# Prevention & Public Health: Health Promotion & Disease Prevention

Different levels of prevention & how they are applied to a range of diseases;

David is 27 years old and has served a number of prison terms. He has history of drug misuse, smoked cigarettes since he was 11. Recently he attended the medical centre with a nasty cough and received advice on how the prison quit smoking campaign is particularly successful. He has signed up for a smoking cessation group and is beginning to commit to give up smoking. Also, he attended a clinic where his drug misuse was addressed and he can now take a part in a needle-exchange programme.

Prevention type:
SECONDARY PREVENTION

Prevention type	Examples
Primordial	• Legislation
Primary - Prevent developing disease before it ever occurs	• Immunisation • Helath living scheme • Condoms, circumcision • Sex education
Secondary - *people already have risk factor (e.g. smoking HTN)*	• Screening (MMG, pap smear) • Early detection
Tertiary - *diseased individuals → improve QoL*	• Prescription • Surgery • Chemo • Rehab
Quarternary – *prevent over medicalisation + over-diagnosis*	
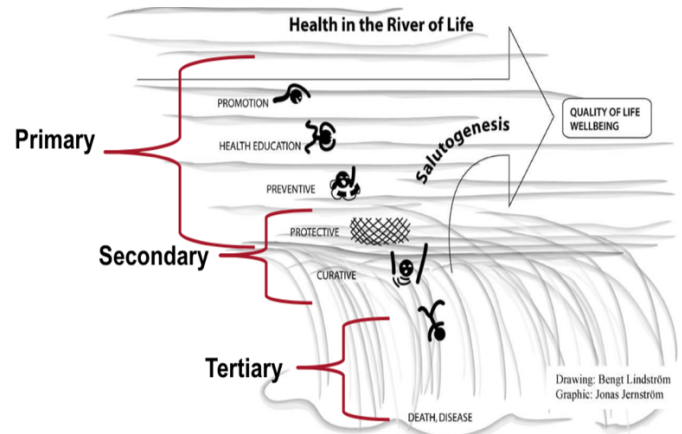
Almost ¾ of non-communicable diseases (e.g. CVD, diabetes, cancer, mental illness) in low-middle income countries esp. ATSI communities

Range of factors impacting people's behaviour & adherence to medical advice;
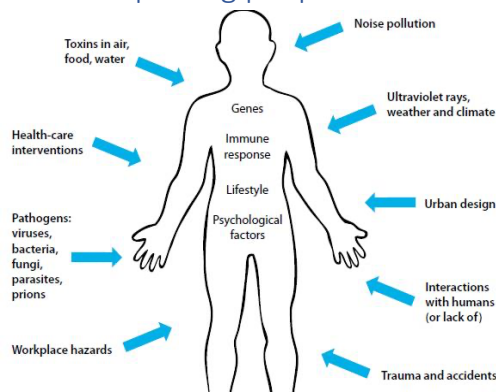

Factors impacting people's ***health and behaviour***

Focusing on patients → has widespread population effects:

- **Individual choices**: depends on habits, behaviours, risks, work
- **Personal choices**: shaped by access to info/resources, health literacy service availability and life opportunities (i.e. upbringing, work, economic status)
- **Health literacy → 60% Australians = low health literacy → Linked to:** greater hospitalisations/ED admissions, reduced Vax uptake, poor medication compliance, higher mortality rate

* *Health literacy **DOES NOT** assess the literacy level of reading materials **NOR** the communications between patients and healthcare professionals*
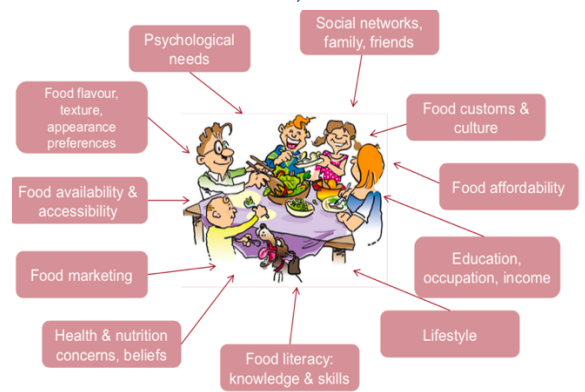
Factors impacting ***dietary behaviours***

