

Basic Health Screening

A Pocket Guide

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Eon Publishing



North American Disease Intervention

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NOTE

The art and science of health screening has undergone and will continue to undergo changes as new research and information gets discovered and verified. The authors and the publisher of this text have reviewed and compiled all the pertinent information that is relevant to health screening. It should be noted that while every effort was invested to ensure that the information being presented here is accurate, neither the authors and publisher nor other involved parties can guarantee that the material presented in this text is comprehensive in every respect and disavow any responsibility for any errors, exclusions, or information that may be countered by later discoveries. This text has been submitted with the most updated information at the time of publishing, but it will not contain any changes or updates that have been implemented after the publishing of this text.

Dedication

*To the health care professionals of tomorrow: **You.***

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Preface

We are excited to present to you the ever first edition of *Basic Health Screening: A Pocket Guide*! We have made it our commitment to present to you the most updated information for health screening. Created by a team of more than 20 people, we have scoured the web to find the best resources and information to use in this guide. Contributors to this book range from medical students to graduate students and was reviewed by a team of faculty advisors from various universities and medical schools – all with the intention of keeping you in mind.

Basic Health Screening presents to you:

- Over a dozen health screening techniques
- Suggestions on screening techniques
- Helpful tips and mnemonics
- Useful diagrams and illustrations
- Recommended resources to consult

The path to your goals is long and winding but we're here to help make that journey a bit easier. Remember to never give up and keep striving to be your very best.

Think we can do more? We invite all students and faculty to reach out to share their ideas and thoughts to help us continually and consistently improve this book through our website and our collaborative editorial platform. See our “How to Contribute” section for more information!

Sincerely,



Aayush Visaria, MPH
Co-founder, NADI
Editor-in-Chief



David Lo, MBS
Co-founder, NADI
Editor-in-Chief

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Professors, faculty, and NADI advisors who have agreed to answer questions on specific topics on health screening and medicine

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For support and encouragement throughout the process, we are grateful to Hsiu-Hui Chao and Harry Lo. And thanks to our publisher, Eon Publishing for their continued support and cooperation.

Whether its clarifying difficult concepts, correcting errors in the first drafts, and revising errors, this project was not an easy task that could not have been done by two people let alone five people. For their time, patience, and willingness to help, we would like to acknowledge and sincerely thank these wonderful individuals below:

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Believe you can and you're halfway there.

How to Use This Book

Hello there! It's an honor for you to turn to us on your path to medical school. You now possess the book that has guided hundreds of students through the health screening process, from training to application. We hope you get out from this book as much as we have creating it. Many of us were in your shoes at one point and had you in mind as we wrote this book.

Basic Health Screening: A Pocket Guide is the first of its kind to gather all the necessary information, tips, and approaches for simple health screening. With appropriate care, the binding of the book should last the expected lifespan of the book, however, if you do find that your book is faulty or missing pages please return it to the place of purchase. If there is an ongoing issue or it has not been addressed, please feel free to reach out to the Customer Service department of our company at www.NADlaid.org.

While some people take their time to settle in to college, the benefits of starting early far outweigh procrastinating. Not only do you have more time the earlier you are in life, you'll also be able to accumulate more clinical experience hours over a long period of time. Of course, grades and MCAT come first and foremost but if you are able to spare the time to get health screening training and certification out of the way, it will make life a lot easier.

You can use this book as a *guiding* and *journaling* tool to help you keep in mind what topics you should know for health screening. In the end, you can take any information you have acquired from your courses and combine it with appropriate chapters, giving you a robust and comprehensive study tool. Best of luck as you begin your journey as a health screener!

How This Was Made

Work on this book officially began June 2016 after seeing a need for a condensed, short guide for screening purposes at NADI. Over the years, the authors have accumulated hundreds of resources from videos to books not only to study from, but also to use as inspiration for writing this book.

Writing began in June 2018 with Aayush Visaria and David Lo. Since then, other editors, reviewers, and advisers have joined in, devoting hundreds of hours to create this book. Multiple sources were used including books, government websites, and Pubmed-indexed research articles.

Microsoft Word Online and Office 365 were used for desktop publishing and typesetting while OneDrive was used to share and edit the documents. Slack was used for Communication, Asana for Project Management, and Adobe Photoshop & Indesign CC for the cover.

The nonprofit publishing Eon Publishing edited, reviewed, and published this book, while the Rutgers Legal and Intellectual Property Clinic handled all legal matters. Interns from the North American Disease Intervention proofread this book and SociaMed was used for marketing advice.

Each book has been vetted through at least twelve rounds of review by both students and faculty alike. To that end, information presented here is true and accurate to the best of our abilities. If you'd like to be part of this editing process, continue reading in the "How to Contribute" section.

How to Contribute

This first version of *Basic Health Screening* was created with helping you in mind. Just as there was extensive time that was taken to make this the right tool for you, there is always room for suggestions and improvements. We invite you to participate in this process!

Please check our website before submitting your contribution to avoid duplicate submissions. After all, we are all doing this for efficiency as well. If a duplicate entry is encountered, the first submitted entry with valid sources will be credited. We kindly ask that you follow the formatting and grammar of this edition as much as possible.

For 2019, we are looking for determined undergraduate, graduate, and medical students who are interested and willing in helping the book improve its approach to its writing. Paid and unpaid part-time and full-time internships are available. We are open to receiving even more help and input from faculty members and professors.

We greatly value every input we receive as we understand that your time is very valuable. We do apologize in advance if we do not respond individually to you, but rest assured that your feedback does not go by unnoticed. Thank you very much in advance!

If interested, please reach out to us by our email conpublishing@gmail.com with a CV and summary of your interest. If you have any sample work or portfolios, please send it along with your CV. We are interested in seeing how you can make *Basic Health Screening* a more essential tool!

Section 1: Guide to Health Screening

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*“I don’t love studying. I hate studying. I like learning.
Learning is beautiful.”
—Natalie Portman*

*“Sometimes the questions are complicated and
the answers are simple.”
—Dr. Seuss*

*“A goal without a plan is just a wish.”
—Antoine de Saint-Exupéry*

Introduction

When it comes to living life, health is #1 in determining how good your life can be. And that's not something you want to leave to chance.

Health screening, also known as biometric screenings, can be thought of as a mini-physical. Usually performed by a nurse or other healthcare professional, it involves measuring a multitude of factors, from your height and weight to your blood pressure and heart rate.

Together, they create a small window into your overall wellbeing and can reveal some insights into health conditions you may not even be aware of. Knowing these numbers can give you the essential tools to guide you on the path toward healthier living habits – so you can live your best life.

This screening does **NOT** replace the annual checkup with your primary care doctor. Think of it as an easy way to keep your health goals in check, allowing you to visualize your health in numbers and keep it on the right track.

Here's a quick list of some of the most common screenings:

- Body Mass Index (BMI)
- Waist Circumference
- Blood Pressure
- Blood Glucose
- Cholesterol/lipid panels

Other screening tests include:

- Heart Rate / Pulse Rate
- Pulse Oximetry
- Grip Strength
- Fat Percentage
- One-Lead EKG

These tests reveal information not only about your health but also for possible conditions and diseases that may arise. As a health screener, you cannot and shall not diagnose patients but it's good to know these things in case questions come up.

Other benefits of health screening include:

- Reducing health risks
- Improving health status
- Reducing health care costs
- Improving productivity
- Improving performance

Common conditions that will be screened for include diabetes, hypertension, and obesity. We will go into the key points to remember about these conditions, including their basic anatomy, physiology, pharmacology, and epidemiology.

HEALTH SCREENINGS



About the Mission

The North American Disease Intervention (NADI) is a nonprofit community health organization where pre-health students are trained and certified to conduct health screenings and then apply their expertise at community health screenings/workshop. Since its founding in 2014, NADI has completed over 200 screening workshops at over 50 locations across NJ, taking participants' blood pressure, blood glucose, and other health metrics with the support and guidance of doctors and other health professionals. The Rutgers chapter alone has currently over 500 student members who are interested in gaining health/community service experience.

NADI was founded in late 2014 and students achieve five main goals:

1. Learn about community health
2. Receive training/certification on conducting screenings and proper equipment use
3. Conduct health screenings and collect data
4. Analyze, present, and publish data
5. Help pre-health students gain admission into their dream health professional school.

Initially, NADI was created by its founders, Aayush Visaria and David Lo, after seeing a lack of awareness in the community about chronic disease, especially diabetes and hypertension. With the internet offering billions of pages of healthcare advice, it would seem that people are taking better control of their health and are being properly informed of risky health behaviors. However, that is not the case.

The incidence of diabetes and hypertension are increasing in all age groups, including the younger generation, and the wealth of access to knowledge has also led to a wealth of misguided information. We realized that even if people knew what actions to take, if there is no change or awareness of one's personal health then action won't be taken.

We were also inspired to create NADI after noticing a lack of hands-on clinical opportunities for students. Many students were genuinely interested in pursuing medicine but were stressed out because they could not find any immediate, long-term clinical opportunities. The ones that they could find either took many months to just get off the waitlist, require them to spend hundreds of dollars, or were not long-term and did not offer hands-on clinical experience. There is also increasing difficulty and stress for students to get accepted into health professional schools due to the increasing reliance on holistic measures: essay, interview, medical, and research experiences.

Thus, NADI was created to address these problems by:

1. Providing resources, training, and experiences for students to improve their skills and gain valuable healthcare experience
2. Having these students perform clinical health screenings in the community and raise preventative healthcare awareness
3. Holding frequent clinical screening events at various community locations that are convenient to everyone and that would usually not be accessed by bigger groups like hospital systems
4. Conduct community-level and survey research studies to determine underlying social, behavioral, and cultural factors in association with chronic disease.

The ultimate goal of NADI is to reduce the rates of hypertension from 1 out of 3 people to 1 out of every 5 individuals in our active states by 2025 and to reduce the rates of diabetes from 1 out of 8 people to 1 out of 10 people in our active states by 2025.

Training

Training and the subsequent assessment are essential for creating strong and knowledgeable health screeners. New members must sign up for both a training and assessment slot with passing the assessment mandatory for attending screening events.

All this information is available during the General Interest Meetings and on our website at www.NADIdaid.org. The Review PowerPoint and Overview of Skills Summary Sheet are crucial for giving you a quick summary of what you need to learn so be sure to review that before training.

Be sure to bring **\$35** for the equipment and dues. **\$30** for the blood pressure kit (stethoscope and cuff) and **\$5** for dues which are used for various purposes including research costs, travel, training equipment, software, and background checks. If you haven't purchase it already, this book is **\$15**.

During training, you will:

- Take a pre-knowledge survey (no need to study)
- Learn about nearly everything in the book
- Practice equipment and speaking techniques
- Ask questions to prepare for the future assessment

We hope that you use the time between your training day and the assessment day to practice using your blood pressure kit and learning about diabetes and hypertension so that you will be able to apply these skills at clinical events.

In Summary, before training day:

- Sign up for both a training & assessment day
- Review NADI Presentation/Video/Summary
- Bring \$35 for equipment and dues

Assessments

There are three parts for the assessment:

1. Online (before Assessment Day)
2. Practical
3. Aural

Before Assessment Day:

- Take the online assessment without notes or books at <https://eliademy.com/app/a/courses/aa2731aece>
- Score **100%** on all module quizzes and **> 80%** on Final Quiz
- Email the certificate to Rutgers.NadiSquad@gmail.com

Assessment Day:

- New members arrive, sign in, and wait in the room until called
- A proctor will call in 2 members at a time
- Perform a mock screening, taking history, blood pressure, and asking/answering questions with each other
- Evaluate based on BP measurement, questions you asked, and the advice you give
- Aural test includes answering health screening questions

Grade:

- Afterwards, we'll email you about your grade
- What could be improved
- Why you got the grade you got.

