Substance misuse and Toxicity

-Substance Use Disorders (SLIDs) are treatable, chronic diseases characterized by a problematic pattern of use of a substance or substances leading to impairments in health, social function, and control over substance use. It is a cluster of cognitive, behavioural, and physiological symptoms indicating that the individual continues using the substance despite

-A substance use disorder (SUD) is a mental disorder that affects a person's brain and behaviour, leading to a person's inability to control their use of substances such as legal or illegal drugs, alcohol, or medications

-Substance misuse: Using any substance at high doses or in inappropriate situations resulting in a health or social problem, immediately or overtime is known as substance misuse

-Substance dependence: Adaptation that results in withdrawal symptoms when substances are discontinued. It is an ordinary biological consequence of taking a substance for weeks or years. (cold turkey behaviour of sudden drop from taking substance)

-Substance addiction: The loss of control over the intense urges to take the substance even at the expense of adverse consequences. It is the continued substance use that persists in face of negative experience.

-Substance tolerance: A condition that occurs when the body gets used to medicine so that either more medicine is needed or different medicine is needed. Diminished response to a substance over the course of repeated or prolonged exposure Why is SUD a public health issue?

35.6 million suffered from a drug-use disorder in 2020, Substance-use was directly and indirectly responsible for 11.8 million deaths globally, Globally, the number of disability-adjusted life-years (DALYs) caused by DUDs approximately increased by 2.6% yearly from 1990 to 2019

-Substance misuse examples: alcohol, prescription drugs(opioids/steroids), tobacco, psychoactive substances (methamphetamines, cannabis)

-WHO strives to address the following challenges:

- Ensure access to needed controlled medicines for medical use.
- · Prevent and manage harms associated with drug use.
- Providing universal access to effective treatment and care for people with drug use disorder.

Methamphetamine(ice)

2015 - 2019; surge in meth use despite increased enforcement (increased meth deaths -> adulterated with fentanyl -> consumer don't know what is inside the meth they buy

History: >Amphetamine first synthesized (1887) then methamphetamine synthesized (1893), widely used by german and japanese soldiers in ww 2 for its stimulant effect and extended wakefulness, but found adverse effects of addiction and depression afterwards so regulated >1950s, indicated for treatment of obesity (increase metabolism, burn calories, lowers appetite) > 1970s, became controlled drug in US > 1980s. US tightened regulations around sale and use of ephedrine and illegal drug production turned to using pseudoephedrine as a precursor >1990s, widespread use of methamphetamines Effects: >Funhoria, increase energy and alertness

>Chronic mood and cognitive changes: irritability, aggression, panic, hallucination, memory impairment >Increased risk of early mortality and suicide attempts >Cardiovascular complications: arrhythmia, myocardial infarction, heart failure >Stroke Prevention/Treatment in SG

>Legal Enforcement; Illegal to possess or consume within or outside of Singapore (Misuse of Drugs Act, listed as Class A controlled drug) >Screening and assessment; prompted by signs and symptoms from patient's presentation, history and/or physical examination

>Drug testing: urine(7days), saliva(2days), blood and hair(90days)

>Diagnosis: DSM-5 diagnostic criteria: Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5)

>Management: psychosocial interventions largely: Motivational interviewing, Drug counselling, Cognitive-behavioural therapy health promotion with WSH (e.g. Total Worker Health, Total Workplace Safety and Health) >Preventive drug education by cnb in sg, continual pde engagement

Challenges for preventing drug misuse in SG

1. Surge in young drug abusers -> difficult to kick it off when they start young (2023, 51% of new drug abusers < 30 yo) 2. New Psychoactive Substances (NPS) -> (low cost, easy to produce || malleability of chem structure || falsely marketed as safe and legal)

long- and short-term consequences unknown (cannot be convicted because different chemical structures, names etc. which TFR) are loopholes)

Alcohol (alcohol use disorder most prevalent mental disorder globally)

