PUBLIC HEALTH &
MICROBIOLOGY
NOTES

PRE-SUMMARIZED
READY-TO-STUDY
HIGH-YIELD NOTES

FOR THE TIME-POOR
MEDICAL, PRE-MED,
USMLE OR PA STUDENT

PDF

199 PAGES

A Message From Our Team

Studying medicine or any health-related degree can be stressful; believe us, we know from experience! The human body is an incredibly complex organism, and finding a way to streamline your learning is crucial to succeeding in your exams and future profession. Our goal from the outset has been to create the greatest educational resource for the next generation of medical students, and to make them as affordable as possible.

In this fourth edition of our notes we have made a number of text corrections, formatting updates, and figure updates which we feel will enhance your study experience. We have also endeavoured to use only open-source images and/or provide attribution where possible.

If you are new to us, here are a few things to help get the most out of your notes:

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Table Of Contents:

What's included: Ready-to-study notes of various population health & infectious disease topics presented in succinct, intuitive and richly illustrated downloadable PDF documents. Once downloaded, you may choose to either print and bind them, or make annotations digitally on your iPad or tablet PC.

Clickable Hyperlinks Below:

- SWINE FLU (H1N1)
- SARS & COVID – SEVERE ACUTE RESPIRATORY SYNDROME
- GENITAL HERPES SIMPLEX
- HUMAN PAPILLOMA VIRUS
- SYPHILIS
- CHLAMYDIA
- GONORRHOEA
- DONOVANOSIS
- HEPATITIS C
- HUMAN IMMUNODEFICIENCY VIRUS
- TRACHOMA
- PULMONARY TUBERCULOSIS
- INTESTINAL TUBERCULOSIS
- LEPROSY
- WHIPPLES DISEASE
- METAZOAN PARASITES
- LYMPHATIC FILARIASIS
- MALARIA
- LEISHMANIASIS
- ARBOVIRUSES
- ROSS RIVER VIRUS (RRV)
- DENGUE VIRUS
- YELLOW FEVER
- MURRAY VALLEY ENCEPHALITIS

PUBLIC HEALTH OVERVIEW:

PUBLIC HEALTH OVERVIEW:

Definitions:
- **Population Health:**
    - Relates the health of certain groups of people to their health-determinants, health-trends, and health-inequalities
    - May be dependent upon:
        - Physical factors
        - Biological factors
        - Social factors
        - Environmental factors
        - Economic factors
        - Personal health behaviours
        - Available health services
- **Public Health:**
    - The programs/policies instituted by a society to protect, promote, and restore individual's health and prevent morbidity and mortality
    - Includes:
        - Practices
        - Programs
        - Policies
        - Institutions
- **Epidemiology:**
    - The study of the distribution and determinants of disease in a population
- **Preventative Medicine:**
    - The arm of medicine devoted to addressing health problems at the risk-factor level in order to minimise the manifestation of disease in a population
- **Aetiology (Etiology):**
    - The Cause of disease or study of factors involved in development of disease
- **Risk factor:**
    - Something associated with an increased risk of developing a particular disease or condition
        - Demographic
        - Behavioural
        - Biomedical
        - Genetic
        - Environmental
        - Social
        - Other factors which may interact to increase or reduce effect

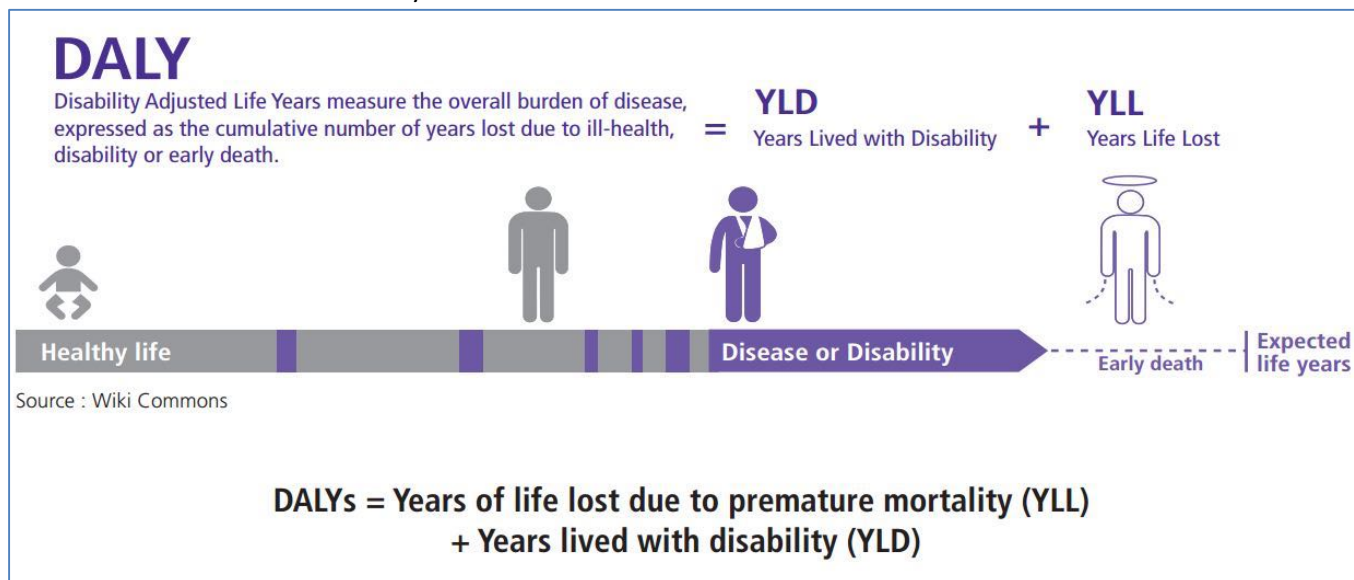**Common Goals of Public Health Services:**
- **Health Protection:**
    - Addressing potential health risks at the population level (Eg: Safe water / food regulation)
- **Surveillance:**
    - Monitoring and early identification of epidemics or events/behaviours likely to cause negative health outcomes
- **Disease/Injury Prevention:**
    - Eg: Vaccination
    - Eg: Mandating PPE in certain workplaces
- **Population assessment:**
    - Studying & engaging with a community to better understand their needs
- **Promoting health:**
    - Promote improved health via policy, interventions, community organizing etc
- **Preparedness & Response Planning**
    - Eg: For natural disasters
    - Eg: For pandemics
    - Eg: For man-made disasters

People Have Different Concepts of Health:
- **Wellness:**
    - State of dynamic physical, mental, social, and spiritual well-being that enables a person to achieve full potential and have an enjoyable life
- **Disease:**
    - Abnormal, medically-defined changes in the structure or function of the human body
- **Illness:**
    - An individual's experience or subjective perception of a lack of physical or mental well-being and consequent inability to function normally in social roles
- **Sickness:**
    - Views the individual and their society hold towards a health condition, affecting their thoughts and actions
- **Impairment:**
    - Any loss or abnormality of psychological, physiological, or anatomical structure or function
- **Disability:**
    - Any restriction or lack of ability to perform an activity within the range considered normal for a human being

Disease Prevention Measurements:
- **DALY** = Disability Adjusted Life Years:
    - An indicator of the time lived with a disability and the time lost due to premature mortality
- **YLL** = (years of life lost):
    - Years Lost due to premature death
- **YLD** = Years Lost to Disability

https://nccid.ca/publications/understanding-summary-measures-used-to-estimate-the-burden-of-disease/

- **Risk Factor Contribution to DALYs:**

Risk factor	Percentage
Overweight	8.6
Tobacco smoking	7.9
High blood pressure	7.3
Physical inactivity	6.7
High cholesterol	6.1
Alcohol harm	3.8
Alcohol benefit	-1.8
Occupational exposure	2.0
Illicit drugs	1.9
Lack of fruit and vegetables	1.0

Why Prevent Disease?:
- Beneficial for patient
- Prevents disability/mortality
- Some diseases aren't curable (Eg: AIDs), but are preventable
- Cheaper than treating chronic disease – Some 70% of all GP visits are due to Chronic Disease:
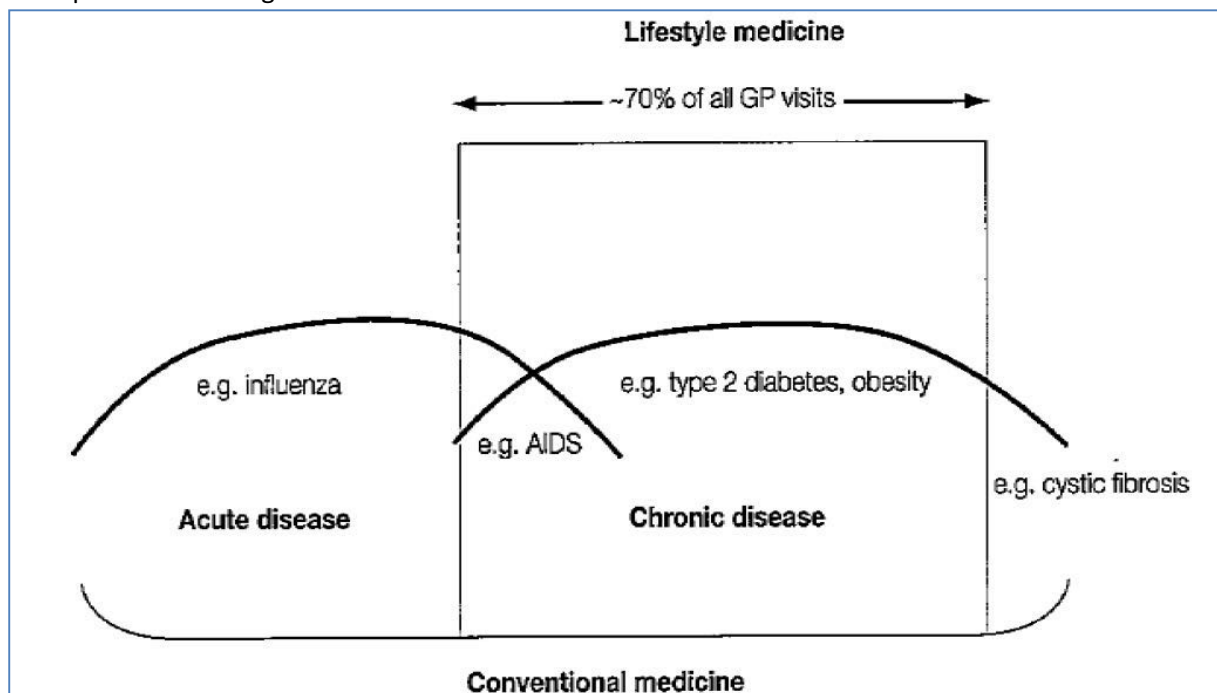
Types of Prevention:
- **Primary Prevention:**
    - o Preventing the disease from developing in the first place by modifying removing risk factors
        - ▪ Eg: Changing eating habits to prevent obesity
        - ▪ Eg: Immunisation
        - ▪ Eg: Fitting vehicles with seat-belts
- **Secondary Prevention (Screening):**
    - o Prevent disease progression by early detection of disease & Early Intervention
        - ▪ Eg: Identifying someone with hypertension → early treatment to prevent CVD
        - ▪ Eg: Mammography
        - ▪ Eg: Routine pap smears
- **Tertiary Prevention:**
    - o Interventions to prevent or minimise complications with an Established disease
        - ▪ Eg: Bariatric surgery for morbidly obese people with poor diabetic control to avoid needing insulin therapy
        - ▪ Eg: Monitoring diabetes with HbA1c, eye exams, foot exams
   - ▪ Eg: Medications