Pass means you pass. Great job!

Conditional Pass means you can go to screening events and participate in all our activities but need to be working with someone who passed. No need to take the test again after we determine you are ready.

Needs Improvement means you are not able to go to screening events just yet but need to practice a bit more and take the practical or aural assessment again. Very few individuals can do everything correctly without prior experience. We will inform you of the next assessment dates or you could try again at one of the upcoming ones this week.

In the end, we must make sure individuals are 100% confident with their ability to measure and interpret all the vital signs and blood pressure. If you have any questions about your grade, please let us know.

Equipment

A screeners tools are as important as the knowledge on how to use them. Typically, screeners will already have their own blood pressure kits and pocket guides

Personal Equipment

- Blood Pressure Kits (Stethoscope & Cuff)
- Screening Pocket Guide

NADI Equipment

- Consent form (paper)
- Patient form (either paper or electronic)
- Blood Glucose Monitor
- Boxes of Blood Glucose Test Strips
- Lancing Devices
- Boxes of Lancets
- Boxes of alcohol wipes
- Tape Measures
- Hand Dynamometers
- Pulse Oximeters
- Thermometers
- Electronic Body Scales
- Fat percentage monitor
- One-lead EKG

Checklist

Gather Information

- Attend club/organization fairs
- Learn about health screening online
- Attend a NADI General Interest Meeting

Before Training

- Sign up for both a training & assessment day
- Review NADI Presentation/Video/Summary
- Bring \$35 for equipment and dues

During Training

- Take a pre-knowledge survey (no need to study)
- Learn and practice using equipment and speaking techniques
- Ask questions to prepare for the future assessment

After Training

- Thoroughly review this book
- Practice using the BP kit
- Perform a mock screening with friends, family, etc.

Before Assessment

- Take the online assessment at <https://eliademy.com/app/a/courses/aa2731aece>
- Email the certificate to Rutgers.NadiSquad@gmail.com

During Assessment

- Take the practical assessment
- Take the aural assessment

After Assessment

- Congrats! You did it!
- Receive assessment grade
- Prepare for screening if pass or re-take if fail

Before Screening Event

- Sign up for events
- Refresh on health screening techniques
- Bring equipment and pocket guide

After Screening Event

- Jot down your experiences in the journal (Section 8)
- Remember to follow HIPAA guidelines
- Share with friends and on social media

Section 2: Main Biometric Screenings

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“When every part of the machine is correctly adjusted and in perfect harmony, health will hold dominion over the human organism by laws as natural and immutable as the laws of gravity.”

—Andrew T. Still

“Man is an intelligence in servitude to his organs.”

—Aldous Huxley

“Always read something that will make you look good if you die in the middle of it.”

—P.J. O’Rourke

Body Mass Index

To measure Body Mass Index (BMI), you will need the patient's height and weight. Height is usually provided by the participant but can be measured via the stadiometer in a doctor's office. Weight is measured by a scale.

The formula for BMI is:

$$\text{BMI} = \frac{(\text{weight in kilograms})}{\text{height in meters}^2}$$

In pounds and inches, it is $703 * \text{weight (lbs)} / \text{height}^2 (\text{in}^2)$. Normal range for BMI is 18-25. 25-30 is overweight. >30 is obese. Follow the steps below to accurately measure BMI:

1. Always ask the patient if they would like their BMI to be taken. Many patients may not want to take BMI for various reasons.
2. Have the patient step on the weighing scale. They may take off their shoes if they would like, but it is not necessary as shoes will contribute minimally to the BMI.
3. Look at the dial and determine the weight to the nearest tick mark. Once you have the weight, say it out loud, with the units. Then ask the patient, "Does this weight sound similar to what it usually is around?" This is done to confirm your reading and also to gain information on any sudden, unintentional weight changes.
4. Ask them for their height. If they do not know it and we do not have a measuring tape, estimate it based on nearby people and their heights.
5. Looking at the chart, tell them what their BMI is. Say the number and follow it immediately with an explanation of what the number means, taking into consideration any outliers. Outliers include bodybuilders (high muscle mass - inappropriately high) and very elderly people (low muscle mass - inappropriately normal). Example of an explanation: "Your BMI is 26 which is in the overweight range. Ideally your BMI should be between 18 - 25."

6. Using the same chart, determine how much weight they might reduce:
7. Figure out, based on their height, what the highest ideal weight would be (corresponding to BMI of 25).
8. Subtract this ideal weight from their current weight and that is how much they should reduce.
9. If it is a high amount, please reassure them and say any amount of weight reduction is beneficial.

BMI Chart

WEIGHT lbs	100	105	110	115	120	125	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215
kg†	45.5	47.7	50.0	52.3	54.5	56.8	59.1	61.4	63.6	65.9	68.2	70.5	72.7	75.0	77.3	79.5	81.8	84.1	86.4	88.6	90.9	93.2	95.5	97.7
HEIGHT in/cm	Underweight				Healthy				Overweight				Obese				Extremely obese							
5'0" - 152.4	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42
5'1" - 154.9	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41
5'2" - 157.4	18	19	20	21	22	22	23	24	25	26	27	28	29	30	31	32	33	33	34	35	36	37	38	39
5'3" - 160.0	17	18	19	20	21	22	23	24	24	25	26	27	28	29	30	31	32	32	33	34	35	36	37	38
5'4" - 162.5	17	18	18	19	20	21	22	23	24	24	25	26	27	28	29	30	31	31	32	33	34	35	36	37
5'5" - 165.1	16	17	18	19	20	20	21	22	23	24	25	25	26	27	28	29	30	30	31	32	33	34	35	36
5'6" - 167.6	16	17	17	18	19	20	21	21	22	23	24	25	25	26	27	28	29	29	30	31	32	33	34	34
5'7" - 170.1	15	16	17	18	18	19	20	21	22	22	23	24	25	25	26	27	28	29	29	30	31	32	33	33
5'8" - 172.7	15	16	16	17	18	19	19	20	21	22	22	23	24	25	25	26	27	28	28	29	30	31	32	32
5'9" - 175.2	14	15	16	17	18	19	20	20	21	22	22	23	24	25	25	26	27	28	28	29	30	31	31	
5'10" - 177.8	14	15	15	16	17	18	18	19	20	20	21	22	23	24	25	25	26	27	28	28	29	30	30	
5'11" - 180.3	14	14	15	16	16	17	18	18	19	20	21	21	22	23	23	24	25	25	26	27	28	28	29	30
6'0" - 182.8	13	14	14	15	16	17	17	18	19	20	21	21	22	23	23	24	25	25	26	27	27	28	29	
6'1" - 185.4	13	13	14	15	15	16	17	17	18	19	20	21	21	22	23	23	24	25	25	26	27	27	28	
6'2" - 187.9	12	13	14	14	15	16	16	17	18	18	19	20	21	21	22	23	23	24	25	25	26	27	27	
6'3" - 190.5	12	13	13	14	15	15	16	16	17	18	18	19	20	20	21	21	22	23	23	24	25	25	26	26
6'4" - 193.0	12	12	13	14	14	15	15	16	17	17	18	18	19	20	20	21	22	22	23	23	24	25	25	26

Waist Circumference

Waist circumference and waist-to-hip ratio are two anthropomorphic measures increasingly being used as surrogate markers for abdominal obesity. Although fat around the entire body is considered unhealthy, fat around the waistline is the unhealthiest.

There are two main types of fat around the waist. They are visceral (bad) and subcutaneous (not-so-bad) fat. The visceral fat is the fat that surrounds the organs, including the liver and pancreas, making it more difficult for those organs' cells to do their job.

When you measure waist circumference, visceral fat is what you are estimating. Subcutaneous fat does not impact organs as much because it is located on the top layer, right beneath the skin but above the internal layers. Below is a table that compares the measurement with health risk.

Waist Circumference

Health risk	WOMEN	MEN
Low Risk	below 31.5 inches	below 37 inches
Moderate Risk	31.5 to 35* inches	37 to 40 inches
High Risk	35* inches or more	40.2 inches or more

Blood Pressure

To measure blood pressure, follow the steps below:

1. Have the patient sit down in a chair next to a table or with a place to rest their arm. The arm should not be angled downwards, but instead be as close to heart level as possible. The patient's hand should be supinated, meaning palms facing up.
2. Have them relax for a few seconds while you get the equipment ready. Before putting in your stethoscope ear pieces, ask them if they had any caffeine or if they smoked in the past 30 minutes. These can temporarily increase blood pressure and give inaccurate readings.
3. Put on the cuff above the antecubital crease (elbow crease). Make sure it is oriented with the artery mark facing up and the arrow pointing down towards the patient's arm. The tubes should also be coming down aligned with the ring finger or pinky.
4. Place stethoscope diaphragm (larger side) on the patient's brachial artery (in the elbow crease slightly off center towards patient's midline).
5. Inflate cuff to 160, making sure the pump knob is tightened all the way to the right. If you do not hear any sounds, you may start slowly releasing pressure at a rate of 2-3 mmHg per second. If you do hear sounds, then continue inflating cuff to 180 and start releasing from there.
6. The first time you hear thumping sounds is your systolic blood pressure and diastolic blood pressure is when the sounds stop completely. Make sure to release all the pressure in the cuff once you've obtained your values.
7. All values need to be to the nearest 2 mmHg because tick marks are every 2 mmHg. This means you should never read an odd blood pressure.
8. Once you release the pressure in the cuff, be ready to say the blood pressure confidently and interpret it as well.
9. Measure the second arm as well to see if there are any differences. Arm-to-arm variation in blood pressure could be a sign of a peripheral artery disease.

Blood Pressure Categories



BLOOD PRESSURE CATEGORY	SYSTOLIC mm Hg (upper number)		DIASTOLIC mm Hg (lower number)
NORMAL	LESS THAN 120	and	LESS THAN 80
ELEVATED	120 – 129	and	LESS THAN 80
HIGH BLOOD PRESSURE (HYPERTENSION) STAGE 1	130 – 139	or	80 – 89
HIGH BLOOD PRESSURE (HYPERTENSION) STAGE 2	140 OR HIGHER	or	90 OR HIGHER
HYPERTENSIVE CRISIS (consult your doctor immediately)	HIGHER THAN 180	and/or	HIGHER THAN 120

Troubleshooting: If you are not able to hear the blood pressure the first time, politely apologize to the patient and try again. If you are still not sure or if it is too loud to hear, do a palpable blood pressure.

Palpable BP

(Systolic blood pressure without stethoscope):

1. Inflate cuff in the same manner as before
2. Place index and middle finger on radial pulse as if you are taking pulse
3. Slowly deflate the cuff in the same manner as before. When you start feeling the pulse, that is your systolic blood pressure. You cannot obtain diastolic blood pressure using this method.

Note: NEVER make up a blood pressure if you cannot hear it. There will always be other NADI members there to help out if you are having trouble.

Blood pressure always fluctuates, so one reading is never an absolute diagnosis. All patients need to get it checked again by their primary care physician or at a clinic.

