

Health determinants, demographics and health outcomes in human populations

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A Cook's Tour of Aspects of Human Epidemiology



- Terminology is a bit different
- Work with limitation/constraints
 - Can't slip out the back and do a quick PM
 - No test and slaughter (haven't put anything down for years – withdrawal, depression, etc.)
 - Other restrictive practices (informed consent, etc.)
- Large databases – condition coding varies

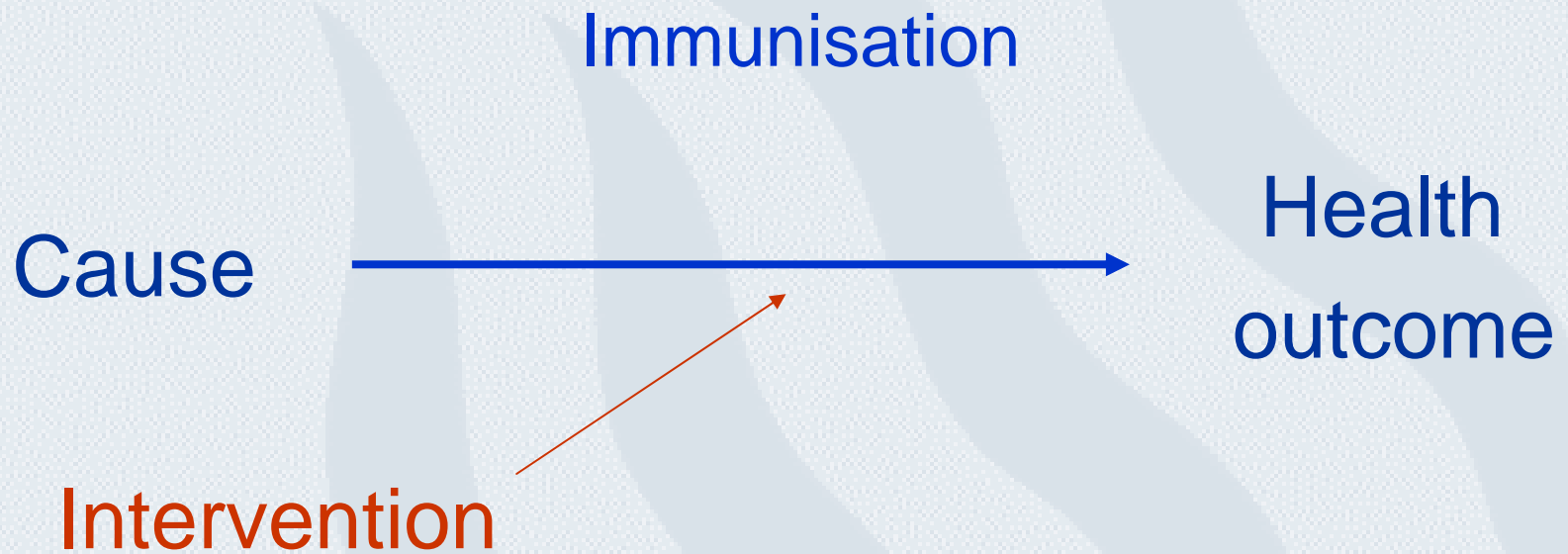
Health - Times are Changing

- Past – all about disease
 - Risk factors for disease
 - Morbidity – the sick
 - Mortality – the dead
 - Only measured part of the health problem
- Now – moving to measure all health
 - Burden of Disease
 - YLL - Years of Life Lost
 - YLD - years of life lost due to disability
 - Markers for **WELLNESS**
 - Social/health determinants
 - Factors which affect health
 - A change of emphasis