- *Resolving dietary behaviour is difficult as need to consider all different factors when managing diabetes*
- *Same with asking someone to do more physical activity to prevent obesity and minimise diabetic complications*
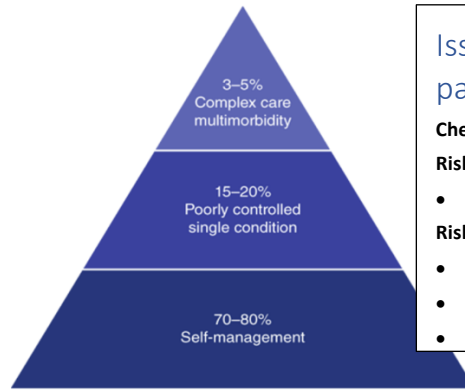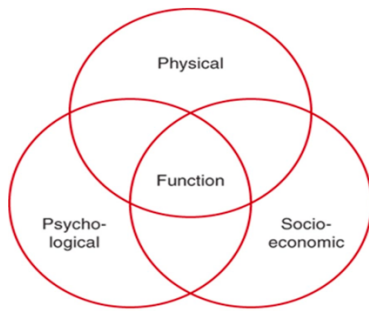
Describe the role of clinicians in the delivery of the National Health Promotion programs.

Dispel fake news & myths & prevent rise of NCDs
1. Direct patients to **lifestyle related interventions/resources** (for children, adults, ATSI groups)
2. Encourage **physical activity**
3. Persuade patients to trust **screenings/ vaccinations** to increase uptake [*dealing with anti-vaxxers]*
4. **Reduce RACP carbon footprint** (*climate change advocacy*) and improve sustainability of health services

1 Develop in-depth understanding of the disease, risk factors & factors impacting patient's behaviour.

2 Be up-to-date with guidelines & evidence-based approaches to tackle NCDs at global & national levels.

3 Develop good communication skills & take into account patient's health literacy level, cultural background etc.

4 Engage with national health promotion initiatives (quit smoking, cancer & STD screening, vaccinations etc.).

Key hospital and community services available in the care of the elderly

- 3–5% Complex care multimorbidity
- 15–20% Poorly controlled single condition
- 70–80% Self-management

Issues w/ surgical care in elderly patients
Check nutrition status, med Hx, alcohol/drug abuse
Risk factors of ==postoperative delirium==
- Alcohol & substance abuse

Risk factors of ==pulm. Comp.==:
- High ECOG status
- High Falls Hx, poor frailty score,
- Poor nutritional status

Elements of CGA (indications)	Assessment setting	MDT

Evaluating multiple factors: (*mental, social and physical health)*
• Age relative criteria
• >75
• Multiple comorbidities
• Cognitive impairment /screening
    ○ Depression
    ○ Delirium
    ○ planning
• Hx of falls, incontinence and poor gait, hospital admissions
• Clinical exam (all systems)
	Inpatient (2 models)
	• Geriatric Evaluation and management Unit (GEMU) → **better functional outcome with reduced discharges to aged care + reduced mortality**
	• Inpatient geriatric consultation services
	
	Home-based
	• Preferred setting for stable community dwellers as provides **familiar environment**
		• Medical (geriatrician)
		• Allied Health:
		    ○ Physio, OT
		    ○ Social worker
		    ○ Dietician
		    ○ Speech therapies
		    ○ Specialist nurse
		    ○ Pharmacist
		Home care packages (need aged care approval - ACAT)
		• Level 1-2= < 14 hrs/week (clean, shop etc.)
		• Level 3-4 = alternative to high level nursing home care (long-wait time)
		• Level 4 = dementia package (respite care + need MMSE < 24)