Blood Glucose

To measure blood glucose using a CLIA-waived glucometer, using the following procedure:

1. Wear gloves and keep a safety hazard bin close by to dispose of the needle after you are done. Keep bandages ready as well in case patient wants one.
2. Take an alcohol swab. Pick a finger to take the blood sugar on. It should preferably be the index, middle, or ring finger but let the patient choose the hand and finger. Clean the area where you will be taking blood sugar by doing ONE circular motion with the alcohol swab. It should be done slightly off center from the middle of the finger. All blood sugars are done at the most distal phalanges.
3. While alcohol is drying, take a test strip and place in the correct orientation into the glucometer. You now have 1 minute to complete the rest; otherwise, an error will show up on the glucometer.
4. Take the lancet (needle), press it down in the correct orientation so that the needle will slice perpendicular to the fingerprints. If you do it parallel to the fingerprints, the blood will run along the fingerprints instead of creating a single droplet.
5. Tell the patient that it will “pinch a little” (do not say that it will not hurt because although that is reassuring, it is not the truth).
6. Once you do the needle prick, make blood come out slightly from the needle prick by squeezing gently on the sides around the needle prick site. Place the droplet onto the indicated area on the test strip, making sure it’s enough for the reading.
7. Take the alcohol swab or a sanitary gauze and have the patient hold down their site of bleeding in order for it to stop. If they require a bandage, please offer to put one on.
8. Once you get the reading from the glucometer, interpret it and ask them the following questions:
 - a. When did you last eat?
 - b. Do you take diabetes medication?
 - c. Has your blood sugar always been around this range?

Blood sugar can be greatly affected by diet and fluctuates throughout the day. If a person has eaten less than 2 hours before the measurement, the actual numerical value of the reading has little clinical value unless it is >200 mg/dl. If it has been more than 2 hours, then it should be between 70-125 mg/dl. If it is higher than that, they may be at risk for diabetes. Between 100-125 mg/dl is considered prediabetes for those who are fasting.

Table 2 – American Diabetes Association diagnostic criteria for diabetes¹⁹

Test*	Threshold	Qualifier
Hemoglobin A _{1c} or	≥ 6.5%	Lab NGSP-certified, standardized DCCT assay
Fasting glucose or	≥ 126 mg/dL (7.0 mmol/L)	No caloric intake for at least 8 hours
2-hour glucose or	≥ 200 mg/dL (11.1 mmol/L)	After 75 g of anhydrous glucose
Random glucose	≥ 200 mg/dL (11.1 mmol/L)	Plus classic hyperglycemia symptoms or crisis

NGSP, National Glycohemoglobin Standardization Program; DCCT, Diabetes Control and Complications Trial.
* Results must be confirmed by repeated testing.

BLOOD GLUCOSE CHART

Mg/DL	Fasting	After Eating	2-3 hours After Eating
Normal	80-100	170-200	120-140
Impaired Glucose	101-125	190-230	140-160
Diabetic	126+	220-300	200 plus



Cholesterol

As a type of fat found in the blood, cholesterol is an essential part of making your body healthy. Comprised about 30% of all animal cell membranes, this molecule is needed to help your brain, skin, and other organs do their jobs.

While the liver makes cholesterol for the body, can also get it from foods like meat, fish, eggs, milk, cheese, butter, and more. What does not contain any cholesterol are fruits, vegetables, and grains.

However, eating too much fat and cholesterol is a bad idea because it floats around in the blood and can stick to blood vessels walls, causing stiffness or clogging. Over many years, this can cause a heart attack or stroke.

Fortunately, a convenient and effective way to test this is through the cholesterol home test kit, giving you results in a matter of minutes! It's performed by taking a little of your blood and testing it.

Like taking blood glucose:

1. Use alcohol swabs to disinfect finger or area
2. Prick finger with the lancet
3. Place the blood droplet on the test strip
4. Insert test strip into the electronic device
5. Interpret cholesterol levels from the electronic meter

	Desirable	Borderline High	High
Total Cholesterol	Less than 200	200 - 239	240 and higher
LDL Cholesterol (the "bad" cholesterol)	Less than 130	130 - 159	160 and higher
HDL Cholesterol (the "good" cholesterol)	50 and higher	40 - 49	Less than 40
Triglycerides	Less than 200	200 - 399	400 and higher

Cholesterol levels help in evaluating the risk of a heart attack and stroke in the next 10 years. Thus, it's important to know how it's transported through the body and the main types of cholesterol.

Due to its nonpolar nature, cholesterol is unable to move through the polar environment on its own but must rely on proteins instead. Cholesterol and protein traveling together are called lipoproteins which are divided into many types.

The two main types of cholesterol are:

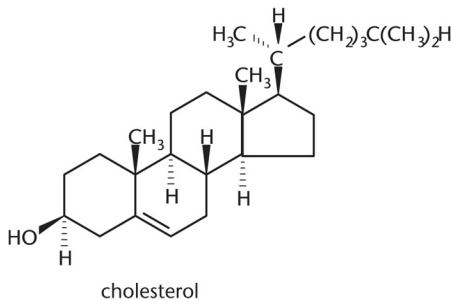
- Low-density lipoprotein (LDL) cholesterol
Known as the “bad” cholesterol, LDL transports cholesterol from liver to bloodstream, where it can stick to the blood vessels
- High-density lipoprotein (HDL) cholesterol
Known as the “good” cholesterol, HDL transports cholesterol from the blood back to the liver, where it is broken down

Easy way to remember this is:

- "L" for lousy in LDL
- "H" for healthy in HDL

*High Cholesterol Prevention

- Eat a healthy diet that includes lots of fruit, vegetables and whole grains.
- Get plenty of exercise. Experts recommend at least 60 minutes every day!
- Limit drinks and foods that have a lot of fat or sugar, like sugary drinks, treats, and fried foods.



Section 3: Other Health Screenings

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*"Hearts will never be practical
until they are made unbreakable."
- The Wizard of Oz*

*"As the arteries grow hard, the heart grows soft."
- H. L. Mencken*

*"Nobody has ever measured, not even poets,
how much the heart can hold."
-Zelda Fitzgerald*

Heart Rate

Also known as pulse rate, heart rate is the rate at which your heart pumps blood per minute (beats-per-minute). We measure heart rate clinically by feeling for a pulse. Your arteries expand and collapse every time blood is pumped by the heart, so you can feel those expansions by placing your fingers near an artery. You can measure pulse at nearly any large artery close to the skin, but as basic clinicians we will focus in on the most common one, radial pulse.

To measure pulse, place your index and middle finger gently on the radial pulse (located 1-2 cm from the base of your thumb). Your radial pulse is always located on the side of your thumb. **DO NOT USE** your thumb to feel pulse because your thumb has a strong pulse of its own.



Measure for 30 seconds and multiply by 2 to get beats-per-minute. You can also measure for 15 seconds and multiply by 4. The normal range is **60 - 100 bpm**.

If > 100 bpm, it is called tachycardia and may be temporary due to nervousness, anxiety or exercise. Check again after 5 minutes of rest. If the heart rate is still high after having a patient rest for 5 minutes, you must encourage patient to see a primary care physician as tachycardia could be life-threatening. Common medical causes of tachycardia include cardiac arrhythmia, medication side effects, psychological distress, etc. Note: Children also have a normal, higher resting heart rate.

If < 60 bpm, it is called bradycardia. 40-60 bpm may be normal in endurance athletes, including cyclists and marathon runners. If your patient has a low heart rate and is not an athlete, they must go see a primary care physician as soon as possible because it may be a sign of heart failure.

Most foods should not affect your heart rate. However, sympathetic stimulation by caffeinated products such as coffee may temporarily increase heart rate (and BP). Always ask patients whether they have had any caffeinated products in the last 30 minutes. Also ask if they've had nicotine and/or alcohol in the past 30 minutes as they may influence heart rate as well.

Men (beats per minute)

Age	18 - 25	26 - 35	36 - 45	46 - 55	56 - 65	65 +
Athlete	49 - 55	49 - 54	50 - 56	50 - 57	51 - 56	50 - 55
Excellent	56 - 61	55 - 61	57 - 62	58 - 63	57 - 61	56 - 61
Great	62 - 65	62 - 65	63 - 66	64 - 67	62 - 67	62 - 65
Good	66 - 69	66 - 70	67 - 70	68 - 71	68 - 71	66 - 69
Average	70 - 73	71 - 74	71 - 75	72 - 76	72 - 75	70 - 73
Below Average	74 - 81	75 - 81	76 - 82	77 - 83	76 - 81	74 - 79
Poor	82 +	82 +	83 +	84 +	82 +	80 +

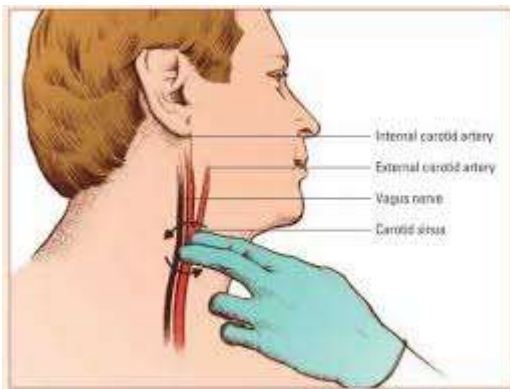
Women (beats per minute)

Age	18 - 25	26 - 35	36 - 45	46 - 55	56 - 65	65 +
Athlete	54 - 60	54 - 59	54 - 59	54 - 60	54 - 59	54 - 59
Excellent	61 - 65	60 - 64	60 - 64	61 - 65	60 - 64	60 - 64
Great	66 - 69	65 - 68	65 - 69	66 - 69	65 - 68	65 - 68
Good	70 - 73	69 - 72	70 - 73	70 - 73	69 - 73	69 - 72
Average	74 - 78	73 - 76	74 - 78	74 - 77	74 - 77	73 - 76
Below Average	79 - 84	77 - 82	79 - 84	78 - 83	78 - 83	77 - 84
Poor	85 +	83 +	85 +	84 +	84 +	85 +

What can doctors do in the short-term if a patient's heart rate is high?

There are a set of techniques known as vagal maneuvers that can lower one's pulse rate by activating the parasympathetic vagus nerve. You should not do any of these techniques on a patient; however, you may educate patients about these techniques and they may try it on their own.

1. Coughing or gagging
2. Holding your breath and bearing down (as if you are going to the bathroom; also known as Valsalva maneuver)
3. Carotid sinus massage is a common technique used clinically in emergency situations to lower one's heart rate. Although as a NADI member you will not be authorized to do carotid massage on someone due to risk of injury, you may tell someone who has a high heart rate to do the technique if they are nervous or anxious. A person would place their index and middle finger gently on their carotid sinus (neck region) and massage it lightly. People often do this when it is very hot outside as well. Placing a cool water bottle or ice cube near the carotid sinus can cool you down and lower heart rate.



Respiratory Rate

NADI members will generally never measure respiratory rate; however, it is important to understand what it is. Respiratory rate is the rate at which someone is inspiring and expiring air from their lungs. You would measure it while doing heart rate by counting the number of times a person's chest rises in 30 seconds. You may also put a hand on their back and count the chest expansions that way. The normal respiratory rate is 12-20 breaths-per-minute. Lower or higher respiratory rates or irregular breathing may be a signal for an acid-base imbalance, a sign of heart problems (dyspnea), among other conditions.

