King Saud University
College of Medicine

Year 1 Foundation Block
Clinical Skills
Student Manual

Department of Medical Education
Clinical Skills and Simulation Center
Riyadh, September 2012

King Saud University College of Medicine
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Riyadh, October 2012 v.1

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Hand hygiene

Hand hygiene is considered to be the primary measure necessary for reducing Health care-associated infection (HCAI). Although the action of hand hygiene is simple, the lack of compliance among health-care workers continues to be a problem throughout the world.[1,2]

Hand hygiene is an important component of any infection control program. Its primary purpose is the mechanical removal of transient microorganisms from the skin of HCWs, preventing cross infection from contaminated hands. Increased frequency of hand hygiene procedures is associated with decreased transmission of micro-organisms and a reduction in the incidence of health-care-associated infections.[3]

To prevent contamination, health-care workers clean their hands (1) before touching a patient, (2) before clean/aseptic procedures, (3) after body fluid exposure/risk, (4) after touching a patient and (5) after touching patient surroundings.[1,2]

Liquid antiseptic-soap is the most common agent for hand washing. These liquid soaps contains different chemical agents such as ethanol, isopropanol, chlorhexidine, hexachlorophene, triclosan etc.[1]

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Hygienic Hand Washing

OBJECTIVE: To perform a proper hygienic hand washing to remove or destroy transient micro-organisms and reduce resident flora.

MATERIALS: Clean water, anti-microbial liquid soap (e.g. chlorhexidine, iodine and iodophors, chloroxylenol [PCMX], triclosan) clean paper towel.

***D**: Appropriately done **PD**: Partially done **ND**: Not done/Incorrectly done*

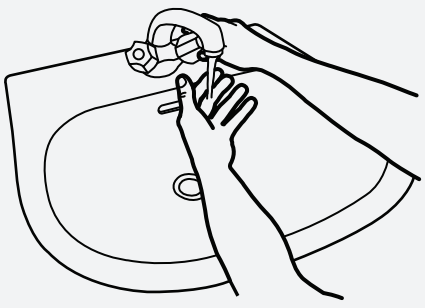
	STEP/TASK	D	PD	ND
	Preparation			
1.	Assemble all the materials to be used.			
2.	Remove jewelleries *(watch, bracelet, ring etc.)* and move sleeves up over the wrist.			
3.	Stand in front of the sink, preventing the uniform from touching the sink.			
	Procedure *(Duration of the entire procedure: 40-60 seconds)*			
4.	Wet your hands with water.			
5.	Apply (2-4 ml) anti-microbial liquid soap and make lather by rubbing it firmly between your hands.			
6.	Wash your hands thoroughly: **A.** Rub hands palm to palm. **B.** Rub right palm over left dorsum with interlaced fingers and vice versa. **C.** Palm to palm with finger interlaced. **D.** Back of fingers to opposing palms with fingers interlocked. **E.** Rotational rubbing of right thumb in clasped left palm and vice versa. **F.** Rotational rubbing backwards and forward with clasped fingers of right hand over palm and vice versa.			
7.	Rinse hands with water *(Do not shake water from hands).*			
8.	Dry hands thoroughly with a single use paper towel. *(Use towel to turn off hand operated handle faucets)*			
9.	Discard the paper towel in the appropriate container.			

How to Handwash?

WASH HANDS WHEN VISIBLY SOILED! OTHERWISE, USE HANDRUB

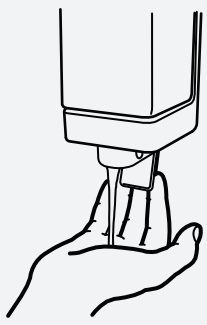
Duration of the entire procedure: 40-60 seconds

0



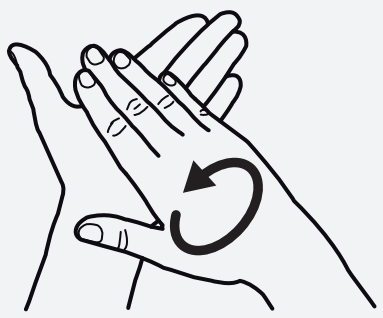
Wet hands with water;