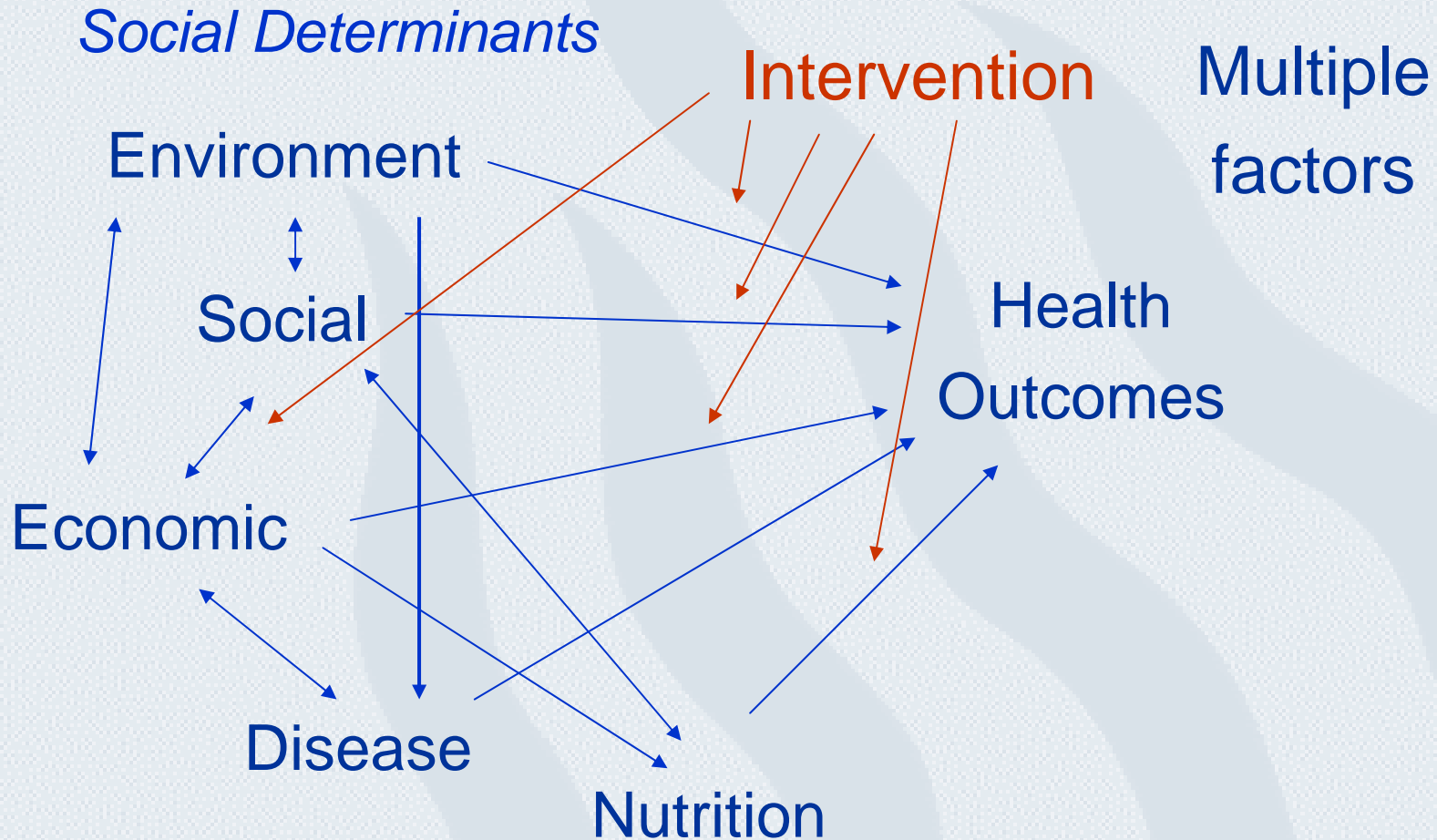
Burden of Disease

- Measures the gap between the current health of the population and the ideal,
 - where everyone lives into old age free of disease and disability.