Screening:
- "Identifying individuals who are *More Likely To Be HELPED THAN HARMED* by further tests/treatment"
- **Criteria for Selecting Diseases to Screen for:**
    - o **1:** It should be an obvious burden for the Individual/Community
        - ▪ Deaths
        - ▪ Suffering
        - ▪ Economic/Social Costs
    - o **2:** It should have an initial Latent Stage, or be determined by risk factors, which can be detected by tests
    - o **3:** The Tests should be simple, safe, precise, socially-acceptable & validated
    - o **4:** Treatment/Intervention is crucial to prognosis
    - o **5:** Early intervention must provide a BETTER prognosis (Mortality/Morbidity/QOL)

Prevention Strategies:

- **1: "High Risk" Prevention Strategies:**
    - o Selecting individuals at high risk of a disease → Medical Intervention
    - o Opportunistic Screening
    - o **Advantages:**
        - ▪ Appropriate for the individual
        - ▪ Cost-Effective
        - ▪ Good Risk-Benefit Ratio
    - o **Disadvantages:**
        - ▪ Problems with screening
            - • Who
            - • How
            - • When
            - • Borderline Cases
            - • Behaviourally Inappropriate (Eg: Pap smears)
            - • $Costs$
        - ▪ Difficult to predict the *Absolute Risk* of disease in an individual:
            - • Some people with risk factors don't get the disease
            - • Many people with the disease, don't have the risk factors
- **2: "Population" Prevention Strategies:**
    - o Where you attempt shift the whole *distribution* of an exposure in a favourable direction by controlling the determinants of the disease (Environmental/Behavioural/etc)
    - o Ie: Trying to reduce the underlying causes of a disease across an entire population
    - o **Advantages:**
        - ▪ A small change can make a huge difference when it occurs across an entire population
    - o **Disadvantages:**
        - ▪ Low Benefit-Risk ratio:
            - • Limited benefit to the individual (Eg: Immunisation – even @ low risk of disease)
            - • Poor motivation

High Risk & Population Approaches to Prevention
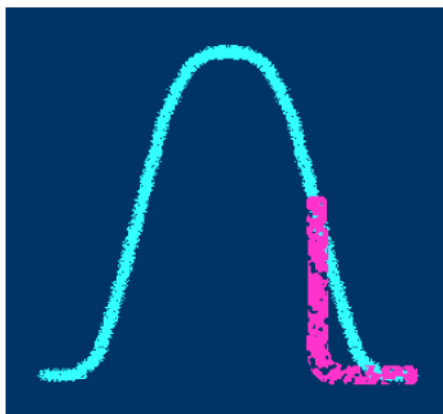
Truncate high risk end of exposure distribution (e.g. organise an obesity clinic).
Clinical approach to disease prevention.
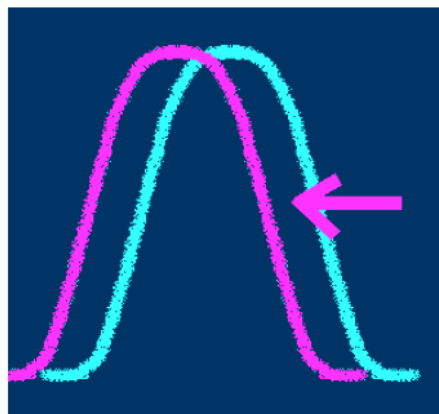
Reduce a small amount of risk in a large number of people (e.g. reduce fat a little in fast-food outlets).
Lifestyle change plus environmental approach.

Commonplace Disease Prevention Practices:
- **Pregnancy:**
    - **Folic Acid (Folate) Supplementation –** Prevents Neural Tube Defects (Eg: Spina Bifida)
    - **Get Genetic Testing for Fragile X**
    - **Check Rubella Immunity**
    - **Stop Smoking**
    - **Stop Drinking**
    - **Prevent Listeriosis –** A bacterial infection typically contracted from 'Deli-foods'
        - Unpasteurised Dairy Products
        - Soft Cheeses
        - Cold Meets
        - Raw Seafood
        - Maintain good Personal/Food-Hygiene

- **Breast Cancer:**
  - **Screening not necessary until 50yrs**
  - **If 50$^+$, screen every 2 years – Mammogram & Breast Examination**

https://healthtools.dhw.idaho.gov/products/copy-of-cancer-infographic-poster-breast-cancer-2-max-10-per-order

- **Cervical Cancer:**
  - **Screen 2yrly**
  - **Pap-smear**
  - **Immunisation (Gardasil)**

CERVICAL CANCER AWARENESS MONTH

WHAT YOU NEED TO KNOW

THIS YEAR...

Did you know?

Nearly all cervical cancers are caused by human papillomavirus (HPV).[5]

13,240 WOMEN WILL BE DIAGNOSED WITH CERVICAL CANCER.[1]

4,170 DEATHS FROM CERVICAL CANCER WILL OCCUR.[2]

GET TESTED

All women should begin cervical cancer testing at age 21. Women ages 21 to 29 should have a Pap test every 3 years.[3]

THE HPV DNA TEST

HPV is the highest risk factor for cervical cancer.
Doctors can now test for HPV types most likely to cause cervical cancer by looking for pieces of DNA in cervical cells.[4]

EARLY DETECTION IS PREVENTION

So, what are the treatment options?

Depending on the stage of the cancer, some common treatments are:

CONIZATION
A procedure using a cone biopsy to remove abnormal tissue on the cervix.

LEEP
An electrical current passed through a thin wire hook to remove the tissue.

RADICAL TRACHELECTOMY
Surgical removal of the cervix.

HYSTERECTOMY
Surgical removal of the uterus and cervix.

Cervical cancer is highly treatable when found early.

1-2 https://www.cancer.net/cancer-types/cervical-cancer/statistics
3-4 https://www.cancer.org/cancer/cervical-cancer
5 https://www.healthline.com/health/cervical-cancer-causes

- **Overweight & Obesity:**
  - **Screen 12mthly for:**
    - **Blood Pressure**
    - **Cholesterol & Lipids**
    - **Diabetes**
  - **Screen 6mthly for:**
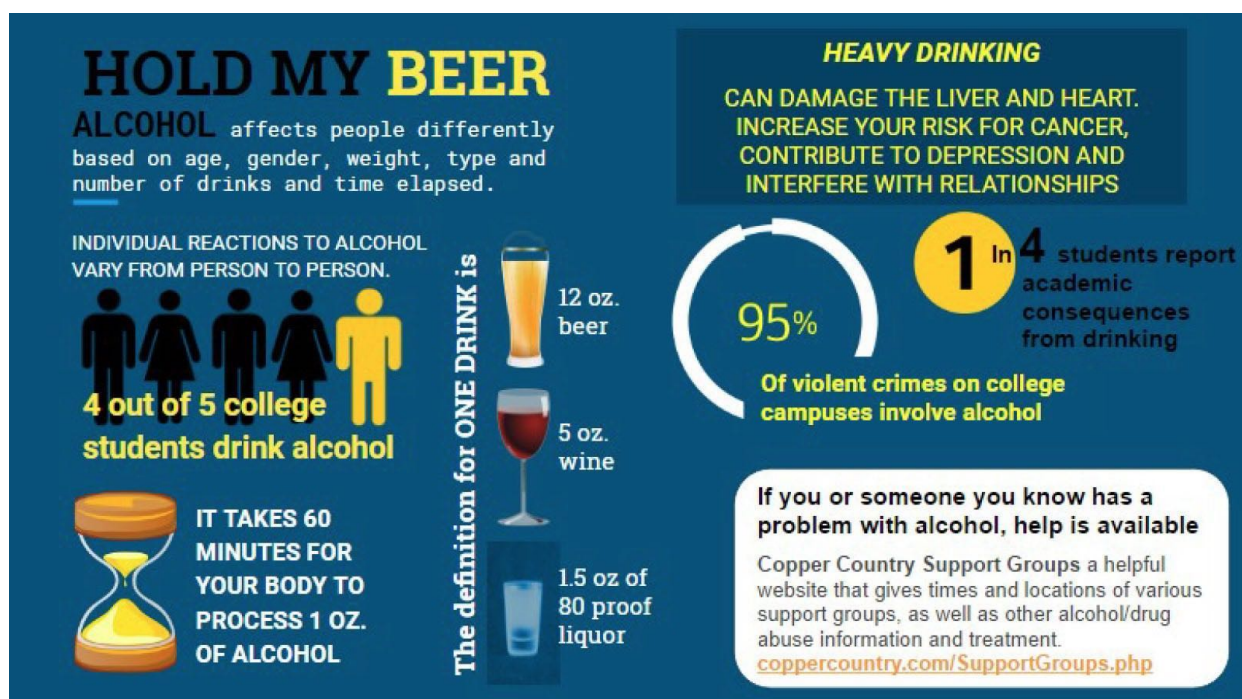   - **Nutritional Advice**
  - **Ideal Waist Circumference = <94cm**
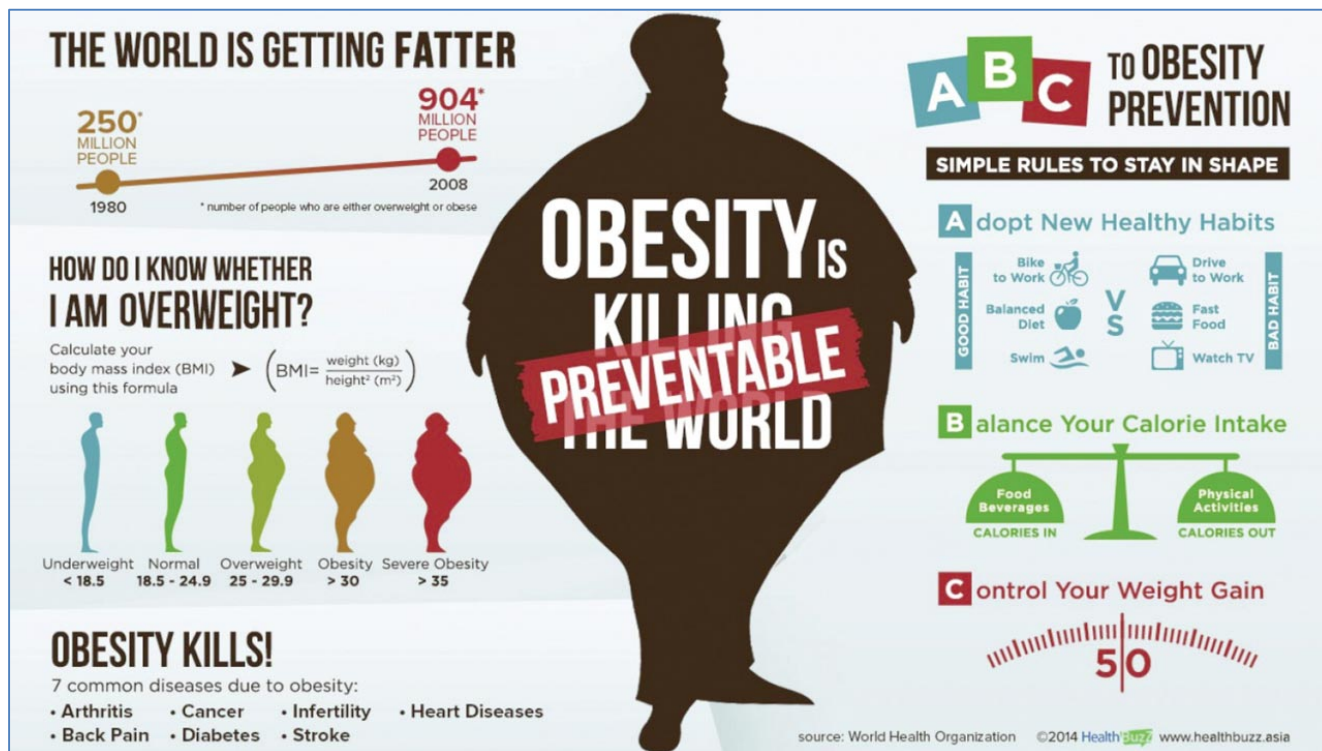
Source: WHO via www.healthbuzz.asia