A normal cause for higher respiratory rates is exercise.

Pulse Oximetry

Pulse oximetry (or pulse ox) is another tool in our screening toolbox that can tell us a small part of a person's health. It is a noninvasive method for monitoring a person's **p**eripheral oxygen **S**aturation (SpO₂).

In its most common (transmissive) application mode, a sensor device is placed on a thin part of the patient's body, usually a fingertip or earlobe, or in the case of an infant, across a foot. The device passes two wavelengths of light through the body part to a photodetector. It measures the changing absorbance at each of the wavelengths, allowing it to determine the absorbances due to the pulsing arterial blood alone, excluding venous blood, skin, bone, muscle, fat, and (in most cases) nail polish.

Pulse oximetry is particularly convenient for instant and continuous measurement of blood oxygen saturation. Pulse oximetry is useful in any setting where a patient's oxygenation is unstable, including intensive care, operating, recovery, emergency, and hospital ward settings, and more. Although a pulse oximeter is used to monitor oxygenation, it cannot determine the metabolism of oxygen, or the amount of oxygen being used by a patient.

A blood-oxygen monitor displays the percentage of blood that is loaded with oxygen. More specifically, it measures what percentage of hemoglobin, the protein in blood that carries oxygen, is loaded. To use, press down on one side to open up the mouth of the device, put it on the finger, and wait a few seconds for results to appear. Acceptable normal ranges for patients without pulmonary pathology are from 95 to 99 percent.

SpO₂ can be calculated using this formula where HbO₂ is oxygenated hemoglobin and Hb is deoxygenated hemoglobin:

$$S_{pO_2} = \frac{HbO_2}{HbO_2 + Hb}$$



Note: You will not need to know mechanically how a pulse ox works or how to calculate it. Just know what it is, how to use it, and what it tells you.

Casualty	SpO ₂
Normal (Healthy)	> 95%
Normal (COPD)	88% – 92%
Hypoxic	85% – 94%
Severely Hypoxic	< 85%

Grip Strength

Grip strength has been shown to be linked to age and neuromuscular function. Use the grip strength device as indicated by the product. Make sure patient's arm is at a 90-degree angle at the elbow with nothing other than his/her grip helping compress the device.

Adult Data for Lafayette Model 78010 Dynamometer*
Averages of Grip Strength in kg. for Adults

Age	Male – Dominant Hand	Male – Non Dominant Hand	Female – Dominant Hand	Female – Non Dominant Hand
20	36 kg	35 kg	21.5 kg	19 kg
25	39 kg	36 kg	22 kg	20 kg
30	40.25 kg	36 kg	21 kg	19 kg
35	39 kg	35.5 kg	19.5 kg	18.75 kg
40	37.5 kg	34 kg	18.5 kg	17.75 kg
45	35.75 kg	32.5 kg	17.5 kg	16.75 kg
50	33 kg	30.25 kg	17.5 kg	16.5 kg

* From Lafayette Instrument Owner's Manual from tests on more than 2000 subjects; 1986

There are no known governmental guidelines for grip strength, although several studies have published data. Above is one such study (in kg) and below is another such study (in lbs). Use the numbers as estimates.

Female (Age)	Needs Improvement	Fair	Good	Very Good	Excellent
15-19	< 54	54-58	59-63	64-70	> 70
20-29	< 55	55-60	61-64	65-70	> 70
30-39	< 56	56-60	61-65	66-72	> 72
40-49	< 55	55-58	59-64	65-72	> 72
50-59	< 51	51-54	55-58	59-64	> 64
60-69	< 48	48-50	51-53	54-59	> 59

Male (Age)	Needs Improvement	Poor	Fair	Good	Excellent
15-19	< 84	84-94	95-102	103-112	> 112
20-29	< 97	97-105	106-112	113-123	> 123
30-39	< 97	97-104	105-112	113-122	> 122
40-49	< 94	94-101	102-109	110-118	> 118
50-59	< 87	87-95	96-101	102-109	> 109
60-69	< 79	79-85	86-92	93-101	> 101

Fat Percentage

Fat percentage is a measurement of the percent of body weight that is due to fat. Whereas BMI can tell you your mass index, fat percentage isolates out the fat part of the mass index. Interpreting the BMI and fat percentage together can give you a powerful view of someone's body distribution of muscle and fat.

For example, if someone's BMI is normal but their fat percentage is high, that may tell you that they have an inappropriately low BMI due to a dearth of muscle around the body. They would need to reduce fat and increase muscle. On the other hand, if someone's BMI was high but fat percentage was low, there is a good chance that person is a muscular athlete and may not have anything to worry about.

Fat percentage is measured using the Omron Fat Percentage Machine. The machine is able to isolate fat because it is a bioimpedance device that sends a small electrical signal throughout the body. Fat conducts electricity differently than bone and muscle, so the device can use an algorithm to calculate fat percentage.



Omron Handheld Body Fat Loss Monitor

Enter in all their information in the machine by pressing “set” (height, weight using scale, age, and gender). Finally, have them hold out their arms completely straight and hold the handles of the machine with their thumbs resting on top. In a few seconds, the

machine will be able to calculate the fat percentage values and you'll be able to compare them to the chart values below.

Female

Age	Athlete	Ideal	Average	Above Ave.	Overweight
16-25	12-19%	20-23%	24-30%	31-33%	34-%
26-35	13-20%	21-26%	27-32%	33-35%	36+%
36-45	14-23%	24-27%	28-35%	36-38%	39+%
46-55	15-24%	25-30%	31-37%	38-40%	41+%
55+	16-28%	29-33%	34-38%	39-41%	42+%

Male

Age	Athlete	Ideal	Average	Above Ave.	Overweight
16-25	3-8%	9-16%	17-22%	23-25%	26-%
26-35	6-12%	13-18%	19-25%	26-28%	29+%
36-45	7-13%	14-22%	23-27%	28-30%	31+%
46-55	9-18%	19-25%	26-30%	31-33%	34+%
55+	10-20%	21-26%	27-32%	33-35%	36+%

One-Lead EKG

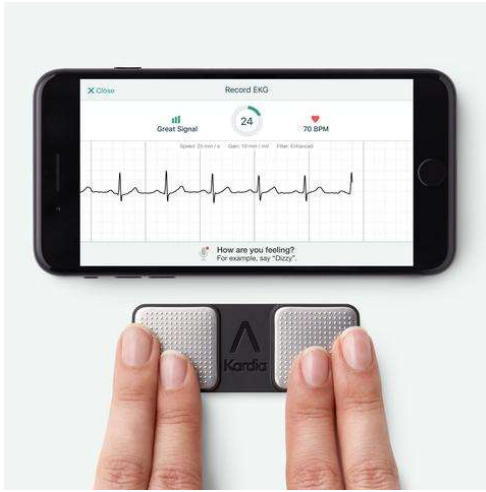
An EKG is a paper or digital recording of the electrical signals in the heart. It is also called an electrocardiogram or an ECG. The EKG is used to determine heart rate, heart rhythm and other information regarding the heart's condition. EKGs are used to help diagnose heart arrhythmias, heart attacks, pacemaker function and heart failure.

We will be using the FDA-cleared, clinical grade personal & portable EKG monitor called KardiaMobile (see below). Along with its accompanying app, Kardia captures a medical-grade EKG in 30 seconds and tells you if your heart rhythm is normal or if atrial fibrillation (A-fib) is detected.

To use, put two fingers on each of the silver leads, press start on the app and wait 30 seconds. After the scan, you will email the EKG to the participant and let him/her know to see their doctor for more information. It works with most smartphones & tablets on Android & iOS. You can find more info on the company's website: www.alivecor.com.

To measure one's one-lead electrocardiogram (EKG):

1. Open the Kardia app
2. Place the Kardia device on the back of your phone or close to the phone (no need to have it attached - it will detect via Bluetooth).
3. Have the patient hold the device so that there are two fingers comfortably resting on each electrode.
4. Press start and have patient hold still while the app captures data for 30 seconds.
5. email the EKG to the participant and let him/her know to see their doctor for more information



Although you are not expected to interpret the EKG, the app will be able to detect if there is atrial fibrillation and also be able to tell you the pulse rate.

Note: You will not need to know how to analyze an EKG but can be analyzed by studying components of the waveform. That's something you can look forward to medical school. You only need to know what it is, how it's used, and what it tells you.

Section 4: Diabetes

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*“Never regard study as a duty, but as
the enviable opportunity to learn.”*

—Albert Einstein

*“Live as if you were to die tomorrow.
Learn as if you were to live forever.”*

—Gandhi

Diabetes: the silent killer

—Anonymous

Introduction

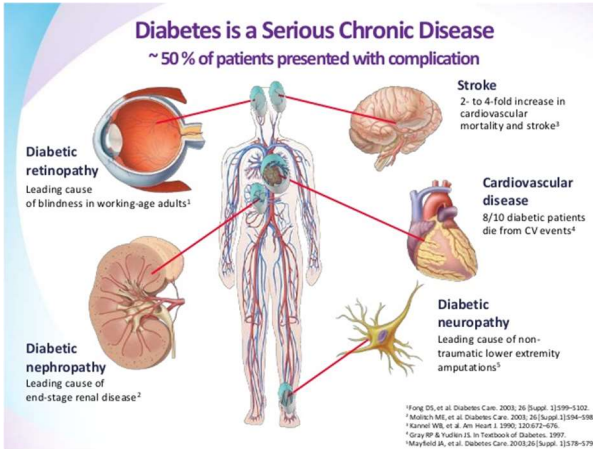
What is Diabetes? Diabetes, specifically Diabetes Mellitus, is a condition in which one's blood sugar is too high (termed, hyperglycemia).

There are three main types of diabetes:

- 1) Gestational diabetes: diabetes caused by pregnancy
- 2) Type 1 diabetes: conditions caused by lack of insulin production due to pancreatic beta cell destruction
- 3) Type 2 diabetes: most common form of diabetes caused by increased insulin resistance; caused by genetic, behavioral, and environmental factors.

For the rest of this section, we will be focusing on Type 2 Diabetes (T2D).

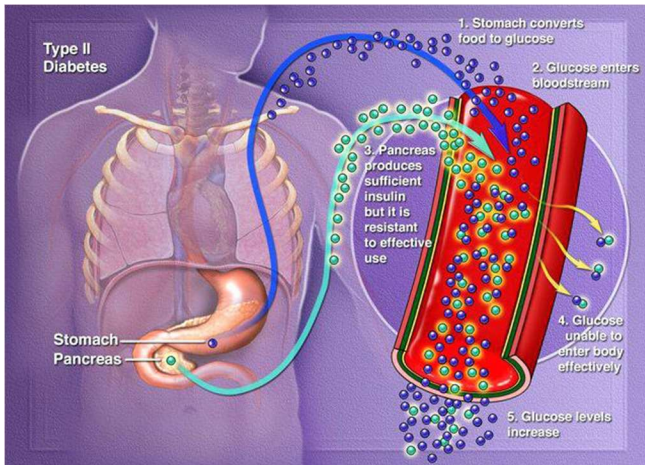
Anatomy



Initial dysfunction occurs in the pancreas. Once blood sugar levels rise to a toxic level, all organs start to be affected. Diabetic retinopathy (eyesight degeneration), neuropathy (nerve degeneration), and nephropathy (kidney failure) are hallmark complications. Diabetics are also at increased risk for heart attacks,

stroke, and are associated with infections and comorbidities (hypertension, obesity etc.) as well.