Risk Factors: drinking at an early age, family history of alcohol problems, mental health condition and history of trauma Effects: causal link and risk factor found in more than 200 diseases and injury, 5.1% of the global burden of disease and injury Cutting back on foreign manpower (need to use sg own population) is attributable to alcohol, as measured in disability- adjusted life years (DALYs), (picture included)

Alcohol consumption centered approaches:

-Reduce population-level consumption by: Raise alcohol taxes, Raise the minimum price of alcohol sold at retail, raising legal minimum drinking age, Reduce permitted hours for sale of alcohol late at night, Advertising restrictions

Injury centered approaches:

-Reduce alcohol-related road injuries by: Publicity campaigns, Police enforcement of drink-driving laws -fines, driving license suspension etc., Random breath testing, Ignition or alcohol interlock devices

-Reduce alcohol-related interpersonal violence by: Reduce trading hours for licensed venues. Improve venue security, Ignition interlock devices (not in sg yet, introduced in several EU countries): do breathe test

Prevention of alcohol misuse in sg

-l egality: legal drinking age of 18 years old, anyone caught drinking with a breath alcohol content > 30 mcg alcohol in 100mL of breath; or > 80mg of alcohol in 100mL of blood can be charged with drink-driving. If found guilty, persons can be liable for a maximum fine of SGD 10000 and/or up to one year's jail

-Recommendation: 2 standard drinks per day for men and 1 standard drink per day for women,

standard drink (one can 330ml of 5% beer, half glass 100ml of 5% wine, one nip 30ml of 40% spirit), men have lower percentage body fat than women, men produce more alcohol dehydrogenase enzyme

-Screening and assessment: Patient's alcohol history, physical examination on potential comorbidities and complications, laboratory investigation.

-Diagnosis: DSM-5 criteria

-Management: Patient education on drinking limits and law, Psychosocial interventions, Consider referral to community resources or psychiatric services where appropriate

Opioids Effects

-A class of prescription drug used to reduce pain.

-Act on the opioid receptors in the brain and/or spinal cord for: Analgesia, Cough suppression, Sedation, Respiratory depression, Euphoria

History of onjoids; started with Morphine Overdose

-Symptoms: Constricted nunils, breathing difficulty, Unconsciousness, May have seizures

-Management: Antidote: Naloxone (opioid antagonist), Supportive care (to improve breathing and ventilation) Withdrawal

-Symptoms: Sweating, Bone or joint aches, Runny nose or tearing, Tremor, Restlessness, Anxiety or irritability -Management: Pharmacological (Buprenorphine/Naloxone), Symptomatic management Prevention of opioid misuse

Increase the availability of opioid dependence treatment. Reduce and prevent irrational or inappropriate opioid prescribing. Monitoring opioid prescribing and dispensing, Limit inappropriate over-the-counter sales of opioids.

Legal regulations → Opioids are controlled drugs in Singapore

License requirement to import, store, wholesale, export or manufacture controlled drugs, Regulations for bringing personal medication to Singapore, Requires approval from Health Science Authority (HSA), Restriction on supply by retail sale of

codeine cough preparations

-National guidelines on safe prescribing of opinids

Opioids should not be prescribed as first line treatment for acute and chronic pain, Identify risk factors and patient factors before initiating opioid therapy, Monitoring of patients under opioid therapy, Patient education

Drug Courts: An alternative to incarceration for drug dependent offenders.

Treatment contracts could involve: Participation in community-based substance abuse treatment, Indiv case management, Regular urine drug screening, Sanctions and rewards to motivate continued drug treatment and compliance. Regularly scheduled contact with the Drug Court Judge for assessment of progress, Regular assessment of eligibility for graduation

1. Better treatment & social outcomes (Factors to consider: Recidivism, Mental Health, Somatic Health, Crime Rates) 2. Better compliance to substance abuse treatment (Early sanctioning is associated with treatment failure due to non-

adherence, while a jail sanction initiated later may better foster treatment compliance in less refractory individuals.) 3. Achieve greater cost effectiveness (Every \$1 spent on drug courts yields more than \$2 in savings in the criminal justice system: Reduced cost from additional re-arrest and incarceration. Improved public safety from sustained recovery of person with substance use disorder)

 Fligibility criteria for drug courts (People who have been arrested or incarcerated have higher rates of substance use positive for illicit drugs in their system, 50% of all inmates suffer from drug or alcohol addiction, <10% of inmates receive proper addiction treatment while incarcerated)

Individual Factors: Employment & Education (Unemployed status and lower educational attainment are associated with treatment failure hazard during drug treatment court.)