- **Alcohol:**
  - **Reduce consumption as much as possible**
  - **Ensure 2x 'Alcohol-Free Days' per week**

https://www.finlandia.edu/news/sophomore-nursing-class-hosting-events-alcohol-awareness-month/

- **Falls:**
  - **Common in elderly due to:**
    - Vision Problems (Eg: Glaucoma – screen @ 55$^+$yrs)
    - Inner Ear Problems → ↓Balance
    - Multiple Meds → Nauseating
    - Gait
  - **Screening Procedures:**
    - Check all of above
    - Suggest Installation of handles/non-slip surfaces in their home
    - Suggest having a carer

AliMed

Fall Prevention
Help Prevent and Reduce Falls

1 in 4 Americans
over the age of 65 fall each year

Every 11 seconds
an older adult is in the emergency room being treated for a fall

Every 19 minutes
an elderly patient dies from a fall

In 2015, medical costs for falls totaled more than $50 billion

Common Causes for Falls

- Low blood pressure
- Poor balance and impaired mobility
- Limited physical-activity endurance and muscle weakness
- Foot problems that cause pain
- Impaired vision

5 Simple Steps to Help Prevent Falls

Stay Active
A good exercise program includes activities to improve balance, strength, and flexibility

Speak up
Talk to your doctor about taking supplements to improve bone, muscle, and nerve health

Eye Exam
Get your vision checked annually as poor vision can increase the likelihood of falling

Keep Your Home Safe
- Install handrails and grab bars
- Use non-slip mats
- Wear socks with a non-slip tread
- Wear slip resistant soles in the shower

Learn the Facts
In reality most falls can be prevented. Learn more about fall prevention and debunking the myths of falls among the elderly

https://www.finlandia.edu/news/sophomore-nursing-class-hosting-events-alcohol-awareness-month/

- **Prostate Cancer:**
  - o **Risk Factors:**
    - ▪ #1 – Family History (The closer the affected relatives, the more likely one is to be affected)
    - ▪ Age – Typically seen in men over 50yrs (40% of men over 50yrs have prostate cancer)
    - ▪ Race: Highest = African American; Lowest = Chinese
  - o **Screen 2yrly for 50$^+$yrs**
  - o **Note:** 85% of cases have a 20yr survival rate with no treatment → Most die with it, not of it
  - o **Note:** Early surgery only saves 1:12 (NNT=12)
  - o **Screening Procedures:**
    - ▪ Digital Rectal Exam (DRE)
    - ▪ Prostate Specific Antigen (PSA) blood test
  - o **PSA Screening:**
    - ▪ **↑PSA occurs with:**
      - • Carcinoma – (The purpose of the test)
      - • However, also with:
        - o Benign prostatic hypertrophy
        - o Prostatitis/UTI
        - o Recent Ejaculation
        - o Bike Riding
    - ▪ **Sensitivity =** Relatively Sensitive (A Few false negatives)
      - • Ie: ≈99% of *Normal* PSAs are Not Cancer
    - ▪ **Specificity =** Poorly Specific (Many false positives)
      - • Ie: ≈33% of *Abnormal* PSAs Are Cancer
      - • Note: False positives → Anxiety, further tests & possible treatment → ↓QOL
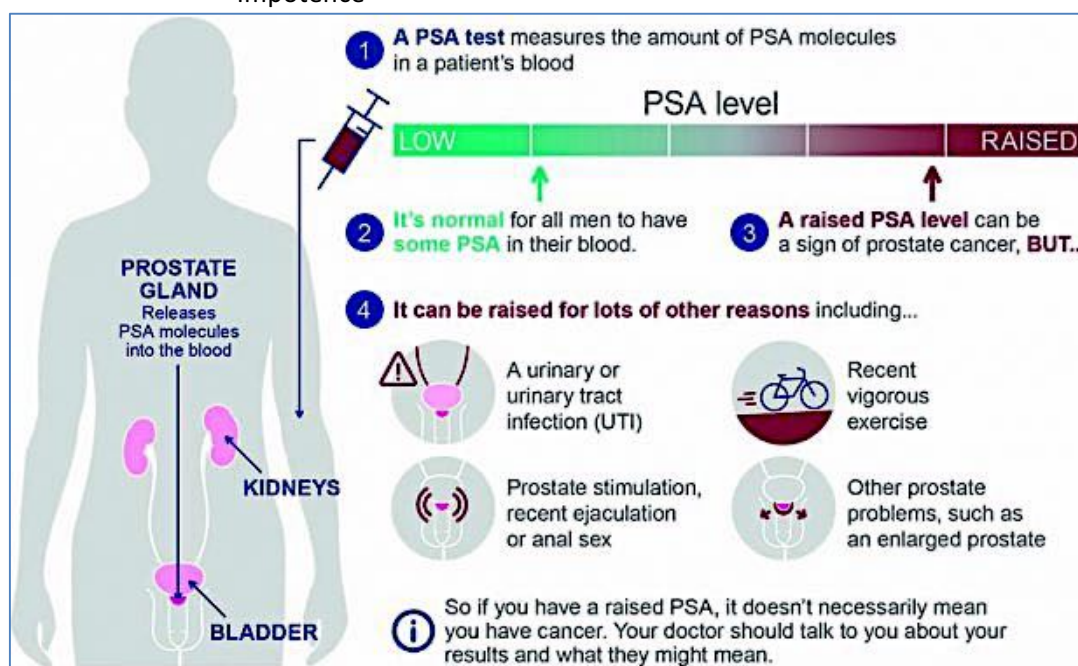 - o **Best Treatment:**
    - ▪ Uncertain; Can't predict who will benefit from early treatment (Ie: No way of knowing which cancers are fatal)
    - ▪ **Options:**
      - • Wait & Watch
      - • Radical Prostatectomy
      - • Radiation Therapy
      - • Hormone Therapy
    - ▪ **Side Effects:**
      - • Infection
      - • Urinary Incontinence (Very Common)
      - • Chronic Diarrhoea & Rectal Bleeding (From radiation)
      - • Impotence

- **Cardiovascular Risk Calculators:**

People without diabetes

Risk level for 5-year cardiovascular (CVD) risk

High risk	Moderate risk	Low risk
≥ 30%	10–15%	5–9%
25–29%		< 5%
20–24%		
16–19%		

* In accordance with Australian guidelines, patients with systolic blood pressure ≥ 180 mm Hg, or a total cholesterol of > 7.5 mmol/L, should be considered at increased absolute risk of CVD.

Charts in this age bracket are for use in Aboriginal and Torres Strait Islander populations only.

People with diabetes

Women

Men

Non-smoker   Smoker   Non-smoker   Smoker

Systolic blood pressure (mm Hg)

Age 65–74
Age 55–64
Age 45–54
Age 35–44

179* 160 140 120

Total cholesterol:HDL ratio*

4 5 6 7 8

Adults over the age of 60 with diabetes are equivalent to high risk (> 15%), regardless of their calculated risk level. Nevertheless, reductions in risk factors in this age group can still lower overall absolute risk.

Charts in this age bracket are for use in Aboriginal and Torres Strait Islander populations only.

*In accordance with Australian guidelines, patients with systolic blood pressure ≥ 180 mm Hg, or a total cholesterol of > 7.5 mmol/L, should be considered at increased absolute risk of CVD.