## L29.3 Community Disability Services

Provide an example of community disability services: → UNCRPD 2008 and developments since then

Pre-NDIS	NDIS (2017 introduced)
• one size fits all' model • All disability services BLOCK funded (i.e providers had full control how services are provided to clients)	• **Patient centred model** • *Specific funding provided* for Allied services – OT,PT, Speech, Hydrotherapist • **Eligible = < 65 y.o. w/** lifelong disability or developmental delay with sig. impact to ADL (at least 1) ○ *Mobility, communication, self management, self care, social interactions and learning*
• Inconsistent distribution of care (some clients had more care while others missed out) • Long waiting list • Blocked beds in overnight respite houses	• Clients must self-manage • Not everyone automatically qualifies • Recent gov. enquiry = aim to remo ve planning process gap between planner and client

Examples of Disability Services
To name a few …..
- Personal care and Social Support, Community Participation
  - Australian Unity, Wesley Mission, HireUp (online platform)
- Living Skills and Supported Employment and Weekend activities
  - AFFORD, CIVIC, Junction Works
- Short Term Accommodation (overnight Respite)
  - Estia Foundation, Northcott, Afford
- Supported Independent Living and Specialist Disability Accommodation
  - Sunnyfield, Northcott, New Horizons , Afford
- Allied Health Services
  - Cerebral Palsy Alliance – CPA, AFFORD
- Assistive Technology, Home Modification – multiple Providers
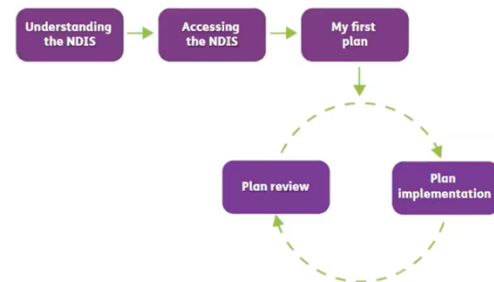
Specialised Intellectual Disabilities Health Team Comprising of:
- Physician, Psychiatrist, Nurse and social worker
- Planners → ECEI partner (for < 6 y.o.) and LAC partner (for > 7 y.o.)

    Early Childhood Early Intervention   *local area coordination*

Role of the NDIS in disability services & day-to-day and systems challenges

Past NDIS challenges	Current challenges
• Person-centred **BUT** requires self management (can prioritise our services) • Severe Shortage of Allied health professionals • Long waiting to get approval for Assistive Technology (e.g. wheelchair took 18months to arrive) → has improved since then	• Those who cannot advocate for disability rights ⟶ unable to obtain help and compensation • **Still requires very experienced planner** who is client-centred⟶ Poor planners = poor outcomes • **Plan cut almost by 50%** for no reason - huge reduction in services • **Lack of skilled staf**f • **Lack of culture/attitude** and persistent stigmatism towards disability → fear of making an error, fear of being judgmental,

Vaccination in Australia

Key points:
- Vaccination is active immunity that is synthetically acquired → essential to protect populations from infectious diseases
- Coverage in **children** in Australia is **high**.
- **Adult** vaccination coverage rates are **sub-optimal** (esp. 18-65)→ esp. flu and pneumococcal (*only free for certain patient groups*)
- Ongoing surveillance is important.
- Factors affecting the uptake of vaccine are context specific and differ between adults and children / diff. countries etc.

| Vaccine benefits	Disadvantages	Live vaccines	Common childhood diseases:

• Simple + safe
• *Health economics*: Cost-effective + safe
• **Reduces morbidity and mortality** + economic + social costs
• **Aim for herd immunity** → sufficient pop. Immunized to minimise spread even among unvaccinated
• **Aim to eradicate disease**
	• > 1 dose may be required
	• Given via injection
	• ***Common side effects:***
	   o pain, redness and/or swelling at injection site
	• **Serious side effects**: anaphylaxis, sepsis
		1. MMR
		2. Zostarix
		3. Rotavirus (PO)
		4. Varicella
		
		Vaccine preventable
		Most → least common
		1. Influenza
		2. Whooping cough
		3. Meningococcal
		4. Measles (most contagious)
		5. Rotavirus (Highly contagious → N/V/D + fever)
		6. HPV (Gardasil)= **Increasing HPV coverage in adolescence**
			• **Diphtheria [cornyebacterium]**: grey-white membranes over tonsils (like Scarlet Fever), barking cough, swollen LN (submental)
			• **Mumps [RNA paramyxovirus]**: 2° to parotidomegaly, fever, myalgia, headache, fatigue
			• **Measles [airbone]**: **triad of 'c'** [cough, conjunc, coryza] + rash, fever, Kaplik's spots in mouth]
			   o *Watch for* those born in 70 and 80s & unvaccinated children travelling overseas to endemic countries (e.g. Isreal)
			• **Rubella**: rash across trunk and limbs + fever and generalised LN (occipital, cervical) + forchheimer spots (petechiae on uvula/soft palette)
			   o **Patent ductus arteriosus**
			• **Scarlet fever**: red bumpy tongue, sandpaper rash, fever, sort throat, headache, LN

**Beware if splenectomy performed → MUST** vaccinate against capsulated organisms:
- Strep pneumoniae
- Neisseria meningitides

Vaccine term	Definition
Vaccine efficacy (RCT)	reduction in incidence of disease in vaccinated group compared to unvaccinated under optimal conditions (%).
