, fair, poor, refused)
- Using percentages of food eaten (100%, 75%, 50%, 25%, 0%)

NCDHHS/DHSR/HCPEC | Module AA Measurement | July 2019 140

The Resident is Served His Meals

Breakfast consists of 2 eggs, 2 slices of bacon, fried apples, grits, biscuit, coffee, and apple juice

Lunch consists of 4 grilled chicken tenders, mashed potatoes, broccoli, a corn muffin, coffee, and water

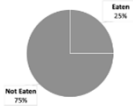
NCDHHS/DHSR/HCPEC | Module AA Measurement | July 2019 141

Resident Ate 0% of Meals (Refused)

Breakfast **Lunch**


NCDHHS/DHSR/HCPEC | Module AA Measurement | July 2019 142

Resident Ate 25% of Meals (Poor)



Breakfast **Lunch**

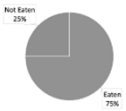

NCDHHS/DHSR/HCPEC | Module AA Measurement | July 2019 143

Resident Ate 50% of Meals (Fair)

Breakfast **Lunch**


NCDHHS/DHSR/HCPEC | Module AA Measurement | July 2019 144

Resident Ate 75% of Meals (Good)



Breakfast

Lunch

NCDHHS/DHSR/HCPEC | Module AA Measurement | July 2019 145

Resident Ate 100% of Meals (All)

Breakfast

Lunch

NCDHHS/DHSR/HCPEC | Module AA Measurement | July 2019 146

Module AA Measurement
Weight and Height

NCDHHS/DHSR/HCPEC | Module AA Measurement | July 2019 147

Weight and Height – Overview

- Weight and height measured on admission to the facility
- Units of measure per facility policy
  - Weight may be measured in pounds or kilograms
  - Height may be measured using feet and inches or just inches
- After admission
  - Height typically not measured again
  - Weight measured per facility policy and/or doctor's orders as directed by nurse and care plan – daily, weekly, monthly

Weights of Residents in Long-term Care

- Current standards of practice recommend weighing resident on admission/readmission, weekly for first 4 weeks after admission, and at least monthly thereafter
- Crucial that weight is obtained accurately and consistently
  - Facility-wide scales are calibrated and functioning appropriately
  - A consistent process in place

Weights – Consistent Process

Weigh the resident:

- Wearing a similar type of clothing
- At approximately the same time of the day (preferably before breakfast)
- Using the same scale
- Either consistently wearing or not wearing orthotics or prostheses

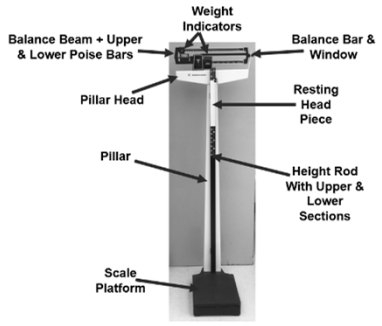
Accurate Weights – Importance

- Weight is a parameter that reflect resident's nutritional status
- Fluid loss or retention can cause short term weight changes; abrupt weight changes along with change in food intake are signs of fluid and electrolyte imbalance
- Weight loss may be important indicator of a change in resident's health status or sign of malnourishment
- If significant weight loss noted, health care team reviews for possible causes

Physician Mechanical Beam Scale (1)

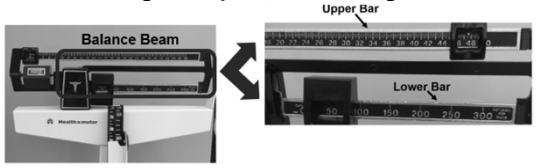
- Used for measuring weight and height
- Residents who cannot stand
  - Weighed using chair, wheelchair, bed, or mechanical lift, as directed by nurse or care plan
  - Height measured in bed using tape measure and ruler

Physician Mechanical Beam Scale (2)



Balance Beam

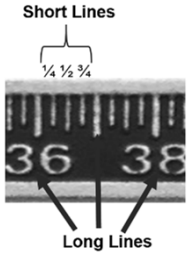
- Has 2 poise bars – upper and lower
- May include pounds only or pounds on the top part of each bar and kilograms on the bottom part of each bar; may have interchangeable pound and kilogram bars