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20–24%		
16–19%		

https://www.summithealth.org.au/wp-content/uploads/2013/03/chronic-disease-referral-pathways.pdf

Disease Prevention Success Stories:
- **Vaccination** →
    - o Eradication of Smallpox/Polio
    - o Control of Measles/Rubella/Tetanus/HiB

- **Car Safety** →
    - o Personal Behaviour Change (Seat-belts/Helmets/Drink-Driving)
    - o ↑Engineering of Roads & Vehicles
    - o → Large Reduction in Deaths

- **Occupational Hazards** →
    - o Injury reductions due to legislation (Health & Safety at all sites/Smoking Ban)
    - o → ↓ "Black Lung"/Asbestosis/Workplace Deaths/etc

- **Communicable Disease Control** →
    - o Clean Water & sanitation
    - o Antibiotics
    - o Vector control

- **Cardiovascular Disease** →
    - o Risk factor reduction
    - o BP Control
    - o Smoking Cessation
    - o Earlier Detection
    - o Safer, more-effective treatment

- **Food Safety** →
    - o ↓Microbial Content (Eg: Pasteurisation)
    - o ↑Nutritional Content (Eg: Food fortification – Eg: Iodised Table Salt)
    - o Food safety legislation for handlers
    - o Elimination of major nutritional deficiency diseases (Rickets, Goitre, Pellagra)

- **Mothers' & Babies' Health** →
    - o Hygiene & Nutrition
    - o Antibiotics
    - o Access to healthcare
    - o Technology
    - o → Infant & maternal mortality decreased by 90%[+]

- **Fluoridation of Water** →
    - o Entire population benefits
    - o 40% Reduction in adult tooth-loss
    - o 60% Reduction in Child Tooth Decay

- **Antismoking Campaigns** →
    - o Recognition of tobacco as a health hazard
    - o Legislation – Sales to minors, Advertising banned, No Smoking in Public/Work-Places
    - o Smoking reduced from 40% → 20%

MEASURING HEALTH CONCEPTS:

MEASURING HEALTH CONCEPTS:

Sensitivity Vs Specificity:
- **Sensitivity:**
    - The ability of a test to pick up people who truly have the disease of interest
    - Ie: Few/No False Negatives
    - **Calculating Sensitivity:**

$$Sensitivity = \frac{Number\ of\ True\ Test\_Positives}{Actual\ Positives}$$

    Ie: The % of the diseased people that the test recognised as diseased

- **Specificity:**
    - The ability of a test to weed out people who are truly Free of the disease of interest
    - Ie: No False Positives
    - **Calculating Specificity:**

$$Specificity = \frac{Number\ of\ True\ Test\_Negatives}{Actual\ Negatives}$$

    Ie: The % of the healthy people that the test recognised as healthy

Why can't some tests be both 100% Sensitive *AND* Specific?:
- Certain diseases have a distribution in a population
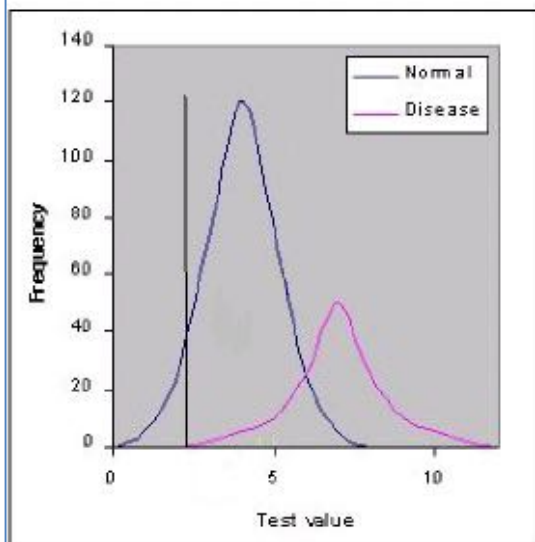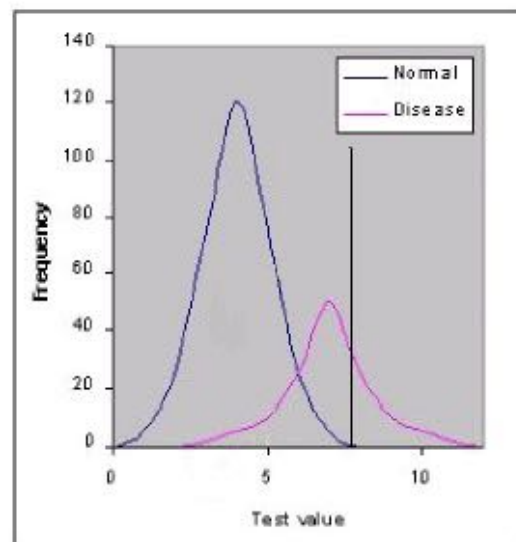
- **So where do you draw the line? Answer – Depends on the disease in question**
- **Note: When 'drawing the line', you trade Sensitivity for Specificity and vice versa:**
    - Eg: If the disease has extreme morbidity/mortality, and the treatment is cheap and harmless, then you want a highly *Sensitive* test to pick up every possible case
    - Eg: However, if the consequences of the disease are minor, but the treatment is extremely costly/invasive/risky, you want a highly *Selective* test so you only treat actual cases

The distribution of thyroid disease using T4
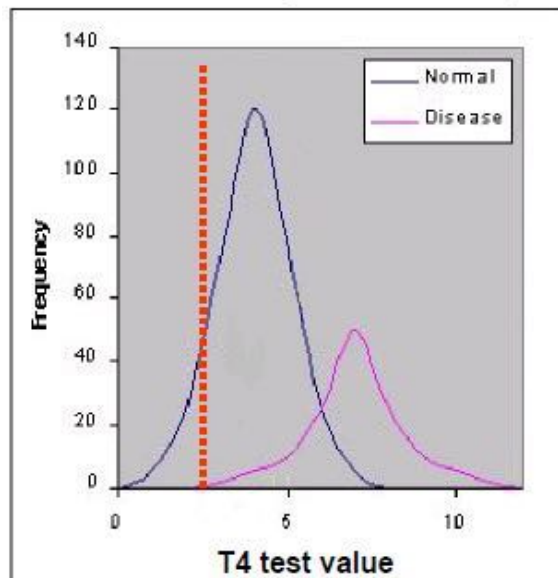
Put the cut-off point here

… and everyone with the disease will be picked up

(= 100% sensitivity)

The distribution of thyroid disease using T4
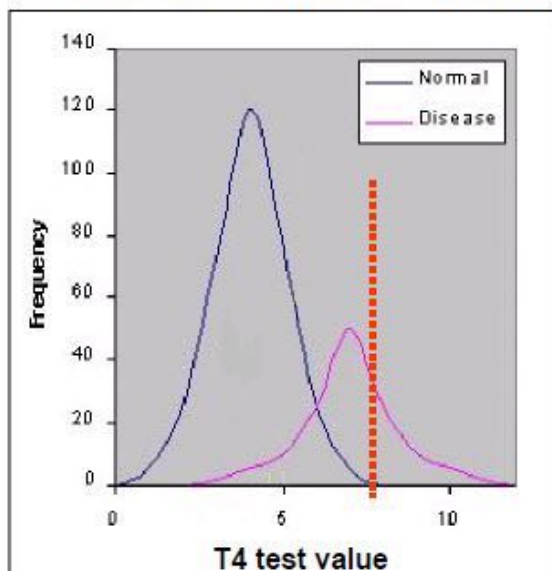
Put the cut-off point here

… and everyone free of the disease will be weeded out

= 100% specificity

Positive Predictive Value (PPV):
- Tells us how likely a Positive Test will be a True Positive
  - o Ie: The % of Positives that were *True*
- **Calculating PPV:**

$$PPV = \frac{True\ Positives}{True\ Positives + False\ Positives}$$

Relative Risk: "The risk of getting a disease when comparing one group to another"
- Eg: Relative risk of lung-cancer in smokers is 2x that of non-smokers
- **Rate Ratio:**
  - o Derived from Cohort Studies
  - o Compares the incidence ==*rates*== of a disease in 2 groups of people (With/Without Exposure)
  - o **Calculating Rate Ratio:**

$$Rate\ Ratio = \frac{Incidence\ Rate\ in\ Exposed}{Incidence\ Rate\ in\ Unexposed}$$

- **Odds Ratio:**
  - o Supposedly tells you what your ==*Odds*== are of getting a disease if you are exposed to a certain risk factor
  - o **Calculating Odds Ratio:**

$$Odds\ Ratio = \frac{The\ \%\ of\ people\ with\ the\ disease\ who\ had\ Exposure}{The\ \%\ of\ people\ without\ the\ disease\ who\ had\ Exposure}$$

	With CHD	Without CHD	Total
Smokers	a. 80	b. 10	90
Non-smokers	c. 20	d. 90	110
Total	100	100	200

OR = a/c   (odds people with CHD were smokers compared to non-smokers
     b/d   (odds people without CHD were smokers compared to non-smokers

Absolute Risk:
- The actual risk of getting the disease, over a period of time
- Eg: Assuming you live to 90, your risk of getting breast cancer is ≈12%
- This is based on the prevalence of that specific disease in that population

Numbers Needed to Treat (NNT):
- The number of patients you need to treat to prevent one additional bad outcome
- Gives insight to the effectiveness & cost of a treatment
- Ideal NNT = 1   Ie: Everyone treated improves
- Eg: A drug with an NNT of 5 → you have to treat 5 people with the drug to get 1 cure

Validity & Reliability:
- **Validity =** The ability of a test to test what it's meant to be testing
  - o (Eg: How well IQ measures intelligence)
- **Reliable =** The degree of consistency of results despite changes in external factors
  - o (Eg: Different testers, different times, different places)

HEALTH BEHAVIOUR

HEALTH BEHAVIOUR

Health Promotion:
- Promote healthy behaviours through education
- Monitor individual wellbeing and risk-taking behaviours
- **Doctor's Role:**
    - Advise the most effective way to a healthy lifestyle
    - Monitor patient's behaviour
    - Skill training
    - Reinforcement of behaviour
    - Role modelling
    - Provision of information
    - Give "expert" opinions
- **Psychologist's Role:**
    - Develop interventions at individual & community levels
- **Mass Media's Role:**
    - Educate people about health risks (AIDs, smoking, alcohol)
- **Role of Legislation:**
    - Rules enforcing healthy behaviour (seatbelts/drink-driving/smoking)