1



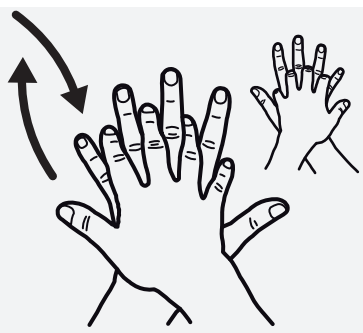
Apply enough soap to cover all hand surfaces;

2



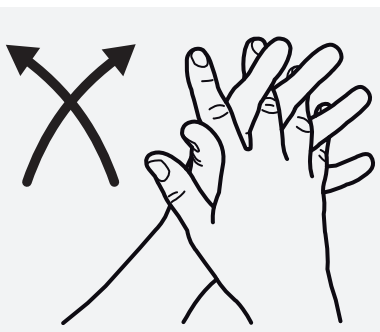
Rub hands palm to palm;

3



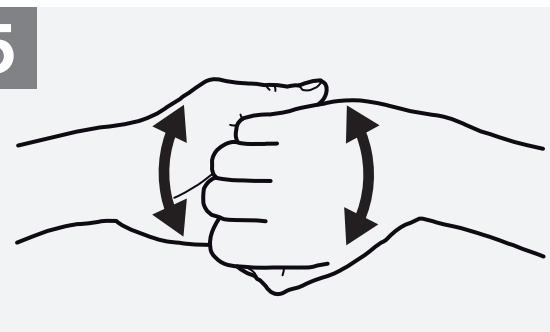
Right palm over left dorsum with interlaced fingers and vice versa;

4



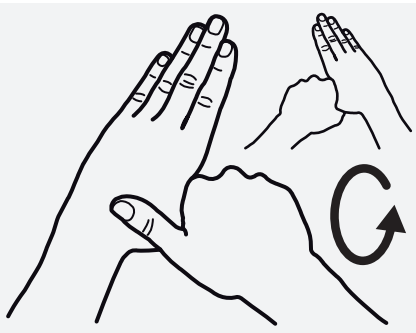
Palm to palm with fingers interlaced;

5



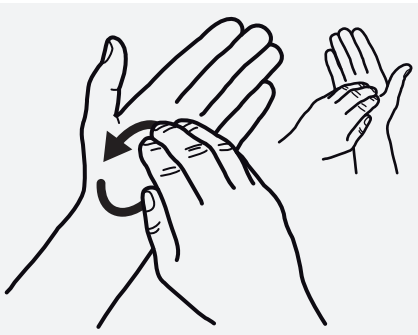
Backs of fingers to opposing palms with fingers interlocked;

6



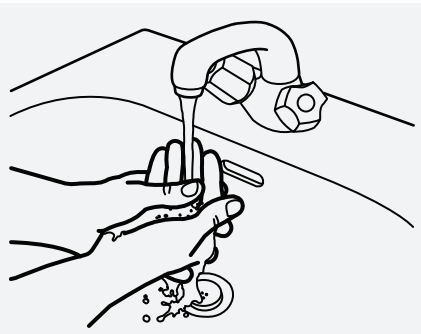
Rotational rubbing of left thumb clasped in right palm and vice versa;

7



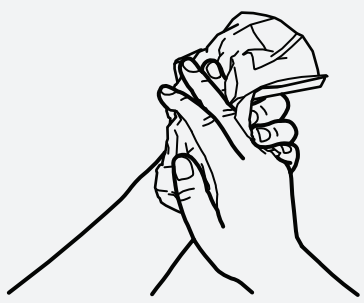
Rotational rubbing, backwards and forwards with clasped fingers of right hand in left palm and vice versa;

8



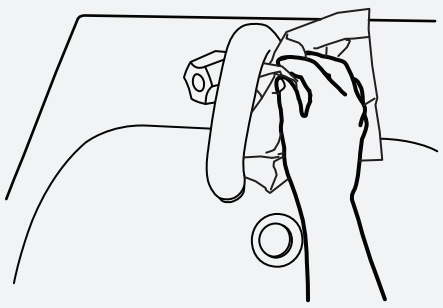
Rinse hands with water;

9



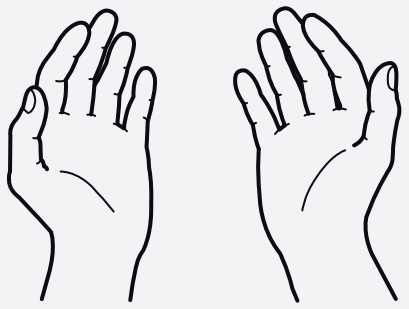
Dry hands thoroughly with a single use towel;

10



Use towel to turn off faucet;

11



Your hands are now safe.