In the past, simplistic view of Disease Causation



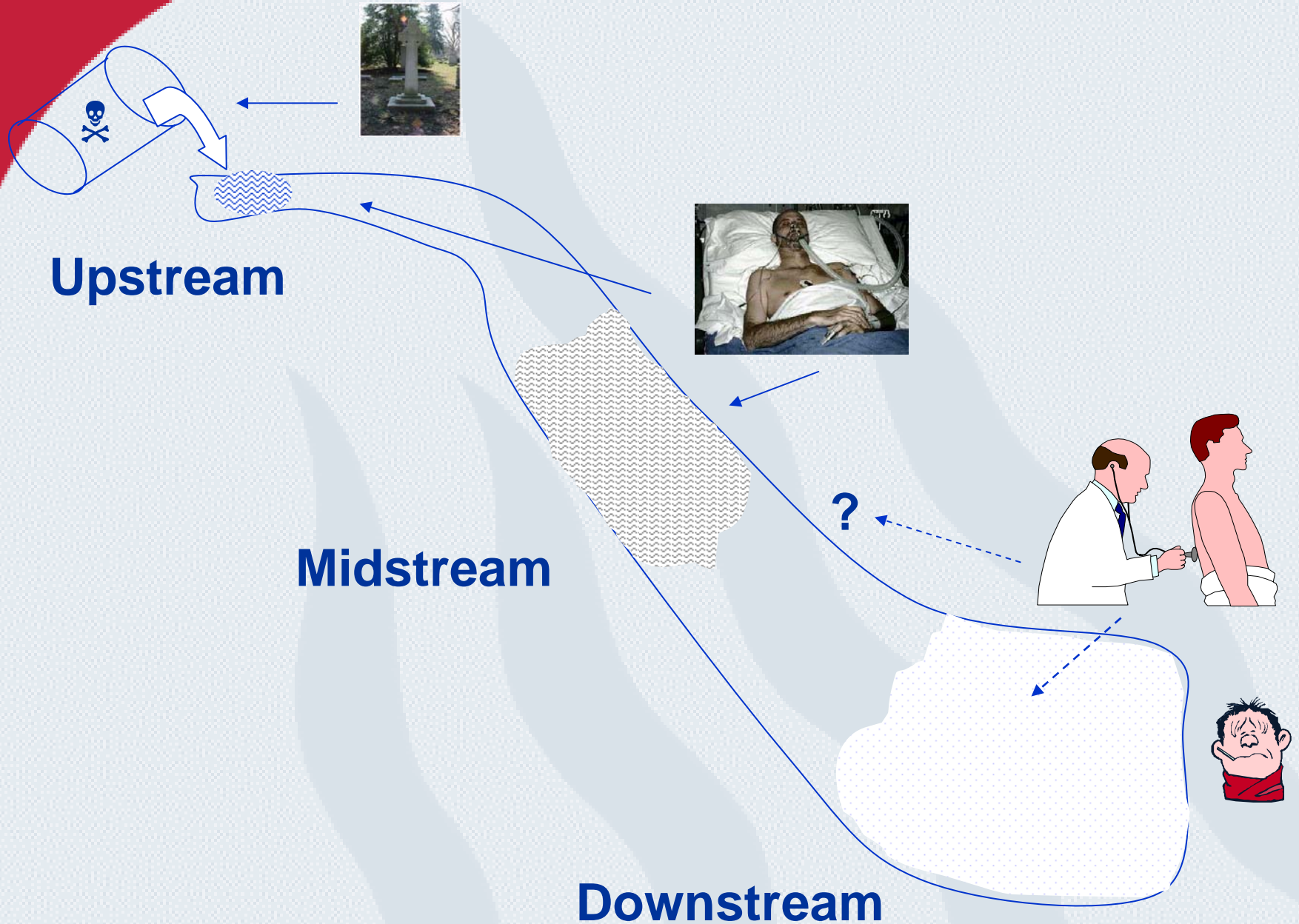
In Reality, very complex a web of Causation



What are Health Determinants

- Factor or characteristic resulting in a change in health,
 - for the better or worse
 - for individual or population
- Interaction of these factors determines the health of individuals, families and communities

Health Determinants



The Division of Health Determinants

- **‘Upstream factors’**
 - International influences, Government policies - economy, taxation
 - Fundamental determinants of health:
 - Socioeconomic - education, employment, income (inequality),
 - environment - living and working conditions - air, water and food quality
 - Culture - attitudes, beliefs, norms
- **‘Midstream factors’**
 - Psychosocial - sense of control, stress, self esteem, isolation, social support, coping
 - Health Behaviours - diet, physical activity, alcohol, smoking.
 - Biological – genetic factors
 - Role played by health care system
- **‘Downstream factors’**
 - Consequences from ‘above’ factors
 - Changes to physiological systems – ‘affects’ endocrine & immune systems
 - Biological “markers” - hypertension, BMI, suppressed immune, glucose