Vaccine effectiveness	How well a vaccine prevents negative outcomes in "real world" settings
Vaccination coverage	• **Important measure of program success** in adults→ managed by **Australian Immunisation Register (AIR)** • Inc. vaccines given via National Immunisation Program, through school programs and privately

|	Children	Adults
National Immunisation Program (NIP)	vaccines against 17 diseases, including measles, mumps and whooping cough	• **Pneumococcal** (> 65, ATSI >50 OR those with specific med. Conditions) • **Herpes Zoster** (live → 70-79 y.o.) • **Influenza** (>65 or < 65 w/ comorbidities, ATSI >15y.o.)
Factors impacting vax	• Safety &Awareness • Accessibility • Perceived risk & susceptibility • **Attitudes and Beliefs** [*Parent acceptability of HPV vaccine driven by attitudes and beliefs regarding the vaccine's effectiveness and safety*]	• Safety • Awareness • Access (location) • Perceived risk & susceptibility • Attitudes and Beliefs • **Prioritisation (what is important them?)** • **GP recommendation**
Coverage	• Coverage in children in Australia is high	• Influenza & pneumococcal vaccination coverage **highest** in Remote and Very remote areas (57%) → **likely due to special clinics targeting remote areas [increased ACCESS]** • 51% of >65 years immunised against pneumococcal and influenza
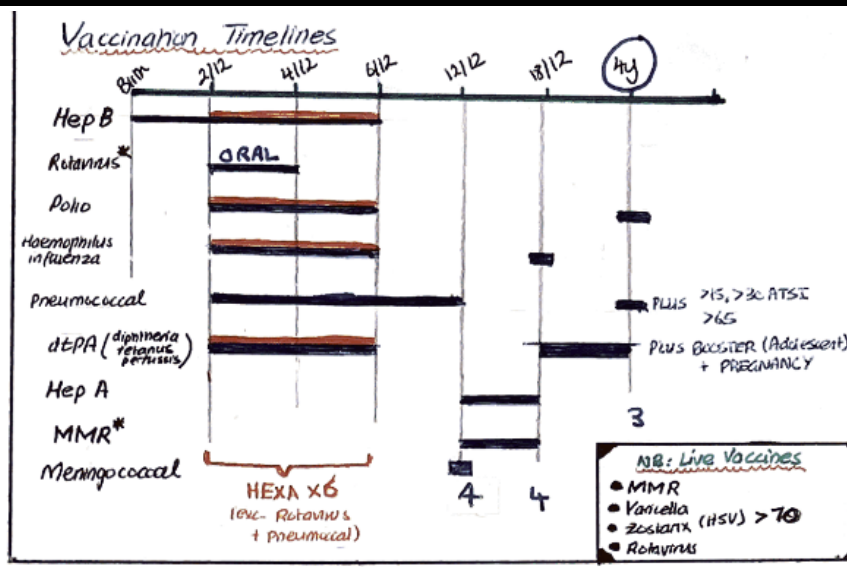
Current status of infectious (communicable) diseases
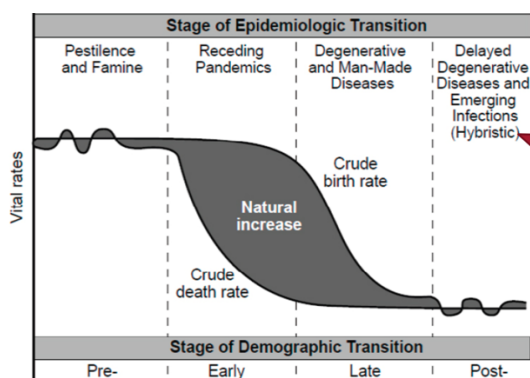
This stage reflects a change in the underlying causes of mortality and morbidity. The term 'hybris' refers to excessive self-confidence or a belief of invincibility. During the hybristic stage, morbidity and mortality are affected by man-made diseases, individual behaviours, and potentially destructive lifestyles.