Role of Behavioural Factors in Disease & Disorder:
- **Health Behaviours:**
    - Behaviours that promote/maintain individual wellbeing
      (Eg: Exercise/healthy diet)
    - Either **Habitual or Intentional**
    - **Health Habits:**
        - Seatbelt/cleaning teeth etc
- **Risk Behaviours:**
    - Behaviours which are proven to increase susceptibility to a specific disease/illness

Primary Prevention:
- Instilling good health habits & changing poor ones
- **Strategies:**
    - Change current health behaviour
    - Prevent the uptake of poor health habits in the first place

Obstacles to Changing Health Behaviours:
- Pleasure (being high)
- Addiction (drugs)
- Behaviour is now habitual
- Relapse
- Factors influencing behaviour (stress → smoking)

Unrealistic Optimism & Irrational Risk Perception:
- Inaccurate perceptions of risk
- Inaccurate perceptions of susceptibility
- Lack of personal experience with problem
- There's no problem now so there won't be in the future
- Belief that problem is infrequent

Components of Motivation:
- **Patient must be…**
  - **Willing**
    - Perceived importance of change
  - **Able**
    - Self-efficacy
  - **& Ready**
    - Motivations to change outweigh motivations not to change

Health Belief Model (Factors determining health behaviour):
1. **Perceived Threat:**
   a. **Perceived Susceptibility:** One's perceived risk of contracting a health condition
   b. **Perceived Severity:** One's opinion of the seriousness of getting/having the condition
2. **Perceived Benefits:** The believed effectiveness of preventative measures
3. **Perceived Barriers:** Potential negative consequences of taking the preventative measures
4. **Cues To Action:** Events (symptoms/media/social) that motivate people to take action
5. **Self-Efficacy:** One's confidence in being able to undertake the preventative measure successfully

The Health Belief Model
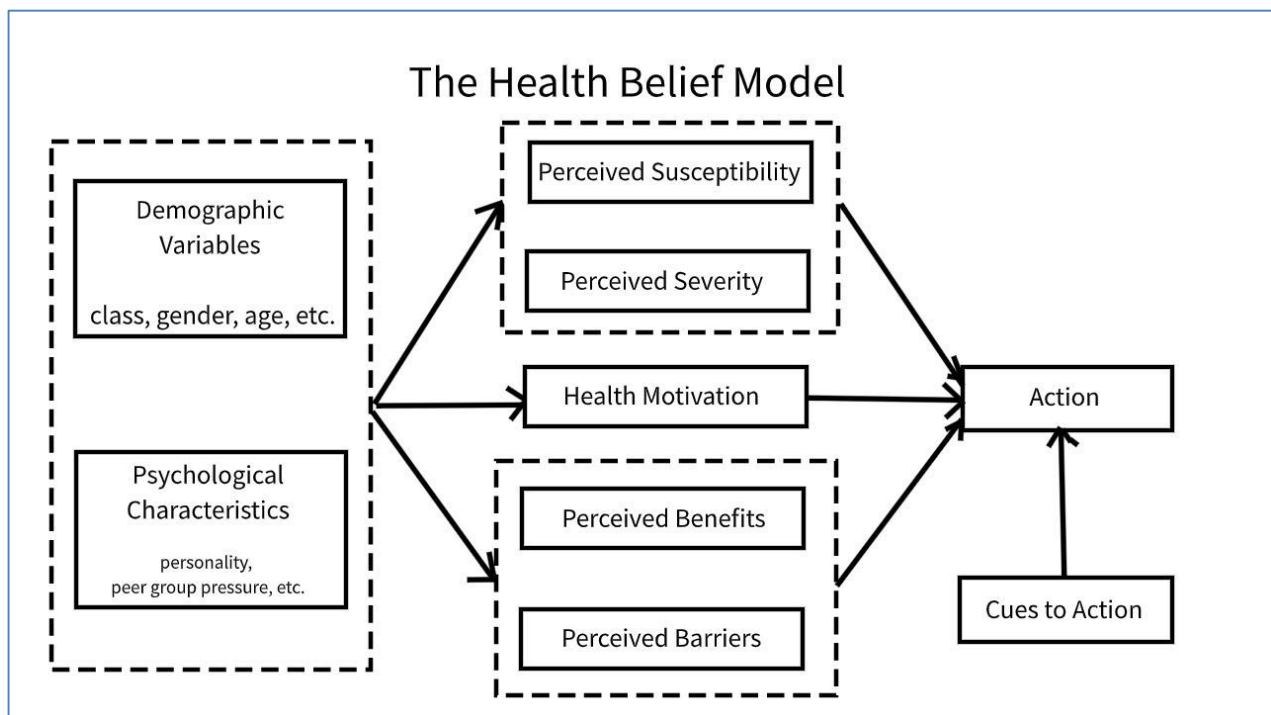
Theory of Planned Behaviour
- Assumes that behaviour is a direct result of a person's intentions
- **3 Behavioural Intentions:**
  1. **Attitude Toward Behaviour**
     - Evaluation of outcomes: Positive / Negative
     - "If I diet, I'll lose weight, improve my health & be more attractive
       - Being healthy & looking good are desirable
  2. **Subjective Norms**
     - The individual's perception of social standard pressures
     - Pressures of significant others (family/friends/girlfriend) to change behaviour
  3. **Perceived Behavioural Control**
     - One's perceived confidence in being able to change their behaviour
     - "I think I can diet"
  - **Results in an Intention:**
    - **Change** behaviour
    - Or **Continue** behaviour
    - **Results in Behaviour**

Cognitive-Behavioural Therapy

- **Behaviour =** the outcome of an interaction between the way one thinks and environmental events
- Behaviour is governed by the individual's expectations about the outcomes of engaging in it
  - Eg: Hot Stove Vs Smoking
- **Focus on:**
  - **The behaviour itself:** Ie: The conditions that elicit/maintain/& reinforce it
  - **Individual's Beliefs about their health habits:** "I will never be able to quit smoking"
  - **Self-observation & monitoring:** Record & chart behaviour

Thoughts / Beliefs
What a person thinks or believes about a situation. How the individual interprets an event.

Situation
Anything that happens to a person. Situations are ultimately outside of the individual's control, but they can be influenced by behaviors.

Behavior / Response
The person's actions and behaviors in response to their thoughts and feelings about a situation

Emotions
How a person feels about a situation. Emotions are not necessarily based in logic, but they are influenced by thoughts and beliefs.

Classical Conditioning

- Where a natural stimulus acquires the ability to be evoked by another stimulus
  - Ie: Unacquiring a 'taste' for something
  - Eg: Using 'antabuse' to treat alcoholism:

Before conditioning
Neutral stimulus

During conditioning
+

After conditioning
Conditioned stimulus → Conditioned response
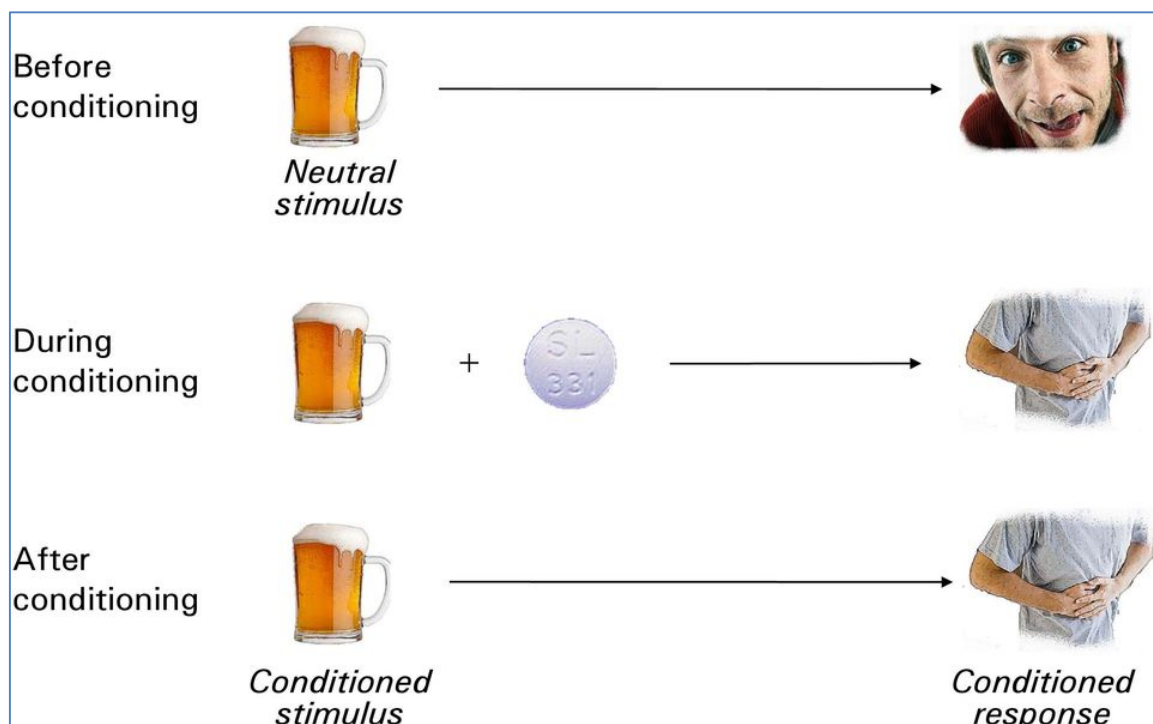
Operant ('Instrumental') Conditioning