Predicting Health Burden, the K.I.S.S. Principle

- Life course
 - Looks at accumulated exposures throughout life
 - These result in ↑ risk of illness & premature death
 - Health conditions occur at different stages of life
 - Depend on:
 - susceptibility
 - Exposure
 - Previous exposure, resistance
 - Incubation period, cumulative exposure
 - Social & Environment determinants
 - Risk factors, personal behaviour
- Therefore:
- Can look at age profile & risk factors to:
 - Predict health burden
 - In Age groups &
 - Socio-demographic groups, e.g. Males, females, children, SE disadvantaged

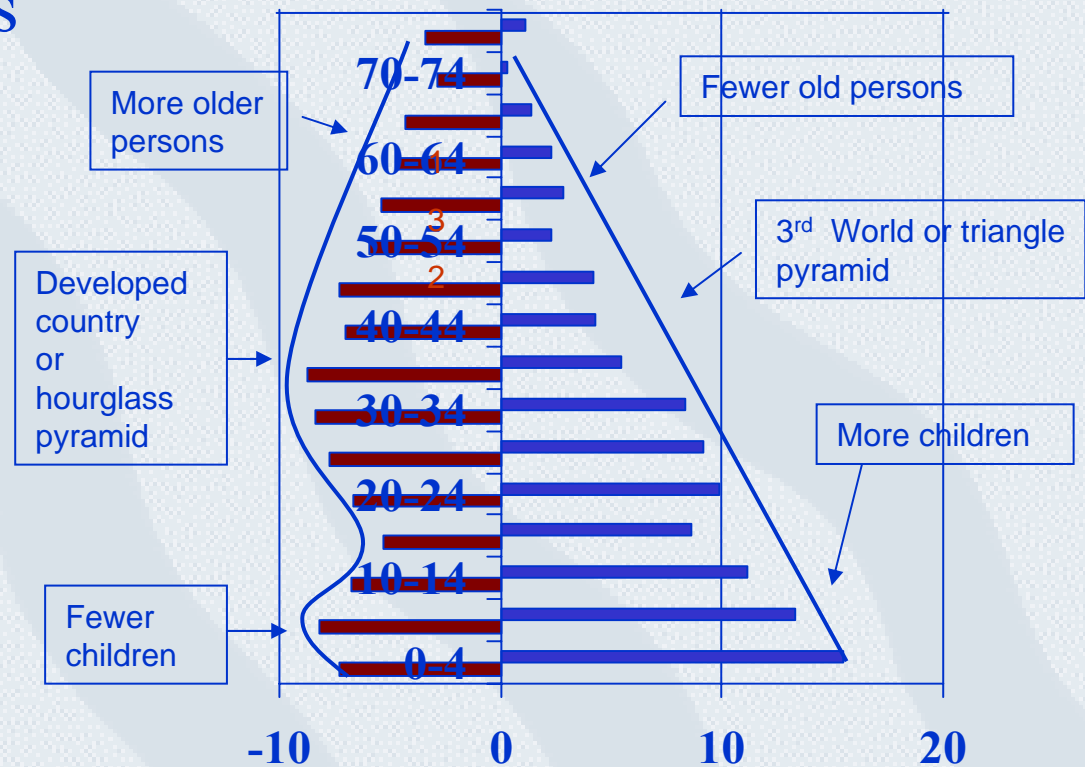
Demographics

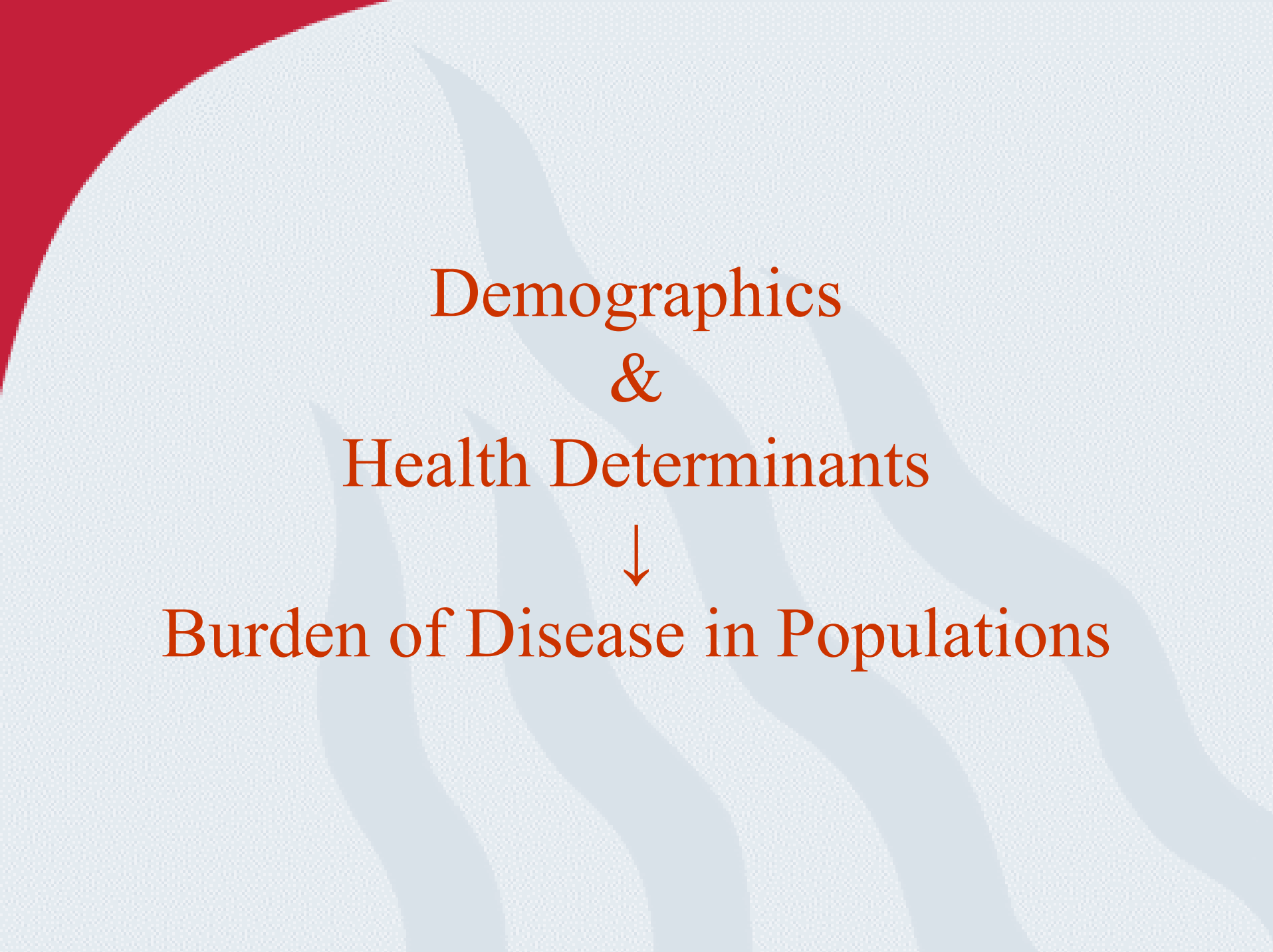
Important Indicator of Health Status

- Key Indicators:
 - Age profile
 - Gender, Population pyramids
 - Ethnicity
 - Rurality
 - Socio-Economic Status

What Population Pyramids say about Burden of Disease (BOD)

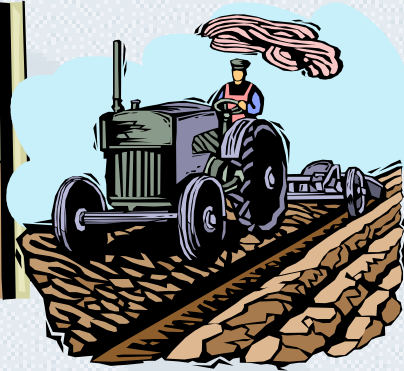
- Must compare apples with apples
- Different areas have different exposures
 - Different population pyramids
- BOD in Children, youth or aged
- Acute or chronic health issues