Institutional Factors: Working Industry / Trades (Highest Use for: Mining 17.5% + Construction 16.5% - Alcohol. Accommodations and food service industry - Illicit Drug 19.1% + SUD 16.9%

Workplace Safety and Health

- Work can affect health: Accidents and injuries (injuries and accidents with machinery etc), Obvious diseases (diseases from working with chemicals in work etc), Hidden diseases (eg sick building syndrome - poor maintenance or cleaning leading congregate settings, long infectious periods – Patients recall to mold, mental stress - from quicker deadline due to fast work pace etc). Incurable diseases (contact with asbestos can cause cancer etc)

-Health can affect work: Decrease productivity (illness reduce output and work performance), Danger to self (illness/medication may cause danger when working with machinery/dangerous areas, can result in safety lapses and affect health), Danger to others / community (eg bus driver getting heart attack and cause accident will affect passengers' life)

- Occupational Health (Work Health) -> health of the working population
- identify potential dangers and hazards at the workplace prevent diseases and injuries

· promote healthy and productivity workforce

Challenges / Changes

-Industrial Revolutions of work (evolution of work overtime)

IR1: Introduction of steam power mechanised production. Child Jahour common. Hazardous work environment. Little WSH legislation

IR2: Electric power, internal combustion engine, Age of mass production, New WSH laws, Use of epidemiological and experimental methods to examine causality between work exposures and disease

IR3: Use of electronics, IT to automate production, Increased sedentary work, Rising NCDs, Move to integrate workplace

IR4: New technologies, e.g. nanotechnology, additive manufacturing, synthetic biology, Changing work conditions e.g. 24/7 digital platforms; work from home, New employment relationships e.g. gig economy -Demographic of SG population: 70% in workforce, sizeable amount in diseases group, need to keep working population

healthy and allow them to work as long as they want to Shrinking workforce due to declining fertility rate (TFR > 2.1 for replacement of population, sg on constant decrease below

Rapidly aging population and workforce (more percentage of population is elderly and aging population) The health of our working population is worse off than the general population (obesity/health problems due to people emphasis on work, more sedentary lifestyle that comes with working)

Opportunities and Developments

-WSH Legislations (Workplace safety and health act 2006, work injury compensation act 2019)

-Total workplace safety and health (total WSH): work, safety and health are inter-related >work (poor work processes, aggravate health / cut oneself when not careful)

>health (infection, uncontrolled diabetes, frequent MCs affecting productivity / fainting spell causing accidents & injuries)

>safety (cuts, injuries, economic and reputation losses to company / wound affected by diabetes) >Looking at work, safety and health together so as to achieve workers' well-being

What is a Genome - All living organisms - plants, bacteria, bacteria, & animals have distinct genomes, which contain 'instructions' to create an organism, encoded in chemicals known as 'DNA' of letters Adenine(A), Guanine (G), Cytosine(C) & thymine(T)/Uracil(U), [RNA]

Genome size	170,000 bp	4,6 million bp	130 million bp	3.2 billion bp	150 billion bp
Common name	Virus	Bacteria	Fruit fly	Human	Canopy plant

Amount of base-pairs (bp) does not represent more advanced/sophisticated organism Pathogens such as viruses & bacteria tend to have smaller genomes → SARs-CoV-2 ~30kbp / TB Bacteria ~ 4.5 Mbp

Different strains will have different molecular fingerprint patterns (genotypes) → similar genotype likely 'linked' by recent

Epidemiology → study of the distribution & determinants of health-related outcomes in a specified population & the application of this study to control health problems Genomic Epidemiology → use of genomic data (highly similar genome, 1 base change) to determine the distribution &

determinants of health-related outcomes in a specified population & the application of this information to control health