World Health Organization

Patient Safety

A World Alliance for Safer Health Care

SAVE LIVES
Clean **Your** Hands

WHO acknowledges the Hôpitaux Universitaires de Genève (HUG), in particular the members of the Infection Control Programme, for their active participation in developing this material.

May 2009

How to Handrub?

RUB HANDS FOR HAND HYGIENE! WASH HANDS WHEN VISIBLY SOILED

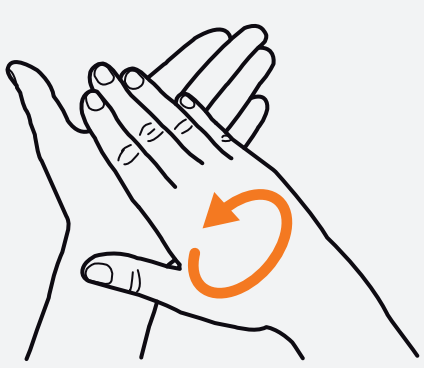
Duration of the entire procedure: 20-30 seconds

1a

Apply a palmful of the product in a cupped hand, covering all surfaces;

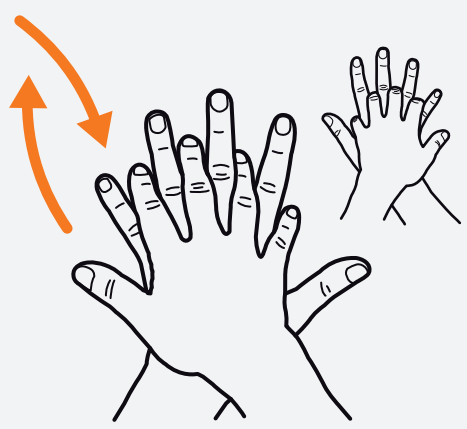
1b

2



Rub hands palm to palm;

3

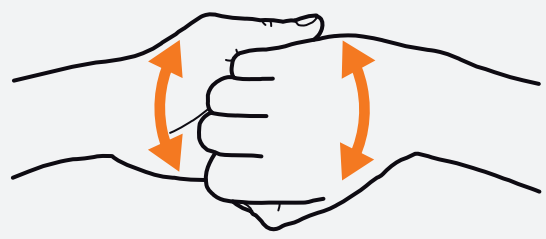


Right palm over left dorsum with interlaced fingers and vice versa;

4

Palm to palm with fingers interlaced;

5

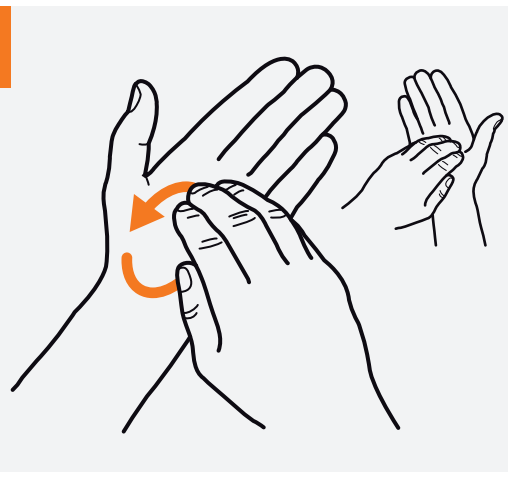


Backs of fingers to opposing palms with fingers interlocked;