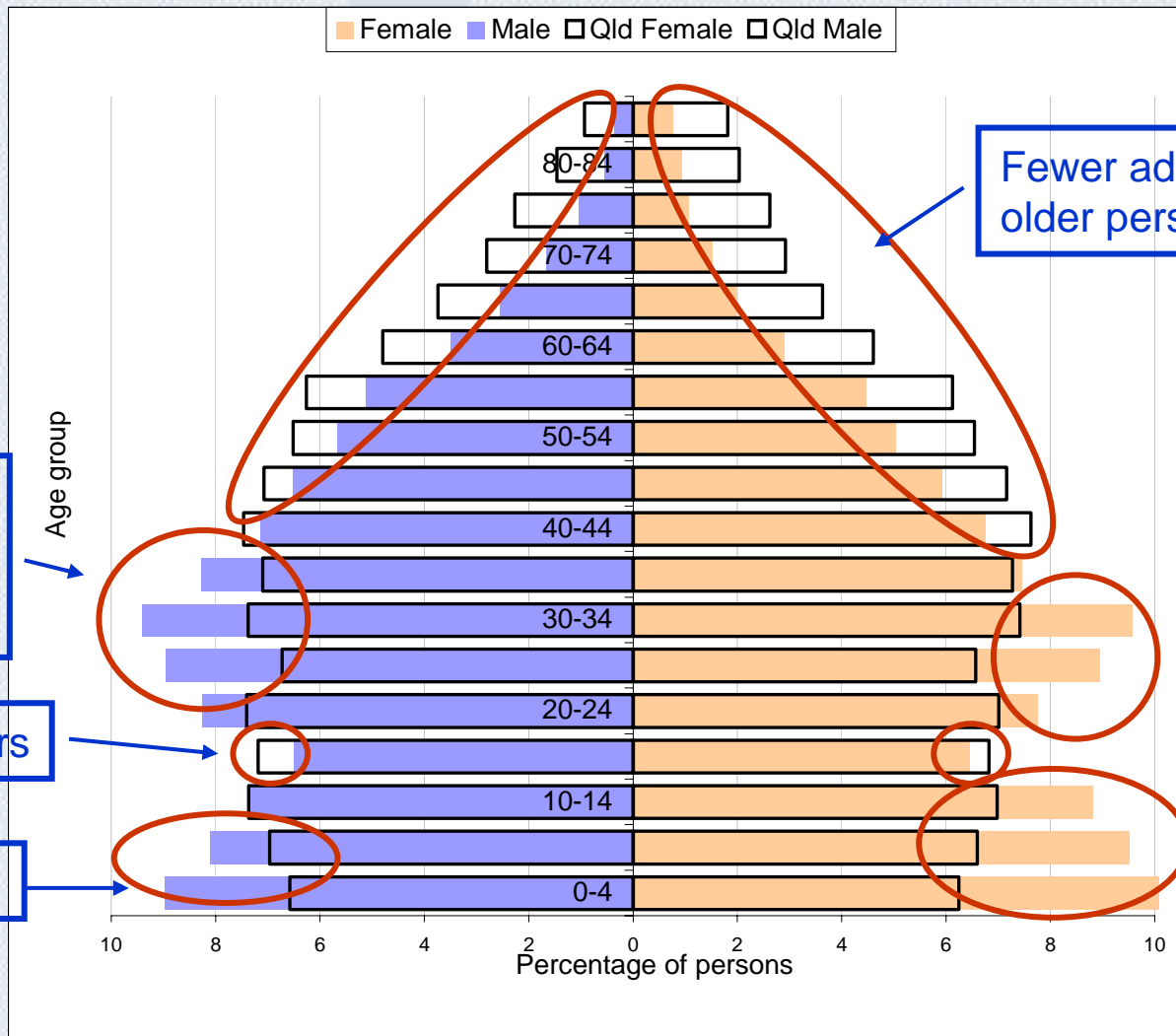


Demographics
&
Health Determinants
↓
Burden of Disease in Populations

Example - Who Lives in the West of Queensland?