Pathogen Genomic Epidemiology: Combining pathogen genomic and epidemiological data to control and limit spread of infectious diseases

Genes determine what traits are passed down from parents to children. Each human cell contains 23 pairs of chromosomes (long strings of DNA bases A, G, T & C) each from dad & mom. 0.1% (of 3.2 billion bp) difference in genes of 2 individuals Genetics → the study of genes, genetic variation & heredity (traits passed) → Cystic fibrosis (CFTR gene) sticky mucus build up: Genomics → the study of the genome, consisting of the entire set of genes & its interaction with the environment of their structure function & evolution

Varying degrees of genetic effects → 100% due to environment (car accident) vs 100% due to genetics (monogenic disorder, down syndrome, CF) → complex traits & diseases (height, cholesterol levels, cancer ...)

Mutations: Inherited (Germline) → Any variant that occurs in a gamete (egg or sperm) or cells that produce gametes Acquired (Somatic) → Cells that are not part of the germline are called somatic cells, Somatic mutations are not present in every cell in the body, and are not passed from parent to child, Happens at some point later in your life (due to errors in DNA replication, or exposure to environmental factors such as UV light, smoking etc)

Precision medicine considers individual variations in genetics/genomes, environmental & lifestyle factors → to more accurately predict which treatment & prevention strategies will work in different groups of people → accurate prediction o health conditions; faster diagnosis; optimised treatment; novel treatments

Pharmacogenomics → Lise of genetic & genomic information to tailor pharmaceutical treatment → curated specialised treatment catered to indivs → Carbamazepine to control Epilepsy (seizures), Stevens-Johnson → HLA-B*1502 Ethical, legal & social implications How should counselling be offered? Who else needs to be tested? When should they be informed of lateonset diseases? Should the data be kept, how long, by whom? Necessary to reanalyse?

Cancer Genomics → Breast Cancer is classified according to whether certain genes expressed in the tumour, like the human epidermal growth factor receptor 2 (HER2), Drugs such as Herceptin (trastuzumab) can be used for treatment of HER2 breast cancer

Translation and Implementation in Public Health and Healthcare

Clinical Genetic Tests: Used to predict, diagnose or guide treatment of medical conditions (e.g. predictive or diagnostic testing for cancers), In SG only doctors are allowed to offer clinical genetic testing, subject to regulatory standards Non-clinical genetic Tests: Used for personal well-being and recreational purposes (e.g. ancestry, personality, behavioural or nutrigenomic testing), though more commonly sold online, such tests can be accessed through local and overseas stores Newborn Genomic Screening

The incorporation of genomic sequencing in newborn sequencing, i.e. determine the genomes of these babies, are able to Increase the chances for early detection of treatable rare diseases

• The genomic data can be used to predict the risks of developing health conditions later

Communicable Diseases / Infectious Diseases: HIV/AIDS, tuberculosis, malaria, dengue • disease that you can catch from disorder than the nation at large, 80% of prison population suffers from substance abuse, 60% of people who are arrested test another person/organism due to transmission of a biological agent • biological agents/pathogens/bugs: virus, bacteria, fungi, protists

Noncommunicable Diseases (NCDs): Cardiovascular diseases, diabetes, cancers, mixture of environment and genetic

Infectious Disease Transmission: Identifying individuals/samples related to disease transmission, Different strains will have different molecular fingerprint patterns (genotypes). Patients with similar genotypes are likely to be 'linked' by recent transmission. Patients with different genotype patterns are highly unlikely to be part of the same transmission

Challenges for Epidemiology Investigation for TB: Airborne

Transmitted - Difficult to assess exposure, especially in might be incomplete or unreliable, common in poor and marginalized communities

Genome Similarity not equals Transmission: Strains that are similar in their genomes are more likely to share an epidemiological association, i.e part of a transmission, Transmission pathways (and the direction of transmission) cannot be assumed to mirror phylogeny (without other data), Causal links (e.g., between cases and exposures) cannot be assumed from sequence data alone