- Assumes that an individual's behaviour is a consequence of **positive** or **negative reinforcement**
- If positive, the behaviour is more likely to occur again
- If negative, it is less likely
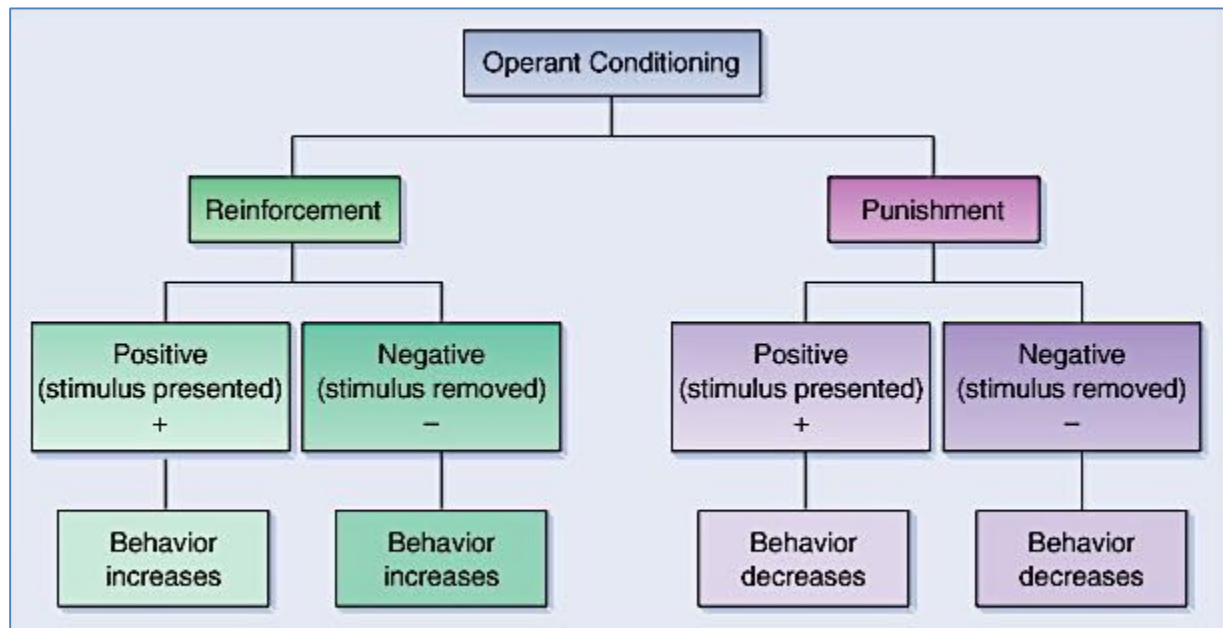
CHANGING BEHAVIOUR

CHANGING BEHAVIOUR

How People Change:
- **Note: Patients don't change just because you say so**
    - o Ambivalence, Resistance & Defence Mechanisms are <u>Normal</u>
    - o **Intentional Change Occurs Gradually**
- **Requirements for Change:**
    - o Change in Thinking/Feeling about an Issue
    - o Planned Steps
    - o Time

"SNAP": – Guidelines for Managing Lifestyle Risk Factors:
- **What are the Risk Factors?**
    - o **Smoking**
    - o **Nutrition**
    - o **Alcohol**
    - o **Physical Exercise**
- **5 A's Approach to SNAP:**
    - o **1: Ask:**
        - ▪ Ask which Risk Factors apply to Patient
        - ▪ Eg: Do you Smoke/Eat Healthily/Drink/Exercise?
    - o **2: Assess:**
        - ▪ Assess Level of Risk & Relevance to Patient's Health
            - • Ie: Behaviour History (Smoking/Diet/Drinking/Exercise History)
            - • BMI
            - • ***Cardiovascular Risk Calculator** – Work out absolute risk level for CVD
        - ▪ Assess Readiness to Change
    - o **3: Advise:**
        - ▪ Advise with Written Information (Eg: Pamphlets)
        - ▪ Advise with a Lifestyle Prescription (Life Script)
        - ▪ Advise with a Brief Intervention & Motivational Interviewing
    - o **4: Assist:**
        - ▪ Assist with Pharmacotherapy
        - ▪ Assist with Self-Monitoring (Suggest Keeping a Diary)
    - o **5: Arrange:**
        - ▪ Arrange Referral to:
            - • Specialist Services (Eg: Dietician/Exercise Physiologist/'ATODs')
                - o Note: ATODs = Alcohol, Tobacco & Other Drugs
            - • Support Groups
            - • Helplines
            - • Counselling
        - ▪ Arrange Follow-Up

Risk factor	Prevalence, %
Smoking	15.9
Poor diet	85.5
Excess alcohol consumption	10.1
Insufficient physical activity	62.3

A Useful Tool: "The 5 Stages of Change Model":
- **1: Precontemplation:**
  - No intention to change behaviour
  - **Precontemplation → Contemplation:**
    - Make the patient aware of the problem (Link their Behaviour to their Health)
    - Encourage them to take ownership of the problem
    - Explain the Negative Aspects of Problem (Convince patient that the behaviour *Is* a problem)
- **2: Contemplation:**
  - Person is thinking about changing behaviour
  - **Contemplation → Preparation:**
    - Get patient to Think How the Behaviour is Affecting Others
    - Change how they think & feel about the Issue
    - Note: Pushing People to Change can be Counterproductive → Resentment
    - 3 Strong Motivators:
      - Health
      - Money
      - Relationships
- **3: Preparation:**
  - Person prepares to make the change:
  - **Preparation → Action:**
    - Gathers information
    - Finds out how to achieve the change
    - Set Firm Goals & Priorities
    - Acquiring Skills Necessary for change
- **4: Action:**
  - Person makes changes (may be small steps at first)
  - **Action → Maintenance:**
    - Self-Efficacy is very important
    - Keep focussed
    - Acknowledge that Change is Difficult & Potential Relapse is Normal
- **5: Maintenance:**
  - Consistently practices new/altered behaviour
  - Acknowledge that Change is Difficult & Potential Relapse is Normal
- **//Relapse:**
  - Person relapses back to original behaviour
  - Move back to Contemplation if Relapse Occurs

Relapse Prevention
- Common with addictive disorders (smoking, drinking, gambling, etc)
- More likely to occur in times of stress, anxiety, depression
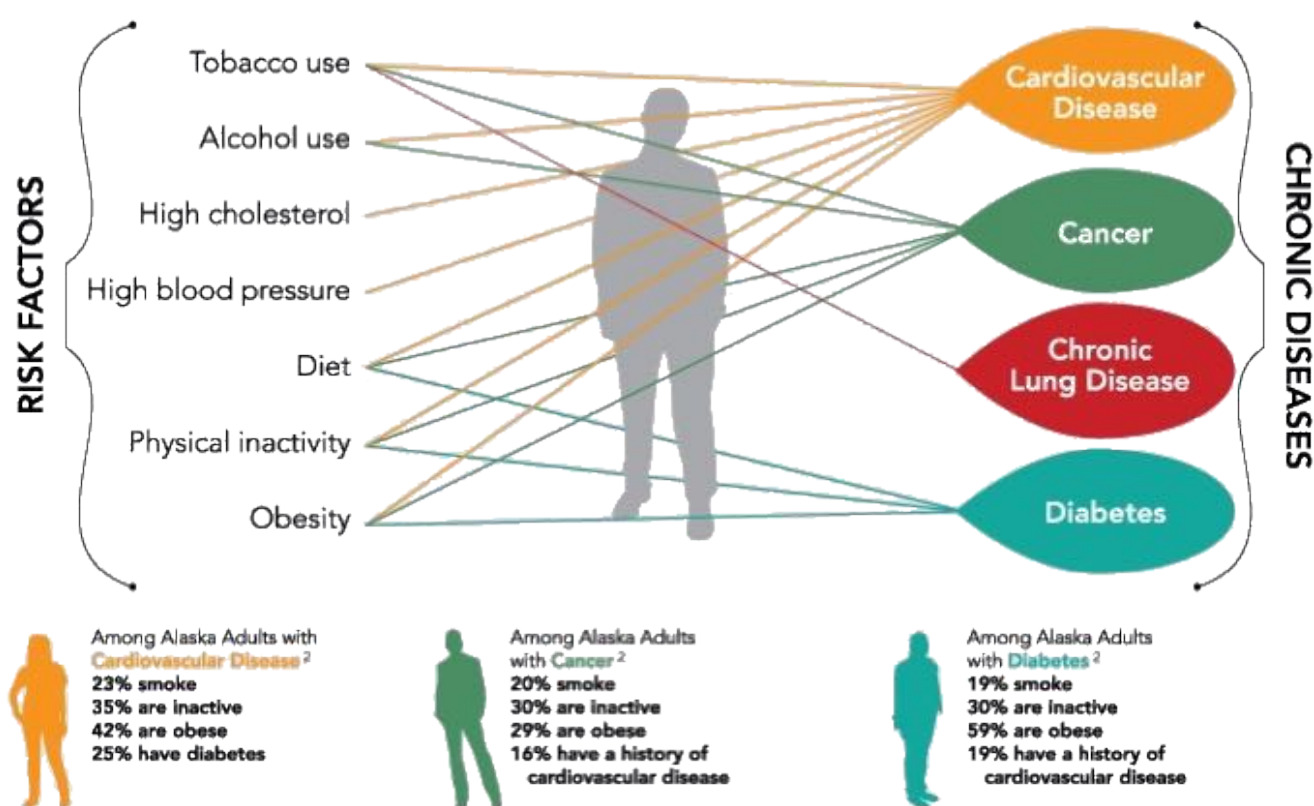- Once relapse has occurred, it is just as hard to 'quit' the 2nd time as it was for the 1st

CHRONIC DISEASE & RISK FACTORS

CHRONIC DISEASE & RISK FACTORS

Chronic Disease:
- **Definition:**
  - ○ **A Disease with One/More of the Following Characteristics:**
    - ▪ It is Permanent (Ie: Incurable) and Leaves Residual Disability (Morbidity)
    - ▪ Caused by Non-Reversible Pathological Alteration
    - ▪ Requires long-term Observation/Management /Care
- **Biggest Contributors to Burden of Chronic Disease:**
    - ▪ Cardiovascular Disease
    - ▪ Anxiety/Depression
    - ▪ Diabetes
    - ▪ Chronic Kidney Disease
- **Causes of Chronic Disease:**
  - ○ **Patients Presenting to Doctors:**
    - ▪ ≈20% are Smoking   (Decreasing)
    - ▪ ≈55% are Overweight/Obese   (Increasing)
    - ▪ ≈65% Do Less than Recommended Levels of Exercise (30mins x 5days/week)
    - ▪ ≈25% Drink at Risky Levels
  - ○ **Risk Factors:**
    - ▪ Risk Factors are often Associated with Many Diseases
    - ▪ Risk Factors shouldn't be considered in Isolation
      - • Risk Factors Interact → Multiplies Risk
    - ▪ Most Risk Factors are Completely Avoidable

The Whole Person: The Web of Chronic Disease[1]