6

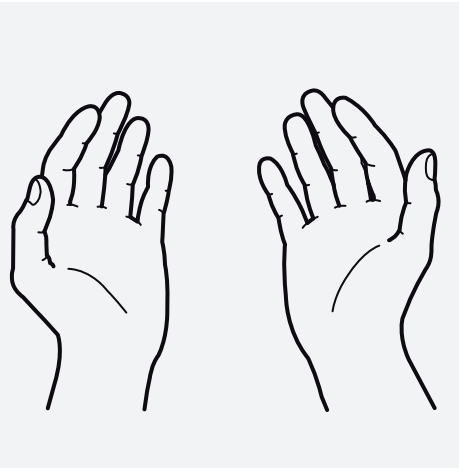
Rotational rubbing of left thumb clasped in right palm and vice versa;

7



Rotational rubbing, backwards and forwards with clasped fingers of right hand in left palm and vice versa;

8



Once dry, your hands are safe.

World Health Organization

Patient Safety

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Clean **Your** Hands

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May 2009

Personal Protective Equipment (PPE)

Standard Precautions are basic infection control precautions in health care and should be applied routinely in all health-care settings when providing care for all patients. If these basic precautions are not in place, additional specific precautions will not be effective. The main elements of Standard Precautions include hand hygiene, use of personal protective equipment (PPE) to avoid direct contact with patient's blood, body fluids, secretions and non-intact skin, prevention of needle stick/sharp injury and cleaning and disinfection of the environment and equipment.[4]

Appropriate Attire includes: Head cap, face mask, eye goggles, face shield, gown and gloves.

Health-care waste and waste disposal

Health-care waste includes all the waste generated by health-care establishments, research facilities, and laboratories. In addition, it includes the waste originating from "minor" or "scattered" sources - such as that produced in the course of health care undertaken in the home (dialysis, insulin injections, etc.).[5]

Appropriate handling, treatment, and disposal of waste by type reduces costs and does much to protect public health. Segregation should always be the responsibility of the waste producer, should take place as close as possible to where the waste is generated, and should be maintained in storage areas and during transport. The same system of segregation should be in force throughout the country.[5]

Color- coding Scheme for Containers and Bags

Color	Type of Waste	Example Type of wastes
BLACK	**Non-risk health care dry and wet waste**	Paper, tissue paper, plastic, food, cups, Feeding formula bottles NOT contaminated *(with blood/ body fluids)* syringe, PPE, IV fluids
ORANGE	**Infectious, Anatomical & Pathological waste**	**Anatomical Wastes:** Animal carcasses blood, body fluids, teeth, tissues, organs, placenta, non viable foetuses etc. **Pathological Wastes:**Thermometer probe, Nasogastric & Endotracheal tube, Foley Catheter &urinary bag, Drain tubes **CONTAMINATED** *(with blood/ body fluids)* syringe, PPE, IV fluids
YELLOW	**Sharps waste**	Slides, broken vials and ampoules, lancets, scalpels, blades and needles *(syringe with needle, cannula needles, butterfly needles)*

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Donning of Personal Protective Equipment

OBJECTIVE: To perform a proper donning of personal protective equipment to prevent the transmission of microorganisms between patients and the healthcare providers.

MATERIALS: Cap, disposable gown, face mask, eye goggles, clean gloves.

***D**: Appropriately done **PD**: Partially done **ND**: Not done/Incorrectly done*

	STEP/TASK	D	PD	ND
	Preparation			
10.	Assemble all the materials to be used.			
11.	Wash your hands *(refer to hygienic hand washing checklist)*.			
	Donning a cap			
12.	Pick up and unfold a cap.			
13.	Apply the cap to your head *(Make sure to tuck hair under the cap).*			
	Donning a gown			
14.	Select appropriate type and size.			
15.	Pick up and unfold gown with opening at the back.			
16.	Wear the gown. *(Make sure **NOT** to touch the outer surface of the gown).*			
17.	Fasten the neck tie at the back.			
18.	Fasten the waist tie at the back.			
	Donning a mask			
19.	Find the flexible nose piece with wire and place it over your nose bridge.			
20.	Fasten the top tie at the back of your head.			
21.	Fasten the lower tie at the top of your head *(adjust to fit comfortably).*			
	Donning an eye goggles *(if necessary)*			
22.	Put goggles over your eyes *(adjust to fit comfortably).*			
	Donning clean gloves *(Hands should be washed and fingernails should be short)*			
23.	Select appropriate size.			
24.	Pick up a clean glove and insert *-first one hand then the other hand-* into the gloves. *(Make sure to extend gloves over gown cuffs).*			

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Removing of Personal Protective Equipment

OBJECTIVE: To perform a proper removal of personal protective equipment to prevent contamination.