Global Pathogen Genomic Surveillance: Key Objectives: Improve access to tools for better geographical representation, Strengthen the workforce to deliver at speed, scale and quality. Enhance data sharing and utility for streamlined local to global public health decision-making, Maximize connectivity for timely value-add in the broader surveillance architecture. Maintain a readiness posture



Introduction to Global Health

Black Death (1300-1600): estimated 100 million deaths (about 25% of world's population), started when habitats of wild rodents in central asia disrupted by human/farming expansion/new trading patterns

Venice 1348, Believed that plague came by ships, Adopted 30-day detention period, Expanded to 40-days (ie "quarantine"), Island as quarantine station (lazaretto), Didn't work (spread by fleas on rats), Bar exit of people/goods from cities/regions -Public health measures are local and unilateral

Imperialism/ Colonialism (late 1400s):

-Transmission of disease in multiple directions, Europeans carried influenza, typhus, smallpox, cholera, Falciparum malaria from Africa to Americas via European slave ships, Syphilis from Americas (early Spanish/ Portuguese explorers) back to Europe...

-High occupational mortality among displaced indigenous groups, bonded labourers, African slaves

-Decision to counter infectious diseases ("tropical diseases") based on external interests; Protect health of European and American colonial personnel and workers, Enhance productivity, safeguarding commerce, Top-down, local compliance was achieved through compulsion, Narrow focus (on single disease)

International Health (1850s):

-Fear of epidemic: Large-scale immigration from Europe and Asia to the Americas, Explosion of mineral extraction, manufacturing, trade, marketing of goods + revolution of transportation (steamships, railroads, Suez Canal), 6 choleras nandemics between 1816-1899 -On-the-ground cooperation deemed as beneficial for: Control of outbreaks (of tropical diseases), Stabilise colonies and

emerging nation states, Improve diplomatic relations, Expand consumer markets, Encourage transfer and internationalising scientific, bureaucratic and cultural values -International Health Organisations (e.g. Rockefeller Foundation – "scientific philanthropy", Save the Children, League of

Nations Health Organisation), De-colonisation, UN, World Bank, IMF, WHO Global health today: Focused on "improvement of health worldwide, the reduction of disparities, and protection of

societies against global threats that disregard national borders." Key Elements of Global Health: Transcends national boundaries / Requires global cooperation / Prevention and clinical care

/ Health equity for all / Interdisciplinary, multidisciplinary within and beyond health sciences Equity is the absence of avoidable or remediable differences among groups of people, whether those groups are defined

socially, economically, demographically, or geographically. (WHO) Health inequities are systematic differences in the health status or in the distribution of health resources between different population groups, arising from the social conditions in which people are born, grow, live, work and age. (WHO)

Why is Global Health relevant to us? Health is interconnected globally (diseases know no borders, global health security). Shared health challenges (increased risk factors for NCD), Health inequalities persist (health disparities even in developed countries), Climate change impacts everyone's health (global issue affecting health of all populations, regardless of country), Economic impacts of global health crisis (disruptions in trade, increased healthcare costs, reduced productivity

	Public Health	International Health	Global Health
Geographical Reach	Focuses on issues that affect the health of the population of a particular community or country	Focuses on health issues of countries other than one's own, esp those of low-income and middle-income	Focuses on issues that directly or indirectly affect health but that can transcend
Level of Cooperation	Does not usually require global cooperation	Usually requires binational cooperation	Often requires global
Individuals or Populations	Mainly focused on prevention programmes for populations	Embraces both prevention in populations and clinical care of individuals	Embraces both prevention in populations and clinical care of individuals
Access to Health	Health equity within a national or community is a major objective	Seeks to help people of other nations	Health among nations and for all people is a major objective

Embraces a few disciplines but Encourages multidisciplinary Highly interdisciplinary and approaches, particularly within has not emphasised multidisciplinary within health sciences and social sciences multidisciplinary

Children <5 in sub-Saharan 14 times more likely to die than rest of the world

Lifetime risk of maternity death (Sweden < 1 in 10000, Chad 1 in 15)