*COVID-19, alzheimer's = **post phase** of demographic transition
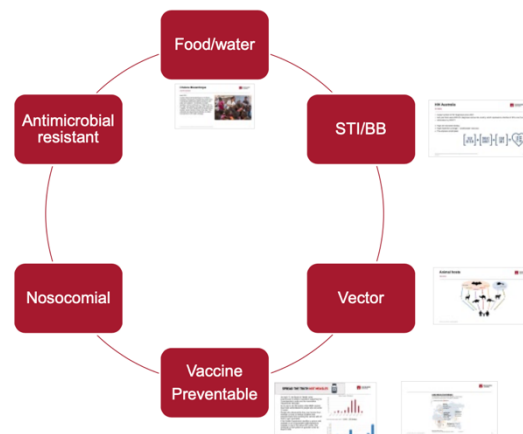
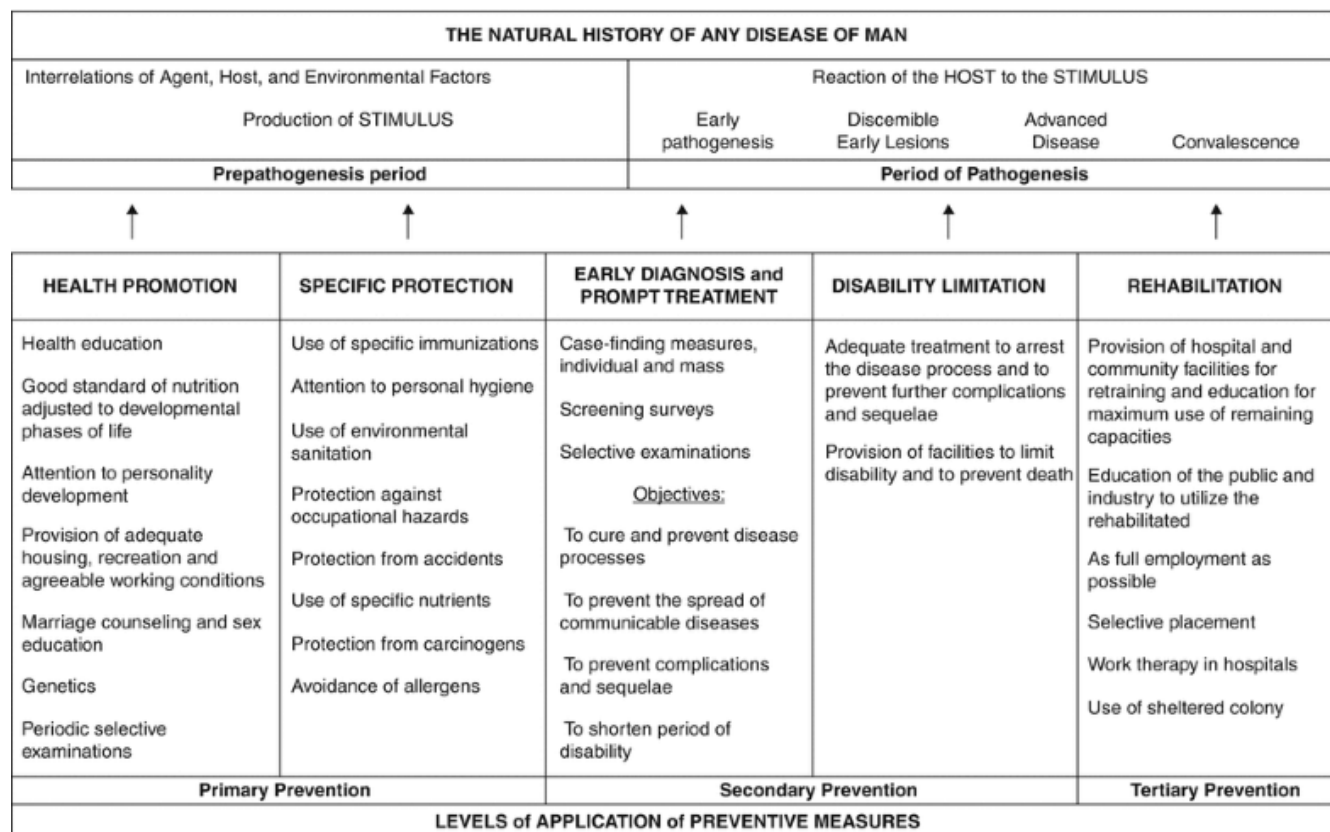| Key measures	Significance
Individual case counts	For statistics to measure level of infection to assess effectiveness of control
Prevalence rate (compare Pop.)	# of cases at point (period) / Population at time during which cases were ascertained
Incidence rate (compare Pop.)	# of new cases/ Population **at risk** × time during which cases were ascertained & the population group (e.g. # of women aged 15-44, total births, total live births etc.)
Case fatality ratio (rate)	# of deaths/number with condition of interest (i.e. symptomatic or infected?)
Years life lost (YLL)	gap in years from disease free life expectancy
Disability adjusted life years (DALY)	quantifies burden of disease – combines quality (health) and years of life lost