***D**: Appropriately done **PD**: Partially done **ND**: Not done/Incorrectly done*

	STEP/TASK	D	PD	ND
While removing, make sure NOT TO TOUCH THE OUTER SURFACE of the Personal Protective Equipment				
	Removing the gloves			
1.	Grasp the outside edge of one of the gloves.			
2.	Peel it away from your hand turning the glove inside out.			
3.	Hold and crumple it in your gloved hand.			
4.	Slide your ungloved hand's finger under the wrist of the remaining glove.			
5.	Peel it away from your hand turning the glove inside out *(creating a bag for both gloves)*.			
6.	Dispose waste material according to infection control standards.			
	Removing the eye goggles *(if present)*			
7.	Lift the goggle from your face.			
8.	Dispose waste material according to infection control standards. *(If applicable, place it in designated receptacle for reprocessing).*			
	Removing the gown			
9.	Unfasten the neck and the back ties.			
10.	Slide your right hand's *(3 or 4)* fingers under the left sleeve of the gown.			
11.	Slightly pull the left sleeve.			
12.	Hold the right sleeve on the outside and peel gown away from your shoulder and neck.			
13.	Roll the gown into a bundle.			
14.	Dispose waste material according to infection control standards.			
	Removing the mask			
15.	Unfasten the lower tie first and then the top tie.			
16.	Remove the mask away from your face.			
17.	Dispose waste material according to infection control standards.			
	Removing the cap			
18.	Slide your both hand's *(2,3 or 4)* fingers inside the cap.			
19.	Remove the cap away from your head.			
20.	Dispose waste material according to infection control standards.			
21.	Wash your hands *(refer to hygienic hand washing checklist)*.			

Preparing the patient for examination

An accurate physical examination is best performed when the examination conditions are ideal. This means taht, if possible, the patient should be in a well-lit room (preferably daylight) from which distracting noises and interruptions have been excluded (rarely possible in busy hospital wards). Screens must be drawn around patients before they are examined. Consulting rooms and outpatient clinics should be set up to ensure privacy and comfort for patients.[6]

Before starting the examination, students/doctors should introduce themselvs to the patient then ask patient's name (*check first and last name and the patient's name band if present*).

The examination should not begin until the nature of the examination has been explained and permission has been asked of the patient.[6]

Patients have a right to expect that students and doctors will have washed their hands before they perform an examination. This is as important in clinics and surgeries as in hospital wards.[6]

Vital Signs

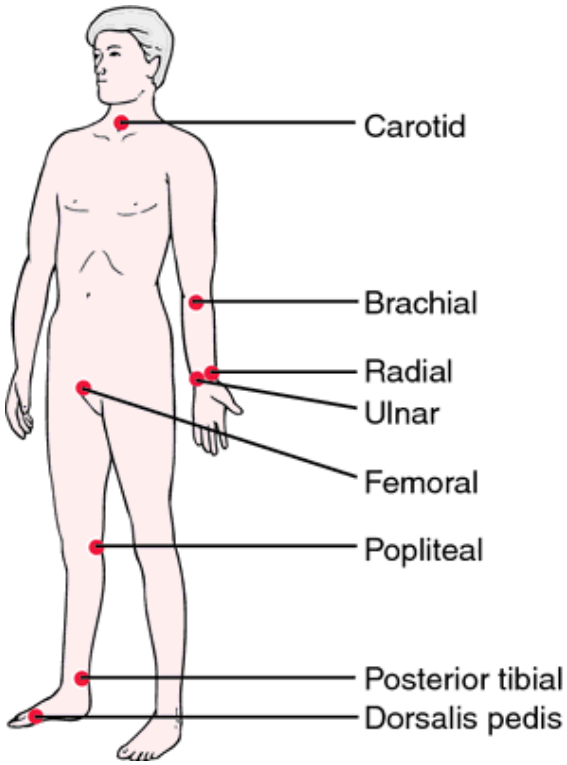
Certain important measurements must be made during the assessment of the patient. These relate to primarily cardiac and respiratory function and include pulse, blood presseure, temperature and respiratory rate.[7]