Life expectancy (Japan 84vo, South Sudan 55vo)

HIV in US (AA represents 13% of population but 48% of all new infections)

Equality (receive same amount of aid) vs Equity (those who need more help requires more aid)

Determinants of Health

-Social & economic environment: Income & social status / Education /Social support networks / Employment / Culture -Individual characteristics & behaviours: Genetics / Gender

-Physical environment: Safe water & clean air / Healthy workplaces / Safe houses / Communities & roads / Working conditions Sustainable Development Goals: 1. No Poverty, 2. Zero Hunger, 3. Good Health and Well-Being, 4. Quality Education, 5. Gender Equality, 6. Clean Water and Sanitation, 7. Affordable and Clean Energy, 8. Decent Work and Economic Growth, 9. Industry, Innovation and Infrastructure, 10. Reduced Inequalities, 11. Sustainable Cities and Communities, 12. Responsible Consumption and Production, 13. Climate Action, 14. Life Below Water, 15. Life on Land, 16. Peace, Justice and Strong Institutions 17 Partnerships for the Goals

Established by UN in 2015, aim to: 1. Create more sustainable, equitable and prosperous world by 2030. 2. Promote peace and justice while ensuring that no one is left behind

Example: HIV Prevention

Factors making people at risk of getting HIV/AIDS (upstream) -> (other social measures) -> People at risk of getting HIV/AIDS -> (health/physical measures) -> People Living with HIV/AIDS

Social factors: Sexual violence (deteriorating social structures, inadequate security, vulnerability to sexual violence). Sex work (precarious legal status, financial vulnerability), Limited access to HIV services

Social measures require: • Transcends natural boundaries (3 countries, targeting origin/ transit/ destination) • Global cooperation (7 organisations consortium) . Prevention, clinical care . Multidisciplinary (beyond health)

Health/Physical Measures: Reducing high risk behaviours / PMTCT / Safe blood / Condoms / PEP/PrEP / Early detection and treatment

Myths and Assumptions of Global Health Programmes

1. Expertise Gradient • "We have superior understanding about how best to identify, prioritise and solve pressing health problems somewhere else." • "Problems elsewhere are simpler than problems at home."

2. Accountability • "As long as the intention is to help - global health interventions need not be vetted by the individuals and communities they are intended to help."

3. Equity vs Inefficiency • "Interventions and programmes motivated by concerns for equity and solidarity do not need to consider efficiency."

Humanitarian Emergencies Definition: "An event or series of events that represents a critical threat to the health, safety, security or wellbeing of a community or other large group of people, usually over a wide area." (Humanitarian Coalition) Types: Natural (earthquakes, floods, hurricanes, volcanoes, landslides, wildfires etc.) / Man-made (conflict,

environmental degradation, pollution, industrial accidents) / Complex (disaster + conflict/political instability)

Large Displaced Population, Population usually settled in temporary locations (High population densities / Inadequate food/shelter / Unsafe water / Poor sanitation / Infrastructure compromised or destroyed). Increase risk of transmission of "epidemic-prone diseases" (mainly infectious diseases) → increase mortality

Determinants of Disaster Risk

World Risk Index consists of factors/variables Exposure and Vulnerability (square root of exposure times vulnerability) Exposure: number and share of population regarding earthquakes, tsunamis, cyclones, coastal floodings, riverine floodings, droughts, sea level rise and the intensity levels (strong, sever, extreme), usually based on location (unable to change)

Vulnerability: (resilience = lack of coping capacities + lack of adaptive capacities)

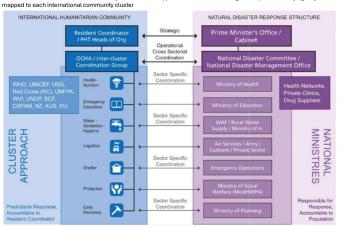
-Susceptibility: Structural characteristics, general conditions of societies > Public Infrastructure (access to basic sanitation and drinking services / Housing conditions (slums, fragile dwellings) / Nutrition (undernourished) / Poverty & Dependency / Economic Productivity & Income Distribution (GDP + Gini Index)