RISK FACTORS: Tobacco use, Alcohol use, High cholesterol, High blood pressure, Diet, Physical inactivity, Obesity

CHRONIC DISEASES: Cardiovascular Disease, Cancer, Chronic Lung Disease, Diabetes

Among Alaska Adults with Cardiovascular Disease[2]
23% smoke
35% are inactive
42% are obese
25% have diabetes

Among Alaska Adults with Cancer[2]
20% smoke
30% are inactive
29% are obese
16% have a history of cardiovascular disease

Among Alaska Adults with Diabetes[2]
19% smoke
30% are inactive
59% are obese
19% have a history of cardiovascular disease

https://dhss.alaska.gov/dph/Chronic/Pages/Publications/Default.aspx

Overweight & Obesity:
- **Trend:**
    - ≈55% are Overweight/Obese
    - Rates are Increasing in first world countries
- **BMI:**
    - **Calculation:**
        - Kg/Height in m^2
    - **Ranges:**
        - Underweight   <18.5
        - Normal   18.5 – 25
        - Overweight   25 – 30
        - Obese   >30
    - **Limitations:**
        - Limited Sensitivity – Some people who are clearly overweight may be tall → False Negatives
        - Limited Specificity – Extremely muscular people will have a high BMI → False Positives
        - Hence, should be used in Conjunction with Waist Circumference
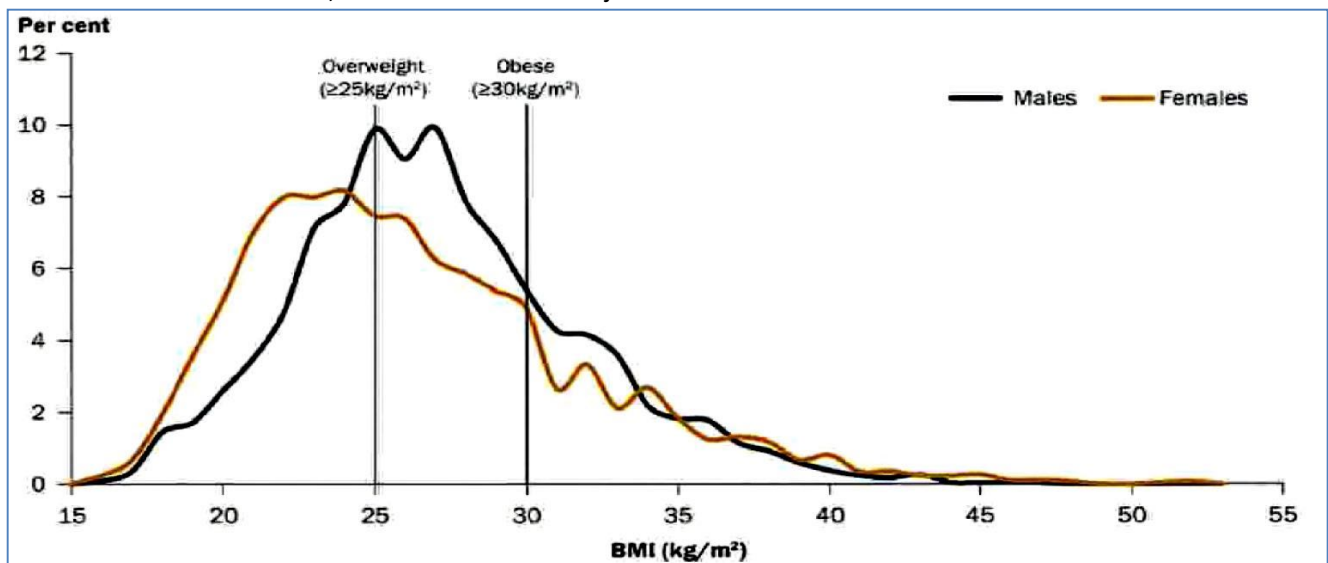
- **Waist Circumference:**
    - Males:
        - > 94cm → Increased Risk
        - > 102cm → High Risk
    - Females:
        - >80cm → Increased Risk
        - >88cm → High Risk
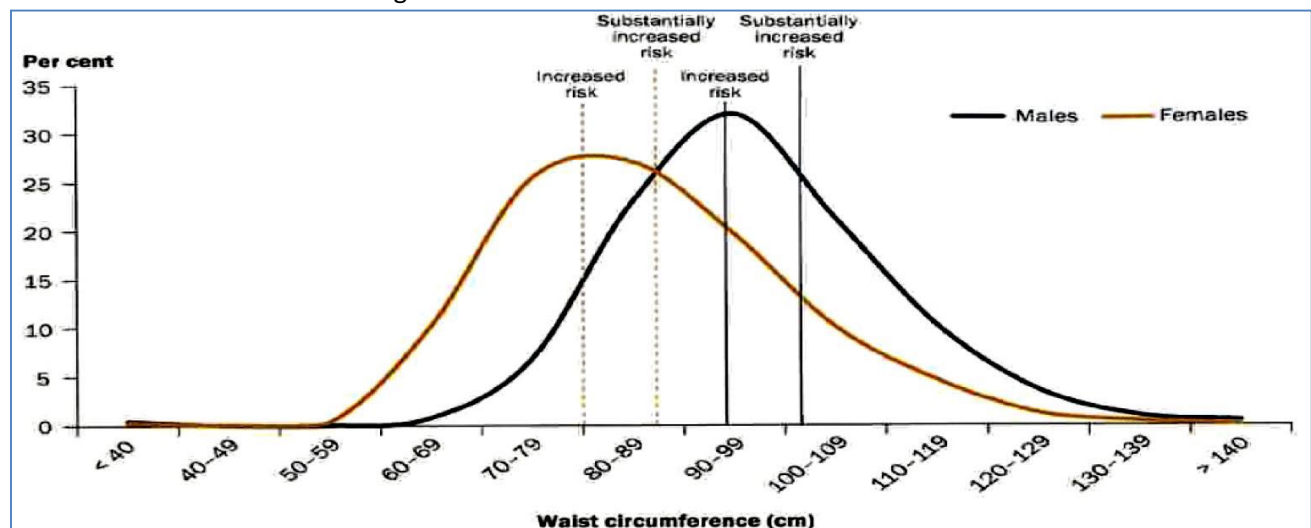
Physical Inactivity:
- Ie: Sedentary Lifestyle
- Recommended Levels of Exercise (30mins x 5days/week)
- It's estimated ≈65% of people don't do enough exercise
- Note: Sedentary Lifestyle increases with Age
- Associated with higher cholesterol levels and risk of type 2 diabetes

No, not literally equivalent to a pack of cigarettes; but illustrates risk
https://mobile.twitter.com/avonhmo/status/1022838331053432832

Poor Diet:
- Inadequate Fruit & Vegetable Intake
- Most prevalent in Low Socioeconomic Status groups

Tobacco Smoking:
- Smoking rates are ≈20% spread evenly across all age groups
- Most prevalent in Low Socioeconomic Status groups

Excessive Alcohol:
- Approximately ≈25% Drink at Risky Levels
- Rates among adults are consistent with age
- Most prevalent in Rural & Remote Areas
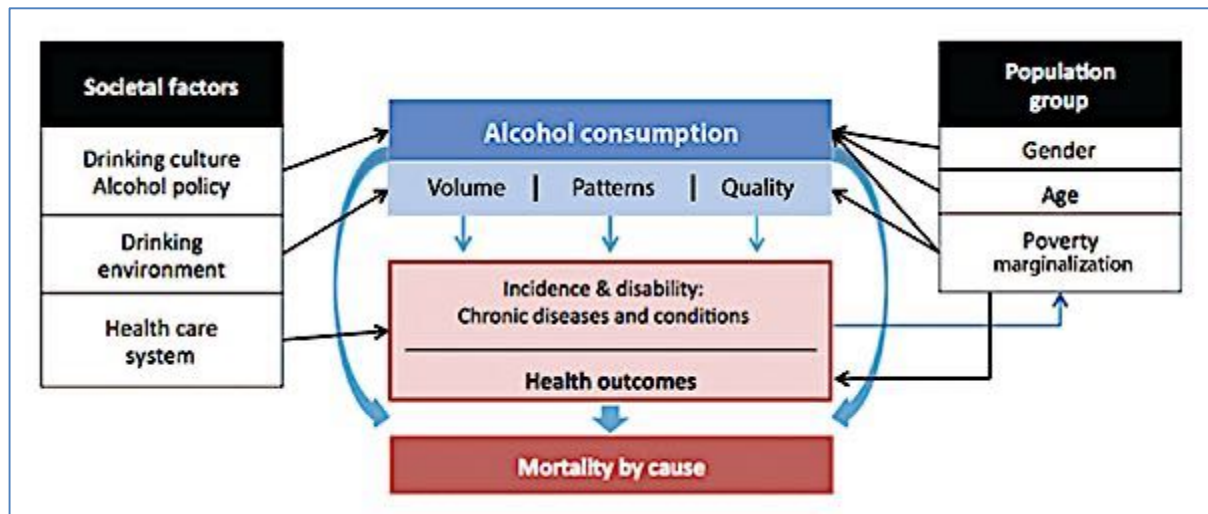
High Blood Pressure:
- Approximately 30% of Adults over 25yrs
- Most prevalent in Males
- **What is High?**
  - Systolic above 140mmHg
  - Diastolic above 90mmHg
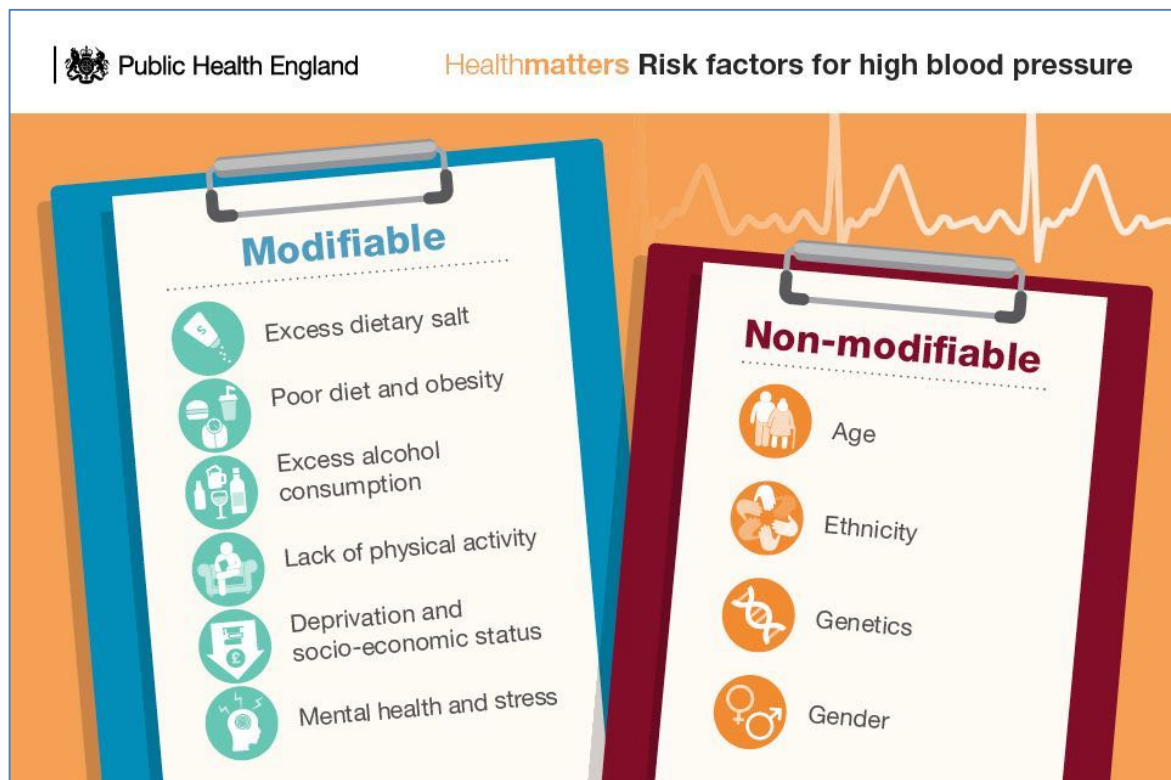
High Blood Cholesterol:
- Approximately 50% of Population have High Cholesterol (Rates are stagnant)
- ≈60% of Indigenous (Rates are stagnant)
- **What is High?**
  - LDL:HDL Ratio