Physiology



As glucose levels increase in the bloodstream due to insulin's ineffectiveness at sending glucose into cells, they react with other metabolites in the blood as well as the cells lining the blood vessels. This can cause inflammation, lead to scarring, calcification, and atherosclerosis of the arteries, and hinder the function of cells and proteins. Over time, this hardening of the arteries reduces its effectiveness and slowly leads to loss of blood circulation and all the symptoms described above.

Diagnosis

Table 2 – American Diabetes Association diagnostic criteria for diabetes¹⁸

Test*	Threshold	Qualifier
Hemoglobin A _{1c} or	≥ 6.5%	Lab NGSP-certified, standardized DCCT assay
Fasting glucose or	≥ 126 mg/dL (7.0 mmol/L)	No caloric intake for at least 8 hours
2-hour glucose or	≥ 200 mg/dL (11.1 mmol/L)	After 75 g of anhydrous glucose
Random glucose	≥ 200 mg/dL (11.1 mmol/L)	Plus classic hyperglycemia symptoms or crisis

NGSP, National Glycohemoglobin Standardization Program; DCCT, Diabetes Control and Complications Trial.
* Results must be confirmed by repeated testing.

At NADI screening events, you will most likely be measuring random blood sugar (also known as random blood glucose or just random glucose). Because random blood sugar is measured without any restriction on diet, there is no pre-diabetic range as there is for fasting glucose (100-125 mg/dl). All results you obtain must be confirmed by a physician by repeated testing.

If someone's blood sugar is high, do not let patients excuse their levels due to a large meal or stress at work. You must make sure they understand the importance of maintaining a normal blood sugar level.

Regardless of blood sugar level, you should always explain what the numerical values indicate. Avoid using vague words like “normal” or “good” because these words do not give an accurate depiction of the values. You may say it is in the “healthy range” and ask follow-up questions about their diet, previous values, and any medications that they take.

Treatment

Oral Medications for Diabetes				
Type	Brand Name	for	What does it do?	Possible Side Effects
Sitagliptin	Januvia	Type 2	<ul style="list-style-type: none"> Increases the level of several hormones, which improves insulin release from pancreas Decreases post meal glucose spikes 	<ul style="list-style-type: none"> Upper respiratory symptoms Abdominal discomfort
Sitagliptin + metformin	Janumet	Type 2	<ul style="list-style-type: none"> Increases the body's sensitivity to insulin Helps the pancreas to release insulin more normally 	<ul style="list-style-type: none"> Diarhea Bloating Upper respiratory symptoms
Sulfonylureas	Glipizide, Glimperperide, Glyburide	Type 2	<ul style="list-style-type: none"> Stimulates the pancreas to make insulin; lowers blood sugars pre and post meals 	<ul style="list-style-type: none"> Hypoglycemia (low blood sugar)
Metformin	Metformin, Glucophage	Type 2	<ul style="list-style-type: none"> Increase the body's (the liver) sensitivity to insulin 	<ul style="list-style-type: none"> Nausea Diarhea
Thiazolidenediones*	ACTOS, Avandia	Type 2	<ul style="list-style-type: none"> Increase the body's (muscle) sensitivity to insulin Improves pre and post meal glucose 	<ul style="list-style-type: none"> Fluid retention Weight gain
Alpha-glucosidase inhibitors	Precoese, Glycet	Type 2	<ul style="list-style-type: none"> Slows absorption of carbohydrates from intestines Lowers post meal glucose 	<ul style="list-style-type: none"> Bloating Gas Flatus
Colesevelam	Weichol	Type 2	<ul style="list-style-type: none"> Generally lowers glucose, mechanism unclear 	<ul style="list-style-type: none"> Heartburn Bloating Constipation
Glinides	Prandin, Starlix	Type 2	<ul style="list-style-type: none"> Stimulates pancreas to release insulin after meals Improves post meal glucose 	<ul style="list-style-type: none"> Hypoglycemia (low blood sugar)

If a patient asks you about a medication, the answer should consist of a qualifying phrase explicitly stating that you are not a doctor and cannot prescribe or suggest changes in dosage for any medication.

To the left, you will a list of common medication names (both generic and brand) for diabetes. Someone may say they do not have diabetes but later on they may say that they take one of these medications. You need to be able to recognize that, so become familiar with the names.

Metformin is the first-line therapy for diabetes and insulin is a common therapy as well.

Preventative Guidelines

Get More Physical Activity

- Lose weight, Lower your blood sugar and Boost your sensitivity to insulin — which helps keep your blood sugar within a normal range.
- Research shows that both aerobic exercise and resistance training can help control diabetes, but the greater benefit comes from a fitness program that includes both.
- Adults should exercise at least 150 minutes a week and at least 3 times a week.
- Reduce time spent sitting to less than 90 minutes per sitting

Moderate and Vigorous Exercise

A 154-lb (69 kg) man who is 5'10" uses up approximately the number of calories listed doing each activity below. *Those who weigh more will use more calories, and those who weigh less will use fewer.* The calorie values listed include both calories used by the activity and calories used for normal body functioning.

	Approximate Calories Used by a 154-lb Man	
	In 1 hour	In 30 minutes
Moderate Physical Activities:		
Hiking	370	185
Light gardening/yard work	330	165
Dancing	330	165
Golf (walking and carrying clubs)	330	165
Bicycling (less than 10 miles per hour)	290	145
Walking (3.5 miles per hour)	280	140
Weight training (general light workout)	220	110
Stretching	180	90
Vigorous Physical Activities:		
Running/jogging (5 miles per hour)	590	295
Bicycling (more than 10 miles per hour)	590	295
Swimming (slow freestyle laps)	510	255
Aerobics	480	240
Walking (4.5 miles per hour)	460	230
Heavy yard work (chopping wood)	440	220
Weight lifting (vigorous effort)	440	220
Basketball (vigorous)	440	220

Source: U.S. Department of Agriculture: Choose MyPlate.gov. Physical Activity. How many calories does physical activity use? Modified June 2011. Available at http://www.choosemyplate.gov/food-groups/physicalactivity_calories_used_table.html. Accessed January 21, 2015.

Get Plenty of Fiber

- Reduce your risk of diabetes by improving your blood sugar control, Lower your risk of heart disease, Promote weight loss by helping you feel full
- Foods high in fiber include fruits, vegetables, beans, whole grains, nuts and seeds.

Go to Whole Grains

- Try to make at least half your grains whole grains. Many foods made from whole grains come ready to eat, including various breads, pasta products and many cereals.

Skip Fad Diets and Just Make Healthier Choices

- Fad diets may help you lose weight at first, but their effectiveness at preventing diabetes isn't known.
- By excluding or strictly limiting a particular food group, you may be giving up essential nutrients. Instead, think variety and portion control as part of an overall healthy-eating plan.
- Resources to tell patients: MyPlate.gov to track calories.

Section 5: Hypertension

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*"It is not the size of the man but the size of his heart that matters."
—Evander Holyfield*

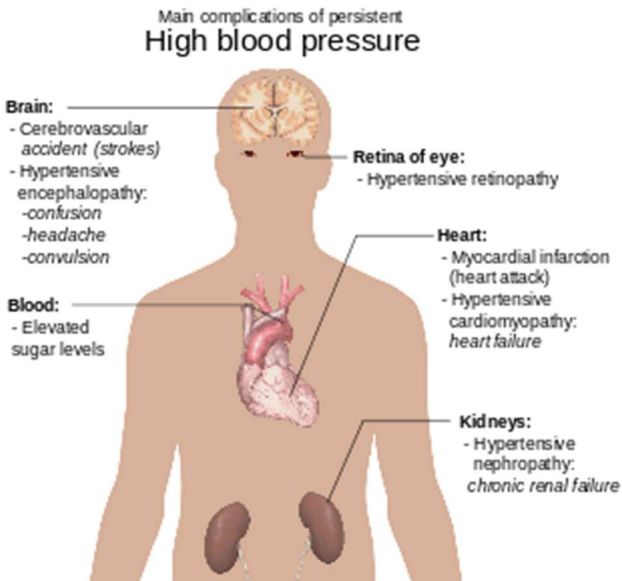
*"For every complex problem there is an answer that is
clear, simple, and wrong."
—H. L. Mencken*

*"Only from the heart can you touch the sky."
- Ru mi*

Introduction

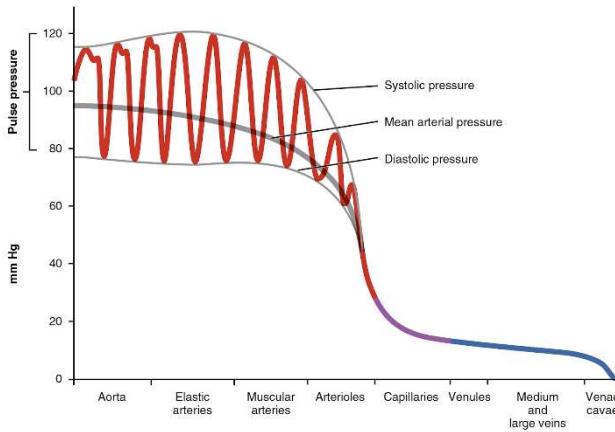
What is Hypertension? Hypertension is a condition defined by high blood pressure. Blood pressure is the pressure of the blood on the arteries.

Anatomy



Hypertension results in various abnormalities in the eye, brain, kidneys and heart. Be sure to tell patients of these complications and also take notice of any such changes when taking one's blood pressure. You may ask questions about their eyesight or changes in mental status to elicit more information if you suspect prolonged hypertension.

Physiology



Blood pressure is defined by a systolic blood pressure (SBP - ventricles contracting) and a diastolic blood pressure (DBP - ventricles relaxing). Pulse pressure = SBP - DBP

Mean arterial pressure = $\frac{1}{3}$ (SBP) + $\frac{2}{3}$ (DBP)

Pressure is highest in the biggest arteries and that is what we try to estimate when taking blood pressure.

Diagnosis

Blood Pressure Category	Systolic mm Hg (upper #)		Diastolic mm Hg (lower #)
Normal	less than 120	and	less than 80
Prehypertension	120 – 139	or	80 – 89
High Blood Pressure (Hypertension) Stage 1	140 – 159	or	90 – 99
High Blood Pressure (Hypertension) Stage 2	160 or higher	or	100 or higher
<u>Hypertensive Crisis</u> (Emergency care needed)	Higher than 180	or	Higher than 110

Above are the ranges for the old guidelines for hypertension and prehypertension. Note: either the systolic OR the diastolic have to be higher than the threshold for you to have hypertension (e.g. 116/96 is hypertension).

Blood Pressure Categories



BLOOD PRESSURE CATEGORY	SYSTOLIC mm Hg (upper number)		DIASTOLIC mm Hg (lower number)
NORMAL	LESS THAN 120	and	LESS THAN 80
ELEVATED	120 – 129	and	LESS THAN 80
HIGH BLOOD PRESSURE (HYPERTENSION) STAGE 1	130 – 139	or	80 – 89
HIGH BLOOD PRESSURE (HYPERTENSION) STAGE 2	140 OR HIGHER	or	90 OR HIGHER
HYPERTENSIVE CRISIS (consult your doctor immediately)	HIGHER THAN 180	and/or	HIGHER THAN 120

These are the new hypertension guidelines. >130/80 is considered hypertension, whereas previously it was >140/90. NADI members will continue to use the old guidelines until January 1st, 2019, after which all NADI members will adopt the new guidelines.