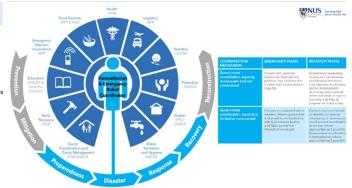
-Lack of coping capacities: Formally/informally organised activities/measures > Govt & Authorities (corruption + fragility) / Medical Services (physicians + hospital heds) / Material Coverage (insurance)

-Lack of adaptive capacities: Societal structures/systems (long term processes/strategies) > Education & Research (literacy) / Gender Equality / Ecosystem Status & Environmental Protection Investments (public/private health expenditure)

Humanitarian Coordination Architecture

Global level > IASC > Humanitarian country team > cluster approach with cluster lead agencies (each ministry/agency





Disaster Management Cycle

Response Phase (Multi-sector/cluster Initial Rapid Assessment (MIRA) Phases)

-Emergency Classifications (IASC/IOM): • Level 1: National Emergency Response • Level 2: Regional Emergency Response • Level 3: Global Emergency Response —> Based on: 1. Scale 2. Urgency 3. Complexity 4. Capacity 5. Renutational Risk

Response/Recovery Phase - Surveillance: • Monitoring a population's health and identifying priority immediate and longterm health needs • Following disease trends for early detection and control of outbreaks (Farly Warning Alert and Response Network - EWARN) • Assisting in planning and implementing health programmes • Ensuring resources are targeted to the most vulnerable groups

Monitoring the quality of health care • Evaluating the coverage and effectiveness of programme interventions Rebuilding Phase (Disaster prevention, resilient and sustainable development: "Building Back Better")

Preparation Phase: 1. Outputs and experience of recovery should feedback into improving resilience and to reduce future risks.

"Do no harm". "Build back better". 2. Many natural hazards that cause disasters re-occur periodically in the same location, most notably floods and weather-related event



Example: Wenchuan Farthquake

12/05/2008. 02:28:01 8.0 Magnitude

>>90000 dead/missing, 374176 injured, 158 relief workers killed in landslide

> 4.8x10^6 homeless (up to 11x10^6)

> Up to 104 major aftershocks (4 - 6.1 Magnitude)

Do's and Don'ts

Don't work solo, work with other relief teams, especially local teams II Don't put yourself/others at risk II Be sensitive on phototaking and eating || Take care of yourself and teammates (physically and mentally) || Do handover/exit well (external support -> local capacity)

Climate and Environmental Change and Public Health

Climate: long term weather patterns, usually over 30 years or longer (what we expect)

Weather: current state of atmospheric conditions (what we get) Climate variability: short term variations around the average weather

Climate change; operates over decades or longer (based on scenarios not predictions from general circulation models (GCMs)

Human activities -> Global surface temperature Less time between disasters

Triple planetary crises; climate change, nature and biodiversity loss, pollution

Impacts of climate change on health; have a range of direct and indirect impacts on health, populations have different levels of vulnerability to these environmentally driven health stressors and may experience multiple impacts. SEA is highly vulnerable and this is priority for public health in the region

Vulnerability factors: demographic, geographic, biological, sociopolitical conditions, socioeconomic

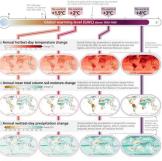
Exposure pathways; extreme weather events, heat stress, air quality, water quality and quantity, food security & safety, vector distribution and ecology

Health system capacity & resilience: leadership and governance, health workforce, health information systems, essential medical products and technology, service delivery, financing Climate sensitive health risks: (Health outcomes)

injury and mortality from extreme weather events, heat stress, respiratory illness, water borne diseases, zoonoses, vector borne diseases, malnutrition & food borne diseases, NCD, mental and psychosocial health (Health systems & facilities outcomes) impacts on healthcare facilities, effect on health systems