Social Determinants of Health:

- **Socioeconomic Status:**
    - High SES people tend to live longer
    - **Why? – They can Afford Better:**
        - Nutrition
        - Medical Care
        - Education → ↓Risky behaviours
- **Early Life:**
    - Eg: Low Birth Weight (Ie: From maternal smoking)
    - Eg: Poor Nutrition
    - Eg: Neonatal Infections
    - Eg: Breastfed Vs Non-Breastfed
- **Stress:**
    - Money
    - Family
    - Relationship
    - Job Security
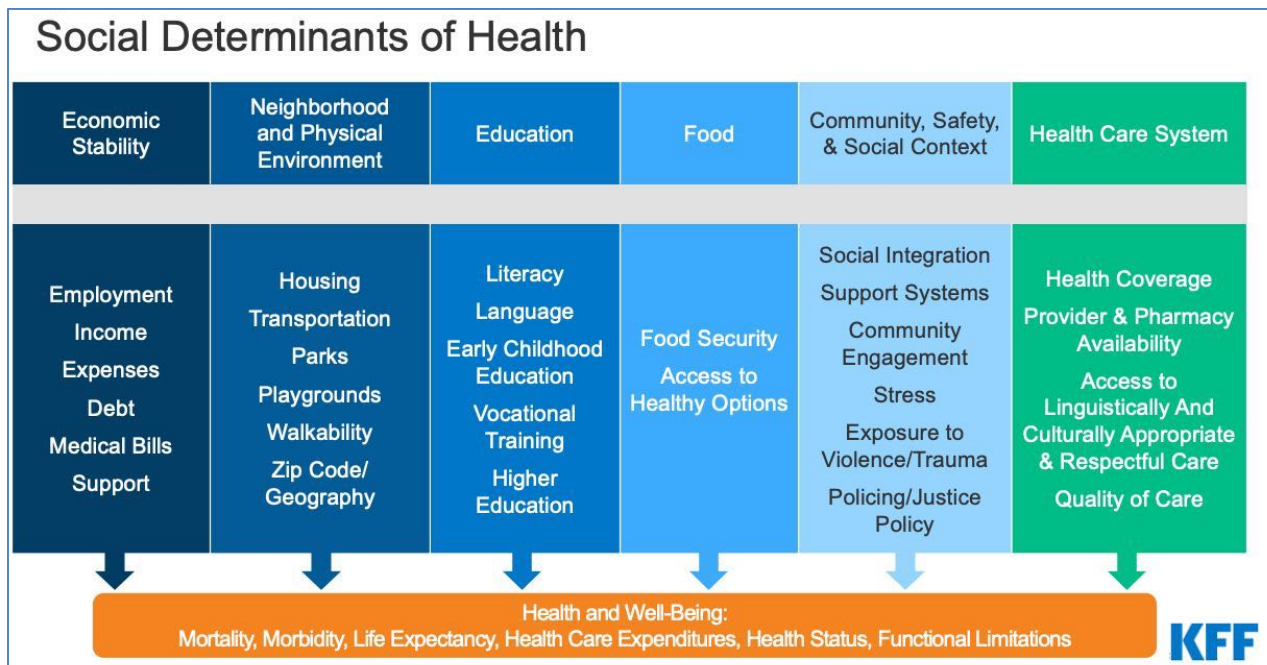- **Employment:**
    - Eg: Occupational Hazards
    - Eg: Bad influences of Workmates (Eg: Drinking/Smoking)
    - Eg: Fast foods for lunches
- **Social Networks:**
    - Or Lack of → Depression
    - Social Exclusion (Eg: Minorities – Racial/SES/Sexuality/Weight/etc)
- **Drug Addiction:**
    - Direct impact on health (Eg: Hep-B/HIV/Substance-Dependence)
    - Indirect impact through:
        - Crime
        - Compromise on nutrition etc. To save money for drugs

Social Determinants of Health

Economic Stability	Neighborhood and Physical Environment	Education	Food	Community, Safety, & Social Context	Health Care System
Employment Income Expenses Debt Medical Bills Support	Housing Transportation Parks Playgrounds Walkability Zip Code/ Geography	Literacy Language Early Childhood Education Vocational Training Higher Education	Food Security Access to Healthy Options	Social Integration Support Systems Community Engagement Stress Exposure to Violence/Trauma Policing/Justice Policy	Health Coverage Provider & Pharmacy Availability Access to Linguistically And Culturally Appropriate & Respectful Care Quality of Care

Health and Well-Being:
Mortality, Morbidity, Life Expectancy, Health Care Expenditures, Health Status, Functional Limitations

KFF

https://mobile.twitter.com/avonhmo/status/1022838331053432832

Prevention of Chronic Diseases You Will See as a Doctor:
- **Hypertension:**
  - **Primary Prevention:**
    - ↑Exercise
    - Lose weight
    - ↓Salt intake
    - ↓Saturated Fats
    - ↓Stress
    - Coping Strategies
  - **Secondary Prevention:**
    - Screening for Hypertension
    - Early Diagnosis
    - Review for other risk factors
    - Lifestyle Counselling
  - **Tertiary Prevention:**
   - Antihypertensive Drug Interventions
    - Follow-up Monitoring

Source: WHO

- **Depression:**
  - **Primary Prevention:**
    - Address Social Isolation/Greif/Family Problems
    - Strategies for Coping with Stress
    - Build good support networks
    - Physical Exercise → ↓Stress
  - **Secondary Prevention:**
    - Screening for signs of depression
    - Early Diagnosis
    - Early Intervention
  - **Tertiary Prevention:**
    - Appropriate Therapy/Counselling
    - Monitoring & Support
    - Refer to Therapist

- **Diabetes:**
  - **Primary Prevention:**
    - Physical Activity
    - Weight Control & Diet
    - Find out Family History
  - **Secondary Prevention:**
    - Screening blood tests in *At-Risk* patients
  - **Tertiary Prevention:**
    - Referral to Diabetes Educator
    - Initiation of Treatment
    - Ongoing Monitoring
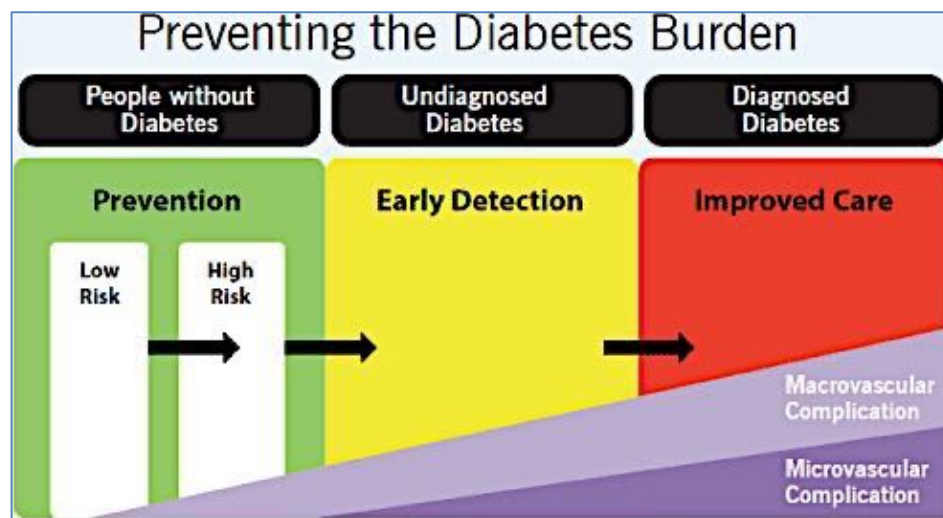
- **Lipid Disorder:**
  - **Primary Prevention:**
    - Diet
    - Exercise
    - Family History
  - **Secondary Prevention:**
    - Screening
    - Risk Factor Profile
    - Dietary Counselling
  - **Tertiary Prevention:**
    - Start Treatment (Monitor Effects & Side-Effects)

- **Osteoarthritis:**
  - **Primary Prevention:**
    - Avoidance of Injuries in Early Life
  - **Secondary Prevention:**
    - Diagnose from Other Rheumatological Disorders
    - Provide Early Intervention
  - **Tertiary Prevention:**
    - Medication
    - Physical Therapies
    - Devices & Aids
    - Surgical Referral

End of Sample

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