Treatment

Common Drug Classes	Medications	Common side effects
Diuretics	Chlorthalidone, hydrochlorothiazide, indapamide	Increase urination, low sodium, gout
Beta-blockers	Metoprolol, atenolol, nebivolol	Fatigue, depression
Alpha blockers	Prazosin, doxazosin	Low blood pressure, dizziness
Alpha agonists	Clonidine, methyl dopa	Rebound hypertension if you miss the dose of medication, dry mouth, drowsiness
Calcium channel blockers	Amlodipine, diltiazem	Swelling of feet
Angiotensin converting enzyme inhibitors (ACEI)	Lisinopril, ramipril	Dry cough, increase in blood levels of potassium, swelling of lips and tongue (very serious reaction!!)
Angiotensin receptor blockers (ARB)	Telmisartan, olmesartan	Increase in blood levels of potassium
Vasodilators	Minoxidil, hydralazine	Swelling of feet

The most common treatments for hypertension include drugs that end in -pril, -olol, -artan, -thiazide. If you see a drug with any of these suffixes, more than likely it is for hypertension, even if the patient does not say he/she has hypertension.

Preventative Guidelines

Maintain a Healthy Weight

- When it comes to hypertension prevention, your weight is crucial. If you are carrying extra weight, losing as little as 10 pounds can help prevent high blood pressure.

Eat a Balanced Diet

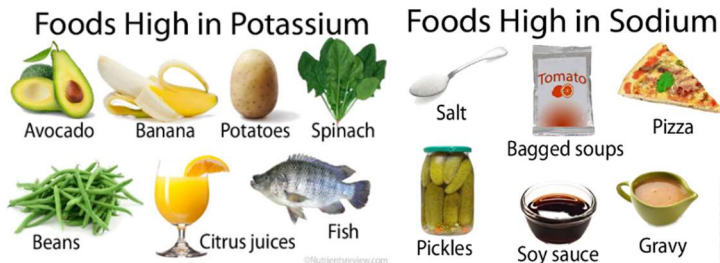
- Eating healthful foods can help keep your blood pressure under control.
- Get plenty of fruits and vegetables, especially those rich in potassium
- Limit your intake of excess calories, fat, and sugar.

Reducing Stress

- Stress temporarily spikes blood pressure and prolonged exposure to stress hormones can lead to long-term damage to the body.

Cut Back on Salt

- For many people, eating a low-sodium diet can help keep blood pressure normal.
- Avoid high-sodium packaged and processed foods and not adding extra salt to your meals
- Common foods with high salt include breads, processed foods, frozen foods, cereal
- Limit sodium intake to 2,300 mg a day.
- Eat foods high in potassium to offset the sodium intake.



Exercise Regularly

- The more exercise you get, the better, but even a little bit can help control blood pressure. Moderate exercise for about 30 minutes five times a week is a good start.

Moderate and Vigorous Exercise

A 154-lb (69 kg) man who is 5'10" uses up approximately the number of calories listed doing each activity below. *Those who weigh more will use more calories, and those who weigh less will use fewer.* The calorie values listed include both calories used by the activity and calories used for normal body functioning.

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Section 6: Patient Interaction

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*Patience is not simply the ability to wait –
it's how we behave while we're waiting.*

Joyce Meyer

*Be patient and understanding.
Life is too short to be vengeful or malicious.*

Phillips Brooks

*Have patience. All things are difficult
before they become easy.*

Saadi

Introduction

As you probably already know, the doctor-patient interaction is the most important relationship shared between these two parties. In the health screening setting, you won't be seeing any patients. Instead it will be more of a screener-screenee interaction. Even so, many concepts and ideas from the doctor-patient relationship can be found during health screening so make most of this time to learn more about this.

What matters most to people is the quality of the discussions and conversations specifically in

- Being listened to
- Receiving clear explanations
- Having their expectations met
- Being involved in healthcare decisions
- Being treated courteously and respectfully

So if you thought that the most significant predictors of patient satisfaction are technical skills, you're wrong. Taking time to communicate clearly, listen intently, understand each patient, and respond compassionately goes a long way toward not only improving patient satisfaction, but also improving outcomes. They are much more likely to listen to and understand medical advice when they themselves feel listened to and cared about.

This is pretty much all you need to know as a health screener. As you gain more and more experience in the health care environment, you'll better understand ways to interact with patients and people. Taking time to build quality interactions with people can actually save you time and help you improve the health care environment for the better. Continue reading if you're interested in learning more about patient interaction.

*Here are five strategies to ensure the most effective patient interactions:

- **Don't assume**
No two people are the same. Don't assume you know how your patients feel and what they care about. Ask them.
- **Listen to understand, not to respond.**
Be genuinely curious about what your patients say, what they ask about, and what they understand.
- **Acknowledge your patient's emotions.**
Ask open-ended questions about how he sees his situation ("What do you understand about what we have discussed today?"), and let him know you are his partner in health.
- **Find out what your patient cares about and needs from you.**
("How can I be most helpful to you in this situation?"). Let patients know what they can expect as it relates to their diagnosis, treatment, and interactions with you, their doctor.
- **Make people feel safe.**
Let patients know what to expect. Whenever possible, involve patients in decision making about their medical care. Help patients know that you will do everything you can to help them through their situations. Treat them with compassion, respect, and courtesy. And be honest, do what you say you are going to do, and be willing to tell patients when you don't know something.

Introducing Yourself

Key points to remember when introducing yourself to a patient include:

1. Clarify whether they speak English. If they do not, still introduce yourself by saying, “Hello, my name is ___ and I will be doing your _____ checkup today.” Most individuals can understand phrases and words in English. Look around to see if they have family members who can speak English and communicate with them if necessary.
2. Remember to ask them if they are here for health screenings, specifying the types of screenings (blood pressure, BMI, blood sugar etc.) being offered.
3. Determine which screenings a patient would like, if not all of them.
4. Before doing your screening procedure, make sure they are comfortably situated with no visible distress or nervousness. A few encouraging words or small talk during this transition phase from introduction to measurement, like “Have you ever had your blood pressure taken?” or “How has your day been?” may help
5. Although the above points are important, do not become overly concerned with hitting all the of them. Be yourself and talk as you would to a colleague.

BMI

When you interpret BMI and Fat percentage, always begin by explaining what BMI is.

Body Mass Index (BMI) is a measure of one's weight as per one's height. The higher the BMI, the heavier you are. Then go on to explain what their BMI is and explain what it means.

Most people will not know what 26 means, so be sure you can tell them which category they are in (underweight, normal, overweight, or obese) and how much weight they have to reduce to get back into the normal, healthy range.

Please keep in mind the exceptions where BMI is not an accurate measure to use, described in detail in the BMI section of the module.

Heart Rate

Whenever you are interpreting any clinical values, please be mindful that the patient may not be happy with the number or may be anxious about it. Do not just say the value without any interpretation or explanation for what it means.

If someone's heart rate is greater than 100, you would first ask them to sit and relax for some time (5-10 minutes) and measure it again. If it is still high, you would ask them if they know they have a high heart rate, and if not, that they should see a doctor when possible. Reassure them that this is something that can get better.

Our job is to give hope to patients and to show that preventative care can help avoid many diseases, not to just say a number and interpret it coldly.

Blood Pressure

Blood pressure interpretation is likely the hardest of all the NADI tasks. Although blood pressure measurements can take some practice to master, after you've done it a couple times at screening events, it becomes second nature. Interpretation, however, is an ever-changing science that requires you to quickly say the readings and explain them to the patient eagerly waiting. Any hesitation and the patient begins to lose confidence in your reading.

When you interpret a reading, begin by saying the number loud and clear without saying "I got..." or "I think it is...". You should be sure your reading is right and say "Your blood pressure is". Many of the patients understand what the numbers mean so you should always say them even if you are planning to measure the other arm.

Below are frequently asked questions by patients:

1. How do I lose weight? A: exercise, portion-controlled diet - skip the fad diets because their role in disease is not well understood
2. How do I reduce my blood pressure? A: DASH diet, see nutrition section
3. How do I reduce my blood sugar? A: see diabetes nutrition section
4. How much weight do I have to reduce? A: see BMI section
5. What does blood pressure mean? A: see hypertension section
6. Do I have to start taking medication? A: I am not a doctor so I cannot say. Your values were high, so I definitely suggest you go to your primary care physician.
7. I never had such a high blood pressure before. Why is it so high now? A: caffeine, smoking, exercise, or he/she does have high blood pressure. Tell them to check again at home or at a pharmacy store. If still high, go to doctor.
8. Is an automatic machine better than manual? A: Manual is more accurate, but automatic does the job.
9. I recently started a new medication. A: Do you think my value is high/low because of that? It is possible, but I cannot say for sure. Have you done anything different the last few days besides medication?

10. A patient takes medication in the morning, but blood pressure is high in the evening at the screening event. How do you proceed in answering this?

a. Did you take your medication today?

b. If they did, have you measured your blood pressure in the evening before? Your blood pressure fluctuates during the day and could rise in the evening after medication wears off.

c. If they did not, they should take it as soon as they can. Tell them that it is important to take the medication at the same time every day because blood pressure fluctuates throughout the day and works the best if you get into a routine and take it 10-14 hours before your peak blood pressure.

d. Do you have a machine at home? If so, you should try measuring your blood pressure at different times of the day and record the numbers. That way your doctor can know exactly when it increases.

There is no one-time-fits-all time for taking blood pressure medications. Depending on the medication and a person's normal fluctuations, there are different times when it should be taken. The general guidelines are that one should take blood pressure medications 10-14 hours before your highest blood pressure in the day. Many people have high blood pressure in the morning when they wake up; hence, they take it at night. Others take it in the morning because their highest blood pressure is in the evening.

Never ask a patient to change their timing until they consult their physician.

Questions to Ask Patients before taking their blood pressure

1. Have you had any caffeine, smoked, or did exercise before coming here?
2. Do you have family history of diabetes / hypertension?
3. Have you been diagnosed with diabetes / hypertension previously?
4. Do you take medications for diabetes / hypertension?
5. What does your diet consist of? Breakfast, lunch, dinner?
6. How many times do you exercise a week? For how long?
7. Have you taken your medication today?
8. Have you tried to reduce your blood pressure / blood sugar?

Questions to Ask Patients after taking their blood pressure

1. Did you get a similar reading when your blood pressure was taken before?
2. When was the last time you got your blood pressure taken?
3. May I take blood pressure in the other arm because there could be a difference in the two arms?
4. Do you have any questions for me?

Many of the above questions can be interchanged between before or after taking blood pressure.

Resources for Patients

- Federally Qualified Health Centers (FQHC) for the uninsured: <http://web.doh.state.nj.us/apps2/fhs/cphc/cphcList.aspx>
- American Diabetes Association: <https://www.diabetes.org>
- American Heart Association: <https://www.heart.org>
- Food Planner: <https://www.choosemyplate.gov>
- Health Insurance: <https://www.healthcare.gov>
- NADI website: <https://www.NADIaid.org>

Section 7: Other

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*“If one cannot enjoy reading a book over and over again,
there is no use in reading it at all.”*

—Oscar Wilde

*“Study without thought is vain:
thought without study is dangerous.”*

—Confucius

*“It is better, of course, to know
useless things than to know nothing.”*

—Lucius Annaeus Seneca

Wellness

It's been found that individuals that have actively looked after their health, wellness, and managed their stress well did better almost every time than those who had poor health and stress management. We cannot emphasize this enough: a great score with poor health means nothing at the end of the day, but a great score and a better you means everything. Finding this balance will be a key indicator of how well you will flourish in medical school.