Climate change impacts vary regionally

Impacts on both the mean values and the number of extremes



Impacts of climate change



Vulnerability: • propensity of individuals or populations of be adversely affected by climate change • caused by biological, social, political and environmental factors • health impacts of climate change will be inequitably distributed within and between countries

Extreme heat: Heatstroke is leading cause of weather-related deaths, has high fatality rate, increases risk of other diseases Physiological factors; older and less abled ppl, ppl with certain medical conditions or taking drugs, pregnant ppl, infants and children

Exposure factors; outdoor and manual workers, ppl living in subpar housing conditions, ppl who are poor/displaced, athletes/attendees of outdoor events

78% (223) diseases exclusively aggravated, 19% (54) both aggravated and diminished, 3% (9) exclusively diminished Direct effects: changes in temp, rainfall, humidity impacting vector distribution & lifecycles, impacts on biodiversity & host ecology, behaviour & distribution, extreme weather events & water borne diseases, changes in agriculture & food borne

Indirect effects; climate driven conflict & migration patterns. malnutrition (food scarcity), logistical challenges in delivering control, comorbidities (heat stress, chronic

diseases), health system pressures Climatic factors and insect vectors: direct effects of temp & humidity on vector ecology are variable, frequently characterized by non-linear r/s, context and species specific Climate change impacts production of food globally -> food

insecurity, undernutrition Nutrition and Food Systems; agriculture remains one of the largest contributors to climate change and drivers of deforestation & biodiversity loss, increased focus on developing alternatives to livestock industry while ensuring adequate nutrition for population, need to balance and optimise climate and health goals

More frequent and more intense

Extreme heat and drought (A) (

Pollution: Climate Change is major driver of changes in air quality (wildfires, haze), strong r/s between air pollution & premature death (cancer, lung disease & NCD, increase susceptibility to infectious disease), climate variability can also influence allergens

Mental health: increased stress (cc. natural disasters, economic factors), decreased access to nature spaces, solastalgia (distress caused by loss of home environment)

1. Hazard (acute; storms floods, wildfires, extrm heat, chronic; drought, sea level rise, sea ice loss, changing climate normal) 2. Vulnerability (pre-existing health conditions, socioeconomic inequities, gender, age, occupation) 3. Exposure (direct, indirect: displacement, food systems disruption, occupational loss, vicarious; observed exp of others, media depictions of

cc) 4. Key adaptation responses (Scale; ins nal; State and Non-State Actors; effective mental health systems, planning and preparedness, informed policies, early intervention. Local Go ts: planning, design, green infrastructure nity: supportive social networks, effective info channels individuals: awareness, preparedness, mental health support, nature-based therapy) 5. Risks to mental health (Mental illness ie; depression, suicide, PTSD, Diminished wellbeing ie: stress, climate anxiety, cognitive impairment. Diminished social relations ie: loss of culture, interpersonal violence) Adaptation: actions to address risks of cc (can be solo, institutions or gov actions, overall goal -> prepare and respond to

Mitigation: intervention to reduce greenhouse gas to address root causes of cc (health sectors advocate for changes in other sectors (energy) to reduce future health burdens, increasing focus on reducing emissions of health sector) Reductions of fossil fuel, tree planting etc to capture carbon

Eg: Early Warning System (tool developed to monitor climate sensitive disease, rely on models using climatic info to predict

Mitigation and Health Co-Benefits: • less severe global warming -> less health consequences of cc (less extreme heat days) • clean transport -> reduce fossil fuels and improve air quality • less meat consumption -> support nutrition and reduce $climatic impacts of livestock industry \bullet expanding green spaces planting trees -> physical and mental benefits . Need to the property of the$ identify and advocate for win win solutions

Carbon Footprint of Healthcare: healthcare from high income countries accounts for 4.4% of carbon emissions, (40% gas electricity, heat, cooling, 13% facilities operational emissions, 11% metal textiles food manufacturing, 9% agriculture etc) Climate Resilient Health Systems: • identify and monitor risks using climate and health info • manage environmental determinants of health • prepare for emergencies • reduce emissions from health sector • ensure financing, policies and training in place