The arterial pulse

Patients expected to have the pulse taken as a part of proper medical examination.[8] Besides, examining peripheral pulses is an essential part of the medical examination. When this traditional part of examination (taking pulse) is performed with some ceremony, it may help to establish rapport between patient and doctor.[8]

The most common arteries examined during the medical examination are radial, brachial and carotid arteries. However other peripheral pulses should also be examined: ulnar, femoral, popliteal, posterior tibialis and dorsalis pedis.

The pulse is usually felt just medial to the radius, using the middle fingr pulps of the examining hand. The following observations should be made: (i) rate of pulse, (ii) ryhthm and (iii) presence or absence of delay of the femoral pulse compared with the radial pulse (*radiofemoral delay*).[8]



Pulse rate (PR)

Pulse rate (PR) is the number of pulses per unit of time, and Heart rate (HR) is the number of heartbeats per unit of time, both typically expressed as beats per minute (bpm). Heart rate is measured by finding the pulse of the body. This pulse rate can be measured at any point on the body where the artery's pulsation is transmitted to the surface by pressuring it with the index and middle fingers; often it is compressed against an underlying structure like bone. The thumb should not be used for measuring another person's heart rate, as its strong pulse may interfere with correct perception of the target pulse.

The more common sites are:

1. The neck (carotid artery) (Fig 1).
2. The inside of the elbow, or under the biceps muscle (brachial artery) (Fig 2).
3. The ventral aspect of the wrist on the side of the thumb (radial artery) – *the most common site* (Fig 3).
4. The ulnar artery (Fig 4).
5. The groin (femoral artery) (Fig 5).
6. Behind the medial malleolus on the feet (posterior tibial artery) (Fig 6).
7. Middle of dorsum of the foot (dorsalis pedis) (Fig 7).
8. Behind the knee (popliteal artery) (Fig 8).[9]

Normal resting heart rate

The chart below shows the normal range of a resting heart rate (pulse rate after resting 10 minutes) in beats per minute, according to age. Many things can cause changes in your normal heart rate, including your age, activity level, and the time of day.

Resting heart rate	
Age	**Beats per minute (bpm)**
Babies to age 1:	100-160
Children ages 1 to 10:	70-120
Children ages 11 to 17:	60-100
Adults	60-100

The palpation of pulses


Figure 1: Palpating carotid artery.


Figure 2: Palpating brachial artery.


Figure 3: Palpating radial artery.


Figure 4: Palpating ulnar artery.


Figure 5: Palpating femoral artery.


Figure 6: Palpating posterior tibial artery.


Figure 7: Palpating dorsalis pedis artery.


Figure 8: Palpating popliteal artery.

Respiratory rate (RR)

Respiratory rate (RR) is the number of breaths per minute or, more formally, the number of movements indicative of inspiration and expiration per unit time. In practice, the respiratory rate is usually determined by counting the number of times the chest rises or falls per minute.

Why is it done?
We measure the respiratory rate to:

1. Establish baseline data.
2. Monitor respiratory rate, depth, and rhythm.
3. Assess patient for presence of dyspnea or cyanosis.
4. Assess for abnormal lung sounds, such as rales, rhonchi, or wheezes.
5. Note respiratory rate, rhythm, and depth.
6. Note labored, difficult, or noisy respirations or cyanosis.
7. Identify alterations in respiratory pattern resulting from disease conditions.
8. Assess if accessory muscles are used for breathing.

Resting respiratory rate for a normal adult is 12-20 breaths per minute.

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Taking the Pulse Rate (PR) and the Respiratory Rate (RR)

OBJECTIVE: To be able to take the pulse rate and respiratory rate accurately.
MATERIALS: Watch or clock with displaying seconds.