So what is wellness, anyways? Do we define it by how well we feel when we wake up in the morning? Wellness encompasses many aspects of ourselves and it affects the different parts of us that make us who we are. It encompasses the tangible and intangible aspect of ourselves.

Intellectual wellness

Determines how open we let our minds be to new ideas and experiences. They can be applied to personal decisions as well as our interaction with others. To better your intellectual wellness, strive to learn new concepts and seek challenges in pursuit of lifelong learning.

Spiritual wellness

Describes one's ability to find and establish peace and harmony in his or her life. It is the ability to develop and accordance between one's values and actions. A disconnect between the two will lead to great instability. Make sure you are aware of the reasoning and intentions behind your actions and make sure they align with your values.

Emotional wellness

Describes how well we can understand ourselves as well as our ability of taking control of our thoughts and feelings. A person with emotional wellness can handle stress emotionally well by not allowing themselves to hold in their frustrations. Even if they are in an unfavorable situation, they are able to cope and bounce back. Being emotionally well means you feel good about yourself and are able to form good relationships with those around you. Keep in mind that being emotionally well does not necessarily mean you are always happy. It means you are in control of your thoughts, feelings, and behaviors.

Physical wellness

Our ability to get through our daily activities without experiencing significant physical stress or fatigue. You can take care of your physical wellness by ensuring you're eating nutritious meals, staying hydrated, exercising, as well as adopting other healthy habits. As a prospective medical student, you might have let out a chuckle reading this, but the more successful students and doctors have a healthy routine they have cultivated and stuck to at an early point and it helps them keep themselves in check. Avoid destructive habits and remember that anything good in excess is bad!

Social wellness

Describes one's ability to relate to and connect with others around us. Without emotional wellness, you are unstable with how you process your emotions and thus cannot form strong and positive social relationships with family, friends, and co-workers. Think of your social wellness as an extension of your emotional wellness. To better it, you need to make sure your emotional wellness is not lacking.

Nutrition

Top 10 facts about Nutrition and Diabetes

1. Insulin is the hormone used to regulate glucose levels.
2. Nutrition affects Blood Glucose Levels.
3. Four things that affect the glycemic index are the ripening and storage time of foods, processing of food, how long the food is cooked, and the variety the food comes in.
4. Carbohydrate counting is a beneficial method of measuring carb intake.
5. Having an individualized meal plan is beneficial for health. Medical Nutrition Therapy is a helpful tool in establishing this.
6. Medicare pays for medical nutrition therapy for people with diabetes.
7. Hypoglycemia can occur in cases where alcohol is present.
8. Women should limit alcohol consumption to once a day while men twice a day.
9. A diabetics plate should consist of 60% carbs, 30% fats, and 12-20% proteins
10. Type II Diabetes is the common type in association with poor health choices.

Exercise

10 Key Facts About Exercise

1. Exercise makes it easier to control your glucose levels and insulin sensitivity and thus control diabetes
2. Two types of exercise: aerobic (good for your heart) and resistance training (good for your muscles and bones)
3. Aerobic or endurance exercise makes it easier for the body to use insulin more effectively and can help reduce overall blood sugar levels
4. Resistance or strength training can decrease insulin resistance, and also increase muscle strength, muscle mass and bone density
5. The ADA recommends getting 30 minutes of moderate-to-vigorous intensity aerobic exercise at least 5 days a week or a total of 150 minutes per week for health benefit/management.
6. Any type of exercise should be of moderate intensity, enough so one can talk, but not sing during the activity.
7. Aerobic exercise may not be feasible for some elderly and obese individuals, so resistance training is a good alternative but is sometimes dependent on equipment, knowledge of exercise technique, or some initial instruction
8. It is important to find the time and start, and this can be done by breaking up/varying exercises throughout the day (i.e walking 15 minutes and/or 15 minutes of climbing stairs later in the day).
9. Fueling your body with food before exercise is important because not eating before workout can lead to low blood sugar, cause your metabolism to slow down, and limit the amount of energy for your workout.
10. Drink water before, during, and after exercise! When there isn't enough water in your body, the glucose in your bloodstream becomes much more concentrated. This means simple dehydration can easily lead to higher blood sugar levels.

Research

For most of the people going through this book, research refers to the application of the scientific method to expand human knowledge. At the very least, this requires a hypothesis, an experiment that tests that hypothesis, and either the rejection, or acceptance of that hypothesis.

With respect to the health fields, this can range from detecting signaling molecules in cell culture, determining the efficacy of treatments in disease models, surveying patient populations for clinic usage statistics, injury threshold testing with cadavers, NIH funded Phase 3 clinical trials, and so on. The house of medicine is huge and there is a place for nearly every interest. Many different techniques are used and nearly every discipline can bring some new insight.

Clinical research generally refers to research with human subjects. Many definitions will focus on testing the efficacy of a drug or treatment, and this encompasses a large part of the clinical research literature. But many cohort and cross-sectional studies don't generally involve treatments, but they are considered clinical research. If the project requires human subjects and IRB approval, then it most likely is clinical research.

All research studies involving human subjects are required to fill out an IRB protocol to either exempt them from approval (if dealing with retrospective, de-identified data) or to get approval. Any information that includes personal health identifiers (PHIs), such as name, date of birth, SSN, address, zip code, and contact information, are all considered confidential data that must be protected and approved by the IRB committee.

For you, you'll be collecting data during health screenings and if you'd like, analyzing, concluding, and publishing this data. Thus, before the participant even begins screen, he/she will need to sign a **consent form**, one for health screening and the other for research (IRB) purposes. Remember consent is extremely important not only

to remove liability for yourself but also to allow everyone to understand what is going on. It's also required under HIPAA.

During screening, you'll have a **patient form** where you will fill in the participant's metrics (heart rate, blood pressure, blood glucose, etc.). You will keep the carbon copy and give them the original copy back for them to keep. All the data has to be entered into the NADI tablet at the end of the event. Although you do not need to worry about that, if you decide to become an e-board member, you will be responsible for that. There will also be a questionnaire that you will administer to participants.

Outside of screenings, you can analyze the data using Excel, SPSS, or SAS. We will have a separate course for you to learn these things. Eventually you can write up your findings and publish this data in a peer-reviewed, PubMed-indexed journal.

Ethics

In a more professional sense, screening allows for people to reduce the risk of morbidity and mortality through early knowledge. In our case, we are screening just to empower the individual and allow them to take better control of their health. There are many ethical issues that have arisen as a result of screening in process of screening in general or specific screening programs:

- Consent for screening
- Utility of the screening tests employed
- Funding of screening programs
- Equity of access to screening
- Uses of screening data

It's critical that ethical issues are understood and remembered to ensure great experiences for both the screener and the screened. No doubt new ethical issues will arise as new technologies and new treatments are developed. For us, we need to make sure that the participants understand and sign a form before getting screened demonstrating that they understand and accept the terms and conditions of the screen.

Doctors swear by 4 core ethical principles when taking the Hippocratic oath (referenced in part from <https://depts.washington.edu/bioethx/tools/princpl.html>)

1. Autonomy: "Requires that the patient have autonomy of thought, intention, and action when making decisions regarding health care procedures [or in NADI's case, health screenings]. Therefore, the decision-making process must be free of coercion or coaxing. In order for a patient to make a fully informed decision, she/he must understand all risks and benefits of the procedure and the likelihood of success."

2. Justice: "The idea that the burdens and benefits of new or experimental treatments must be distributed equally among all groups in society. Requires that procedures uphold the spirit of existing laws and are fair to all players involved." In NADI's case,

this means you need to treat all participants and patients equally, regardless of language, culture, gender, or nationality.

3. Beneficence: "Requires that the procedure be provided with the intent of doing good for the patient involved. Demands that health care providers develop and maintain skills and knowledge, continually update training, consider individual circumstances of all patients, and strive for net benefit." Although as NADI students you do not have to weight positives and negatives because you are asked only to do screenings, if you are consenting a participant for one of our research projects, you must factor in their inconvenience and willingness to participate in the study.

4. Maleficence: "Requires that a procedure does not harm the patient involved or others in society." This is especially important because you must not lie about your readings or lack thereof and must be able to interpret the values correctly and comprehensively. You must also know when to not do a measurement (e.g. do not do blood pressure in arm affected by breast cancer).

HIPAA

When talking about ethics, patient privacy is also as important as the ethical principles mentioned before. Health Insurance Portability and Accountability Act (HIPAA) is a US law that lists privacy standards to protect patients' medical records and other health information. While you may think that health screening is not subject to HIPAA, but if it's offered as a wellness program as part of a group health plan, then it falls under HIPAA rules.

Regardless, NADI will follow these rules and all members will need to get HIPAA training. This training is usually provided for free by your university, but we hope to eventually implement one as well. See the training status and learn more information at www.NADId.org/HIPAA

HIPAA contains thousands of different regulations, but they can be broken down into 3 main rules:

1. Privacy Rule
2. Security Rule
3. Breach Notification Rule

Privacy Rule

- Sets standard for protected health information (PHI)
- Provides individuals important rights to their protected PHI, like the right to examine and obtain a copy
- Examines how PHI can be used and disclosed

Security Rule

- Protect against unreasonable or impermissible use
- Detect and defend against security threats to electronic protected health information (ePHI)
- Safeguard the confidentiality, integrity, & availability of ePHI

Breach Notification Rule

- Mandates affected individuals, government bodies, and other related parties to be informed about breaches

Covered Entities

While it's clear that all health care providers must go through HIPAA training, did you know that business associates involved in any of the PHI process also fall under HIPAA rules? This includes anyone in billing, consulting, legal, and management. Thus, any person who handles or may potentially handle patient information must undergo training and follow HIPAA Rules.

Penalties

Breaking any of these rules may result in civil and criminal penalties ranges from thousands to millions of dollars. Therefore, we take the HIPAA training and rules very seriously and do our best to ensure that they are always followed.

More Information

Resources	Link
Training Materials	HHS.gov/hipaa/for-professionals/training
HIPAA Guidance	HHS.gov/hipaa/for-professionals/privacy/guidance
HIPAA Breach Notification Rule	HHS.gov/hipaa/for-professionals/breach-notification
HIPAA Covered Entities	HHS.gov/hipaa/for-professionals/covered-entities
HIPAA Compliance and Enforcement	HHS.gov/hipaa/for-professionals/compliance-enforcement
HHS Special Topics in Health Data	HHS.gov/hipaa/for-professionals/special-topics

Cultural Competency

10 Key Benefits of Cultural Competency

Social Benefits

- Increases mutual respect and understanding between patient and organization
- Increases trust
- Promotes inclusion of all community members
- Increases community participation and involvement in health issues
- Assists patients and families in their care
- Promotes patient and family responsibilities for health

Health Benefits

- Improves patient data collection
- Increases preventive care by patients
- Reduces care disparities in the patient population
- Ability to receive better care through improved cultural understanding from health professional.