NCDHHS/DHSR/HCPEC | Module AA Measurement | July 2019 154

Upper Poise Bar

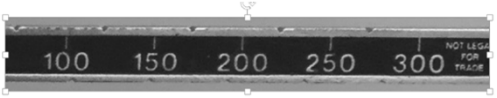
- Long lines represent pounds
- Short lines represent ¼ pounds each; increments include ¼, ½, ¾



NCDHHS/DHSR/HCPEC | Module AA Measurement | July 2019 155

Lower Poise Bar

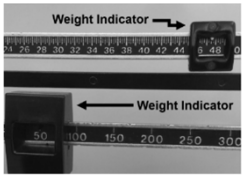
- Single lines represent increments of 50 pounds
- Grooves located along the top of the lower bar align with weight increments



NCDHHS/DHSR/HCPEC | Module AA Measurement | July 2019 156

Weight Indicators

- Both upper and lower bars have movable weight indicators
- The weight indicator for the lower bar fits into the groove as weight is obtained

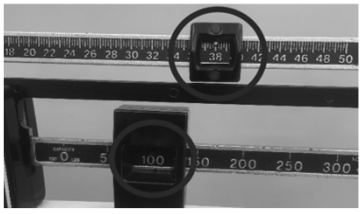


Balance Bar and Balance Window

- Ensure balance bar floats freely and in center of window when poise bars set on 0 and resident is not standing on scale platform
- If balance bar is off-center and/or touching window, do not weigh resident and notify nurse

Reading the Weight

To determine weight: add the value for the lower bar to the value for the upper bar



100 pounds + 38 pounds = 138 pounds

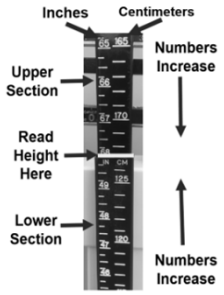
Height Component – Head Piece

- Becomes active when extended upward in preparation for measuring resident's height
- Lowered and placed on resident's head and height measured
- Becomes at rest when flat and low against height rod

Height Component – Rod (1)

2 Units of measure
- Inches
- Centimeters

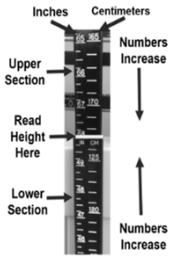
2 sections
- Movable upper section
- Non-movable lower section



Height Component – Rod (2)

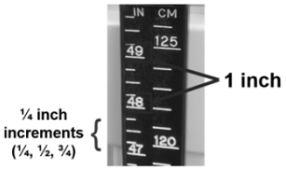
Movable upper section
- Raised or lowered to adjust to resident's height
- "Read height here" area is the location of the weight value if resident's height is located in this section
- Numbers increase from top to bottom

Non-movable lower section
- Height read in lower section if resident's height is located in this area
- Numbers increase from bottom to top



Measuring the Height (1)

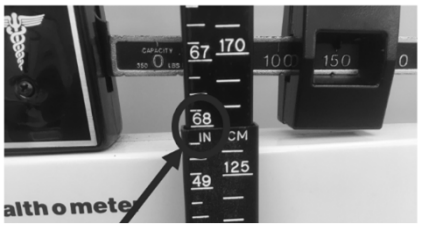
- When measuring in feet and inches using height rod
  - Long lines represent inches
  - Shorter lines represent ¼ inch each; increments include ¼, ½, ¾
- Read height to the nearest ¼ inch



NCDHHS/DHSR/HCPEC | Module AA Measurement | July 2019 163

Measuring the Height (2)

How tall is the resident?



NCDHHS/DHSR/HCPEC | Module AA Measurement | July 2019 164

Converting Inches into Feet and Inches

- Resident's height is 68 inches
- How does the nurse aide convert 68 inches to feet and inches?

NCDHHS/DHSR/HCPEC | Module AA Measurement | July 2019 165

Converting Inches into Feet/Inches

- To convert inches to inches and feet
- Divide the number of inches by 12
- The quotient is the feet and the remainder (if there is one) is the inches

NCDHHS/DHSR/HCPEC | Module AA Measurement | July 2019 166

Height in Feet and Inches

- Resident's height is 68 inches
- How does the nurse aide convert 68 inches to feet and inches?
  - 1 foot = 12 inches
  - Divide 68 inches by 12 inches
  - Quotient = 5, remainder = 8
  - Answer = 5 feet, 8 inches

Resident's height is 68 inches or 5 feet, 8 inches

NCDHHS/DHSR/HCPEC | Module AA Measurement | July 2019 167