***D**: Appropriately done **PD**: Partially done **ND**: Not done/Incorrectly done*

	STEP/TASK	D	PD	ND
	Preparation			
1.	Introduce yourself to the patient.			
2.	Confirm patient's ID.			
3.	Explain the procedure and reassure the patient.			
4.	Get patient's consent.			
5.	Wash hands.			
6.	Prepare the necessary materials.			
If the patient is anxious, irritable or has been a physically active or if he/she has smoked, drunk stimulant drinks *(tea, coffee, energy drinks etc.)* in the last 30 minutes, give him/her 10 minutes to rest before measuring the BP.				
7.	Position the patient in a sitting position and uncover one of his/her arms. *(Make sure the patient is relaxed and comfortable).*			
	Procedure for Pulse Rate (PR)			
8.	Gently place your two or three fingers (index, middle and ring fingers) on the selected artery. *(Do not use your thumb because it has its own pulse that you may feel).*			
9.	Count the beats for one full minute.			
	Procedure for Respiratory Rate (PR)			
10.	Proceed with taking the Respiratory rate (RR) while your hand is still on the patient's radial artery *(**Do not** inform your patient that you are taking the RR).*			
11.	Observe the rise and fall of the patient's chest and count the number of respirations for another one full minute. *(One respiration consists of one complete rise and fall of the chest, or the inhalation and exhalation of air).*			
	After the Procedure			
12.	Ensure that the patient is comfortable.			
13.	Make explanations to the patient, answer his/her questions.			
14.	Wash hands.			
15.	Document the procedure.			

Limits

Pulse Rate (PR)	
Normal*	60-100 *beat per minute*
Bradycardia	< 60 *bpm*
Tachycardia	> 100 *bpm*

Respiratory Rate (RR)	
Normal*	12-20 breaths per minute
Bradypnea	< 12 *bpm*
Tachypnea	> 20 *bpm*

**Normal limits for a resting adult.*

The blood pressure (BP)

Measurment of the arterial blood pressure is an essential part of the examination of almost any patient. Usually, indirect measurment of the systolic and diastolic pressures are obtained with a sphygmomanometer. systolic blood pressure is the peak pressure that occurs in the artery following ventricular systole, and the diastolic blood pressure is the level to which the arterial blood pressure falls duiring ventricular diastole.[10]

To measure blood pressure accurately, you must carefully choose a cuff of appropriate size.

An adult cuff showing size

A cuff for children

The sphygmomanometer may be either the aneroid (with indicator) or the mercury type. Because an aneroid instrument often becomes inaccurate with repeated use, it should be recalibrated regularly.

A free-standing aneroid model.

Portable mercury sphygmomanometer

A classification of blood pressure readings*		
Category	**Systolic (mmHg)**	**Diastolic (mmHg)**
Optimal	< 120	< 80
Normal	120 - 129	80 - 84
High Normal	130 - 139	85 - 89
Mild hypertension (grade 1)	140 - 159	90 - 99
Moderate hypertension (grade 2)	160 - 179	100 - 109
Severe hypertension (grade 3)	> 180	> 110

** The cardiovascular system. In: Talley NJ, O'Connor S., A systematic guide to physical diagnosis: Clinical Examination. Australia: Elsevier, 2010;p.56.*

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Measuring Blood Pressure (BP)

OBJECTIVE: To accurately measure the blood pressure using the manual sphygmomanometer.
MATERIALS: Stethoscope and a manual sphygmomanometer.