Terminology	Significance	Continued intervention	Disease example
Control	Reduce disease incidence, prevalence, morbidity or mortality to a locally **acceptable** level	Required (e.g. social distancing)	
Elimination of disease	Reduce to **zero incidence of a specified disease**	Required	
Elimination of infections	Reduce to **zero incidence of infection** caused by a specific agent (regardless of getting disease or not)	Required to prevent re-establishment of transmission	**Measles** (if there is documented surveillance system w/ no cases in 12 mths) **HIV mother to child transmission**
Eradication	**Permanent reduction to zero** of **worldwide** incidence of infection	NOT needed	**Smallpox**
Endemic	Disease always present in a region		**HIV** *Malaria*
Epidemic	Affects a greater number than expected		**Gonorrhoea, measles, Ebola, smallpox**
Pandemic	Epidemic that spreads across a region		**COVID-19, SARS**
Cluster	≥2 cases (not in same household) but **common source not yet established**		
Outbreak	≥2 cases (not in same household) from specific group or time period associated **with common source known**		Cholera, COVID-19

Outbreak Investigation

Outbreak: "occurrence of disease cases in **EXCESS** of normal **expectancy**"

Steps of an outbreak investigation (CDC) → many of steps happen CONCURRENTLY

1. Prepare for field work 2. Establish **outbreak existence** 3. **Verify diagnosis**	***Is this an outbreak?*** • *Expected incidence of disease vs # currently infected* • *Severity of the disease & transmissibility potential* ***Confirm diagnosis*** • *Identify causative disease + confirm that it IS an **actual increase** (based on clinical features, lab results – sub-typing and descriptive statistics)*
4. Construct **working case definition/criteria**	• **Standard Criteria** classifying people as possible outbreak case (inc. S+S, lab results, <mark>person, place & time</mark>) • ***Consistency*** = Must use SAME criteria → Can be probable or confirmed A case was initially defined as • Person: any person who ate breakfast • Place: at the implicated restaurant • Time: between the 10 February and 25 February 2014 Probable case definition= 'any person who ate at the restaurant 10 February and 25 February 2014 and developed symptoms of gastroenteritis, defined as two or more gastrointestinal symptoms'. Confirmed case definition= 'any person who ate at the restaurant 10 February and 25 February 2014 and developed symptoms of gastroenteritis, defined as two or more gastrointestinal symptoms and had a faecal sample that was positive for *Salmonella*'.
5. Find **cases systematically** & **record** info [contact tracing]	• **Identifying cases** w/ help from clinicians, hospitals, labs, affected → <mark>may need to issue public media alert</mark> • **Recording info:** demographics (i.e. age, sex, address), clinical info (S+S – duration), possible exposures (i.e. close contacts)
6. Use **descriptive epidemiology** 7. **Develop hypotheses**	• ***Describe outbreaks*** → <mark>person, time, place</mark> 　　o Create an **epidemic curve**: # of cases in an outbreak, plotted over time • ***Hypothesis*** → what do you know about the disease? 　　o Contact affected → e.g. interviews with confirmed & probable cases of Salmonella 　　o Use info gathered to develop hypothesis & test it 　　o *E.g. Case control study was developed based upon the restaurant's breakfast menu to determine causes of salmonella outbreak*

8. **Refine and re-evaluate hypothesis epidemiologically** 9. Compare & reconcile w/ lab and/or environmental studies	• ***Epidemiological study designs***: case control, cohort, descriptive → **IDENTIFY CAUSE**

Case-control	Cohort Study
• Based on disease status (cases & controls) • Generates <mark>odds ratio → measure of association</mark> • OR = 1.0 shows the same odds of exposure • OR > 1.0 shows a higher odds of exposure among ill (e.g. OR = 5 → 5x risk of being exposed → ill)	• Based on exposure status (exposed vs. non exposed) • <mark>Must be include every person in cohort</mark> (i.e. wedding) • Generates a relative risk as a measure of association • RR = 1.0 shows the same risk in exposed and unexposed • RR > 1.0 shows *risk is higher in those exposed*

10. **Implement control measures**	• As early as possible →can include (beware of confidentiality): 　　o Sending warning/advice about control/prevention to clinicians 　　o Quarantine 　　o Recall of contaminated products 　　o Recommendations (e.g. decrease temp. in storage fridge or don't use eggs in salmonella outbreak)
11. **Initiate/maintain surveillance**	• Determine control of outbreak and effectiveness of prevention/control measures • **Level of surveillance** depends on infectivity and severity of illness (e.g. active case findings in Ebola is critical)
12. **Communicate Findings**	• Clinicians **LEGALLY** required to report & record on Notifiable Disease Data [Public health law] 　　o E.g. influenza, HIV, foodborne illness (> 2 linked cases) • Public Health officials may reach out to clinicians during active case finding 　　o Media attention may be required • **Outbreak MDT debriefings** (inc. lab personnel, public health team, env. Health officers etc.)