Section 8: Journal & Reflection

The care of humanity unfolds in stories. The ability to absorb, interpret, and reflect upon experiences in health care allows for more humane and compassion care in medicine. It puts power in both patients and caregivers enabling them to be valued that improves medicine for the better.

You can begin as early as training, writing down your experiences and thoughts about medicine. Remember, there is no limit. Write about anything you want. Observations, analyses, unique quirks. This is your space to explore both yourself and the field of medicine.

In this section, you will get the opportunity to participate in narrative medicine, writing down your own personal experiences as you interact with various people.

Possible Events: Health Screening, Educational Workshops, Non-clinical Volunteering, etc.

Possible Locations: schools, colleges, libraries, festivals, carnivals, farmer's markets, 5K run, YMCA, hospitals, clinics, churches, temples, other faith-based organizations

Possible Activity Types: training, assessments, meetings, clinical, and non-clinical

Journal Questions:

- What did you do?
- What did you learn?
- What did you experience?
- Why pursue a medical career?
- How does this relate to medicine?
- How does this relate to aspects of your life?
- How does this relate to school or future career?
- How can the health screening experience be improved?

Training Date: _____ Hours: _____

Location: _____

Assessment Date: _____ Hours: _____

Location: _____

Re-Training Date: _____ Hours: _____

Location: _____

Re-Assessment Date: _____ Hours: _____

Location: _____

Date: _____ Hours: _____

Event: _____

Location: _____

Activity Type: _____

Date: _____ Hours: _____

Event: _____

Location: _____

Activity Type: _____

Date: _____ Hours: _____

Event: _____

Location: _____

Activity Type: _____

Date: _____ Hours: _____

Event: _____

Location: _____

Activity Type: _____

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Push yourself, because no one else is going to do it for you.

Your limitation—it's only your imagination.

Sometime later = never. Do it now.

—Anonymous

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Abbreviations

AFIB	Atrial fibrillation	Disturbance of heart rhythm
BMI	Body mass index	Measure showing if people have the right weight for their height
BP	Blood pressure	Force of blood pushing against the walls of arteries
CAT	Computerized axial tomography	Type of x-ray
CBC	Complete blood count	Blood test that measures many properties in the blood
CNS	Central nervous system	Brain and spinal cord
CVD	Cardiovascular disease	Condition involving narrowed or blocked blood vessels; Can lead to stroke, heart attack, or chest pain; Heart & circulatory disease
ECG, EKG	Electrocardiogram	Measures electrical impulses of the heart
ECHO	Echocardiogram	Test that uses sound waves to look at the heart
EEG	Electroencephalogram	Test that measures electrical impulses of the brain
GI	Gastrointestinal	Another term for your digestive system
HDL	High-density lipoprotein	Type of cholesterol, also known as "good" cholesterol
HGB	Hemoglobin	A blood test measurement
HTN	Hypertension	High blood pressure
IM	Intramuscular	Type of injection into the muscle
IV	Intravenous	Type of injection into the veins
LDL	Low-density lipoprotein	Type of cholesterol, also known as "bad" cholesterol
MI	Myocardial infarction	Heart attack
PHI	Protected Health Information	Or personal health identifiers
RBC	Red blood cell	Type of blood cell
T1D	Type 1 diabetes	Insulin-dependent diabetes
T2D	Type 2 diabetes	Adult onset diabetes mellitus
WBC	White blood cell	Type of blood cell
TC	Total cholesterol	Total cholesterol in bloodstream
TG	Triglyceride	Type of fat (lipid) in the blood

Most Common Abbreviations

DOB	Date of Birth
DM	Diabetes mellitus
Ht	Height
pt.	patient
SOB	Shortness of Breath
Wt	Weight
Temp	Temperature

Symbols

♀	female
♂	male
+ve	positive
-ve	negative
Δ	diagnosis

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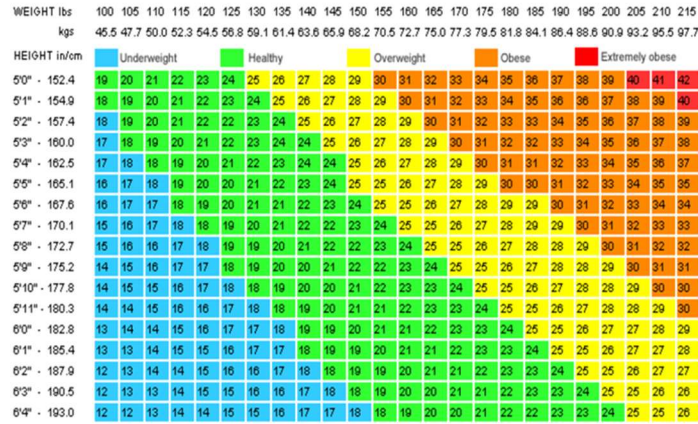
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Rapid Review

Screening	Device	Ranges	Description
Body Mass Index	Scale (Wt) Self-reported (Ht) (stadiometer in doctor's office)	Varies (see chart)	Measure showing if people have the right weight for their height
Waist Circumference	Measuring tape	Normal: <31.5 in (♀) <37.0 in (♂)	Indicator of health risk with excess waist fat
Blood Pressure	Stethoscope & cuff (Sphygmomanometer)	Normal: 120/80 High BP: >130 or >80 mm Hg	Provides insight into HTN risk
Blood Glucose	Alcohol swabs, lancing device, lancet, test strips, glucometer	Normal: 80-140 mg/DL; depends on eating time	Provides insight into diabetes risk
Cholesterol	Alcohol swabs, lancing device, lancet, test strips, cholesterol meter	TC: <200 LDL Chol: <130 HDL Chol: >50 TG: <200	Provides insight into stroke & heart attack risk
Heart Rate Pulse Rate	Stopwatch	Normal: 60-100 BPM Depends on age	Measured by the # of contractions (beats) per min.
Respiratory Rate	Stopwatch	Varies	# of times the chest rises or falls per minute
Pulse Oximetry	Pulse oximeter	Normal: > 95%	Measured oxygen saturation in blood
Grip Strength	Dynamometer	>55 (♀) >85 (♂) Depends on age	Measures hand strength
Fat Percentage	Fat monitor	Depends on age	Measure of fitness level examining body composition
Electrical Heart Activity	EKG (one-lead)	Read device	Assesses electrical & muscular heart functions

Reference Charts

BMI Chart



Waist Circumference

Health risk	WOMEN	MEN
Low Risk	below 31.5 inches	below 37 inches
Moderate Risk	31.5 to 35* inches	37 to 40 inches
High Risk	35* inches or more	40.2 inches or more

Blood Pressure Categories



BLOOD PRESSURE CATEGORY	SYSTOLIC mm Hg (upper number)		DIASTOLIC mm Hg (lower number)
NORMAL	LESS THAN 120	and	LESS THAN 80
ELEVATED	120 - 129	and	LESS THAN 80
HIGH BLOOD PRESSURE (HYPERTENSION) STAGE 1	130 - 139	or	80 - 89
HIGH BLOOD PRESSURE (HYPERTENSION) STAGE 2	140 OR HIGHER	or	90 OR HIGHER
HYPERTENSIVE CRISIS (consult your doctor immediately)	HIGHER THAN 180	and/or	HIGHER THAN 120

BLOOD GLUCOSE CHART

Mg/DL	Fasting	After Eating	2-3 hours After Eating
Normal	80-100	170-200	120-140
Impaired Glucose	101-125	190-230	140-160
Diabetic	126+	220-300	200 plus

Cholesterol

	Desirable	Borderline High	High
Total Cholesterol	Less than 200	200 - 239	240 and higher
LDL Cholesterol (the "bad" cholesterol)	Less than 130	130 - 159	160 and higher
HDL Cholesterol (the "good" cholesterol)	50 and higher	40 - 49	Less than 40
Triglycerides	Less than 200	200 - 399	400 and higher

Heart Rate

Men (beats per minute)

Age	18 - 25	26 - 35	36 - 45	46 - 55	56 - 65	65 +
Athlete	49 - 55	49 - 54	50 - 56	50 - 57	51 - 56	50 - 55
Excellent	56 - 61	55 - 61	57 - 62	58 - 63	57 - 61	56 - 61
Great	62 - 65	62 - 65	63 - 66	64 - 67	62 - 67	62 - 65
Good	66 - 69	66 - 70	67 - 70	68 - 71	68 - 71	66 - 69
Average	70 - 73	71 - 74	71 - 75	72 - 76	72 - 75	70 - 73
Below Average	74 - 81	75 - 81	76 - 82	77 - 83	76 - 81	74 - 79
Poor	82 +	82 +	83 +	84 +	82 +	80 +

Women (beats per minute)

Age	18 - 25	26 - 35	36 - 45	46 - 55	56 - 65	65 +
Athlete	54 - 60	54 - 59	54 - 59	54 - 60	54 - 59	54 - 59
Excellent	61 - 65	60 - 64	60 - 64	61 - 65	60 - 64	60 - 64
Great	66 - 69	65 - 68	65 - 69	66 - 69	65 - 68	65 - 68
Good	70 - 73	69 - 72	70 - 73	70 - 73	69 - 73	69 - 72
Average	74 - 78	73 - 76	74 - 78	74 - 77	74 - 77	73 - 76
Below Average	79 - 84	77 - 82	79 - 84	78 - 83	78 - 83	77 - 84
Poor	85 +	83 +	85 +	84 +	84 +	85 +

Pulse Oximetry

Casualty	SpO2
Normal (Healthy)	> 95%
Normal (COPD)	88% – 92%
Hypoxic	85% – 94%
Severely Hypoxic	< 85%

Grip Strength

Female (Age)	Needs Improvement	Fair	Good	Very Good	Excellent
15-19	< 54	54-58	59-63	64-70	> 70
20-29	< 55	55-60	61-64	65-70	> 70
30-39	< 56	56-60	61-65	66-72	> 72
40-49	< 55	55-58	59-64	65-72	> 72
50-59	< 51	51-54	55-58	59-64	> 64
60-69	< 48	48-50	51-53	54-59	> 59

Male (Age)	Needs Improvement	Poor	Fair	Good	Excellent
15-19	< 84	84-94	95-102	103-112	> 112
20-29	< 97	97-105	106-112	113-123	> 123
30-39	< 97	97-104	105-112	113-122	> 122
40-49	< 94	94-101	102-109	110-118	> 118
50-59	< 87	87-95	96-101	102-109	> 109
60-69	< 79	79-85	86-92	93-101	> 101

Fat Percentage

Female

Age	Athlete	Ideal	Average	Above Ave.	Overweight
16-25	12-19%	20-23%	24-30%	31-33%	34+%
26-35	13-20%	21-26%	27-32%	33-35%	36+%
36-45	14-23%	24-27%	28-35%	36-38%	39+%
46-55	15-24%	25-30%	31-37%	38-40%	41+%
55+	16-28%	29-33%	34-38%	39-41%	42+%

Male

Age	Athlete	Ideal	Average	Above Ave.	Overweight
16-25	3-8%	9-16%	17-22%	23-25%	26-%
26-35	6-12%	13-18%	19-25%	26-28%	29+%
36-45	7-13%	14-22%	23-27%	28-30%	31+%
46-55	9-18%	19-25%	26-30%	31-33%	34+%
55+	10-20%	21-26%	27-32%	33-35%	36+%

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