***D**: Appropriately done **PD**: Partially done **ND**: Not done/Incorrectly done*

	STEP/TASK	D	PD	ND
	Preparation			
1.	Introduce yourself to the patient.			
2.	Confirm patient's ID.			
3.	Explain the procedure and reassure the patient.			
4.	Get patient's consent.			
5.	Wash hands.			
6.	Prepare the necessary materials.			
If the patient is anxious, irritable or has been a physically active or if he/she has smoked, drunk stimulant drinks *(tea, coffee, energy drinks etc.)* in the last 30 minutes, give him/her 10 minutes to rest before measuring the BP.				
7.	Position the patient in a sitting position and uncover one of his/her arms. *(Make sure the patient is relaxed and comfortable).*			
	Procedure			
8.	Turn on the mercury valve *(if it is mercury sphygmomanometer).*			
9.	Select an appropriately sized cuff and apply it to the upper arm ensuring that it fits securely. *(The centre of the cuff bladder must be over brachial artery **[the bladder should cover 80% of the circumference of the upper arm]** and lower edge 2.5 cm above the ante-cubital fossa).*			
10.	Palpate the brachial or radial artery while inflating the cuff till the point where pulsation disappears and keep inflating the cuff 20-30 mmHg more.			
11.	Slowly deflate the cuff, noting the pressure at which the pulse reappears. *(This is the approximate level of the systolic blood pressure).*			
12.	Deflate the cuff completely.			
13.	Place the stethoscope over the brachial artery pulse, ensuring that it does not touch the cuff *(bell is better than diaphragm to pickup low pitched Korotkoff sounds).*			
14.	Re-inflate cuff to 20-30 mmHg above palpated systolic pressure.			
15.	Slowly deflate the cuff at a rate of 2-3 mmHg/second. *(Note where the beats appears in relation to the number on the gauge).*			
16.	The first sound indicates the systolic blood pressure *(continue deflation).*			
17.	The muffling and disappearance of the sound indicate the diastolic blood pressure.			
18.	Deflate the cuff completely.			
19.	Turn off the mercury valve *(if it is mercury sphygmomanometer).*			
	After the Procedure			
20.	Ensure that the patient is comfortable.			
21.	Make explanations to the patient, answer his/her questions.			
22.	Wash hands.			
23.	Document the procedure.			

Temperature

The temperature should always be recorded as a part of the initial clinical examination of the patient. The normal temperature (in the mouth) ranges from 36.6°C to 37.2°C (98°F to 99°F). The rectal temperature is normally higher and the axillary and tympanic temperature lower than the oral temperature. There is a diurnal variation; body temperature is lowest in the morning and reaches peak between 6.00 and 10.00 PM.[10]

Digital themometer


Mercury glass thermometer

Average temperature values*		
	Normal	**Fever**
Mouth	36.8°C	> 37.3°C
Axilla+	36.4°C	> 36.9°C
Rectum	37.3°C	> 37.7°C

+ Tympanic temperature are similar to axillary ones.

** The general principals of history taking. In: Talley NJ, O'Connor S., A systematic guide to physical diagnosis: Clinical Examination. Australia: Elsevier, 2010;p.28.*

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Measuring Body Temperature

OBJECTIVE: To accurately measure body temperature (in the mouth) using a digital thermometer.
MATERIALS: Digital thermometer, disposable probe, cotton gauze, disinfectant solution.

***D**: Appropriately done **PD**: Partially done **ND**: Not done/Incorrectly done*

	STEP/TASK	D	PD	ND
	Preparation			
1.	Introduce yourself to the patient.			
2.	Confirm patient's ID.			
3.	Explain the procedure and reassure the patient.			
4.	Get patient's consent.			
5.	Wash hands.			
6.	Prepare the necessary materials.			
7.	Position the patient in a sitting position *(Make sure the patient is relaxed and comfortable).*			
8.	Put on clean gloves			
	Procedure			
9.	Take the digital thermometer.			
10.	Withdraw probe and observe for test display A digital human icon will appear on the screen)			
11.	State audible tone will sound, then display of probe type:			
12.	Load appropriate probe into probe cover *(**Do not** press ejection button)*.			
13.	Change modes *(oral, axillary or rectal)* by pressing  button.			
14.	Place probe under the tongue reaching the sublingual pocket. *(Holding the probe still will ensure fast and accurate measurement.* *A "Walking cycle" will appear on the display to indicate measurement is in progress.)*			
15.	When final temperature is reached a tone will sound and temperature will be displayed.			
16.	Remove probe by pressing "**ejection button**" and dispose cover according to infection control standards.			
17.	Insert probe in storage channel to clear display.			
18.	Wipe all surfaces with damp *(not wet)* cloth with mild detergent, alcohol or non-staining disinfectant *(**Do not** scratch LCD screen. **Never** autoclave digital thermometer).*			
19.	Put thermometer back in its case.			
	After the Procedure			
20.	Ensure that the patient is comfortable.			
21.	Make explanations to the patient, answer his/her questions.			
22.	Remove the gloves.			
23.	Dispose waste material according to infection control standards			
24.	Wash your hands.			
25.	Document the procedure.			

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