Paediatric Population Health

THE NATURAL HISTORY OF ANY DISEASE OF MAN				
Interrelations of Agent, Host, and Environmental Factors		Reaction of the HOST to the STIMULUS		
Production of STIMULUS		Early pathogenesis	Discemible Early Lesions Advanced Disease	Convalescence
Prepathogenesis period		Period of Pathogenesis		

HEALTH PROMOTION	SPECIFIC PROTECTION	EARLY DIAGNOSIS and PROMPT TREATMENT	DISABILITY LIMITATION	REHABILITATION
Health education

Good standard of nutrition adjusted to developmental phases of life

Attention to personality development

Provision of adequate housing, recreation and agreeable working conditions

Marriage counseling and sex education

Genetics

Periodic selective examinations | Use of specific immunizations

Attention to personal hygiene

Use of environmental sanitation

Protection against occupational hazards

Protection from accidents

Use of specific nutrients

Protection from carcinogens

Avoidance of allergens | Case-finding measures, individual and mass

Screening surveys

Selective examinations

Objectives:

To cure and prevent disease processes

To prevent the spread of communicable diseases

To prevent complications and sequelae

To shorten period of disability | Adequate treatment to arrest the disease process and to prevent further complications and sequelae

Provision of facilities to limit disability and to prevent death | Provision of hospital and community facilities for retraining and education for maximum use of remaining capacities

Education of the public and industry to utilize the rehabilitated

As full employment as possible

Selective placement

Work therapy in hospitals

Use of sheltered colony |
| Primary Prevention | | Secondary Prevention | | Tertiary Prevention |
| LEVELS of APPLICATION of PREVENTIVE MEASURES | | | | |

URGENT (by phone):
- Avian Influenza
- Creutzfeldt-Jakob disease (CJD) variant
- Foodborne illness (greater than 2 linked cases)
- Gastroenteritis (in an institution)
- Measles
- Coronavirus strains (SARS, MERS-CoV, SARS-CoV-2)
- Smallpox
- viral haemorrhagic fevers.

ROUTINE (by phone or mail):
- Acute rheumatic fever
- Acute viral hepatitis
- Adverse event following immunisation
- Creutzfeldt-Jakob disease (CJD)
- HIV
- Leprosy
- Pertussis
- Rheumatic heart disease - (< 35 yo)
- Syphilis
- TB Tuberculosis

Global causes of childhood morbidity and mortality and assess the impact of social determinants of health on children.

Global causes for childhood morbidity and mortality
- War and conflict
  - Drowning, road traffic injuries (lack of road safety programs and adequate road infrastructure)
- Unable to access clean drinking water
  - Increased risk of diarrhoea associated illnesses (e.g. cholera, ETEC – traveller's diarrhoea)
- Malnutritious diet (nil fortified foods – iodised salt in the making all breads)– increased risk of vitamin and nutrient deficiencies → high risk of marasmus and kwashiokar
- Poor health literacy
- Ineffective or absent primary prevention programs (e.g. CST screening or HPV vaccination in India not implemented unlike in Australia)
  - Unprotected sex → increased Tx of STIs, TORCH → birth defects
  - No vaccination plan
- Reliance on voluntary aid – MAFs (doctors without borders) – they come and go (may pass on some knowledge but

Social determinants
- Low SES
- Geographical location
- Unequal access to medical resources and expertise
  - Higher rates of pre-term baby deaths (e.g. HIE – birth asphyxia, aspiration pneumonia etc.)
  - Unable to manage congenital abnormalities effectively
- Prioritisation of healthcare is non-existent in war-torn conflict nations
- Low education – do not understand human rights to standard healthcare