Age & Gender Profiles Mt. Isa - 2005 ERP



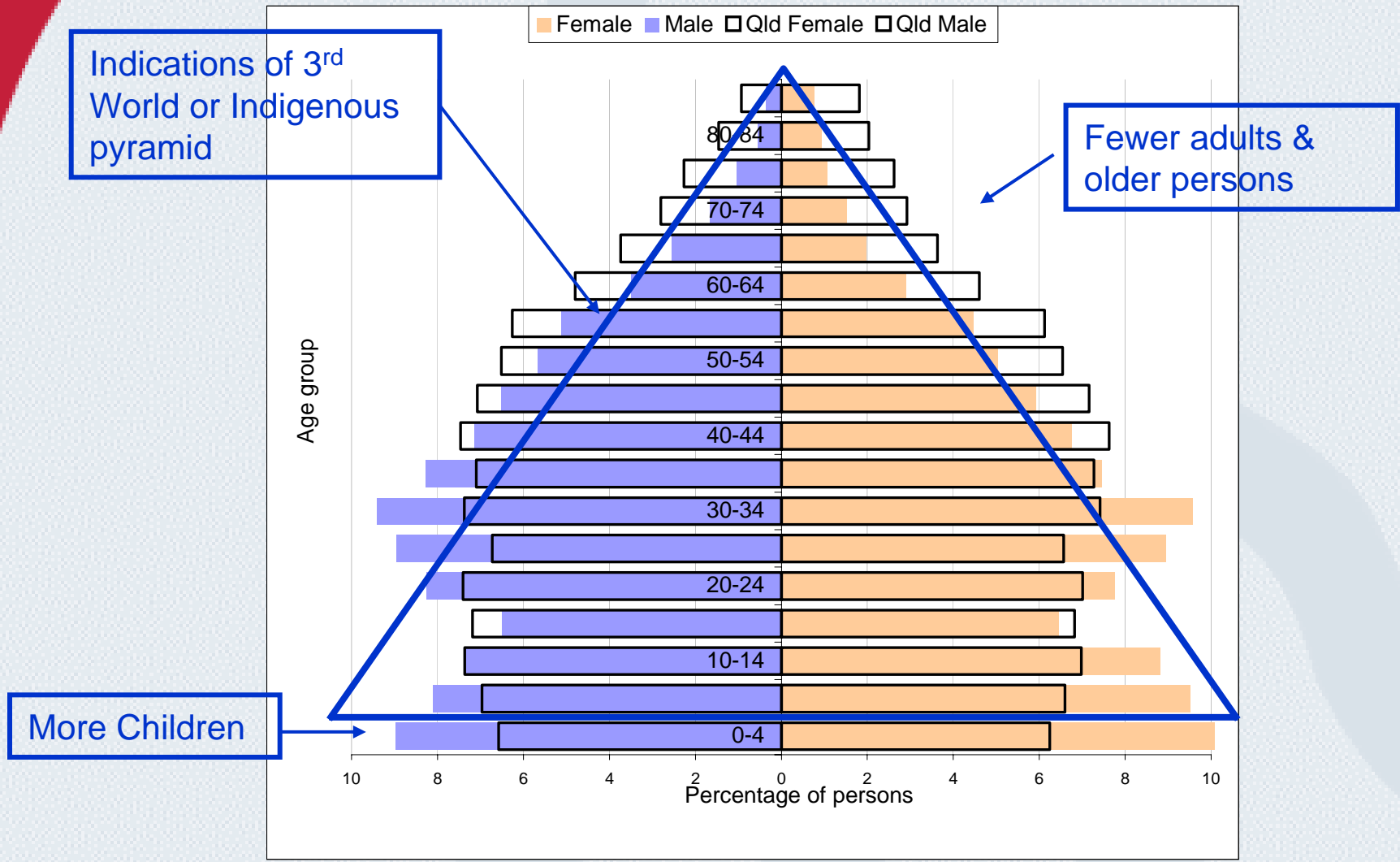
More young people & young adults

Fewer teenagers

More Children

Fewer adults & older persons

Age & Gender Profiles Mt. Isa - 2005 ERP

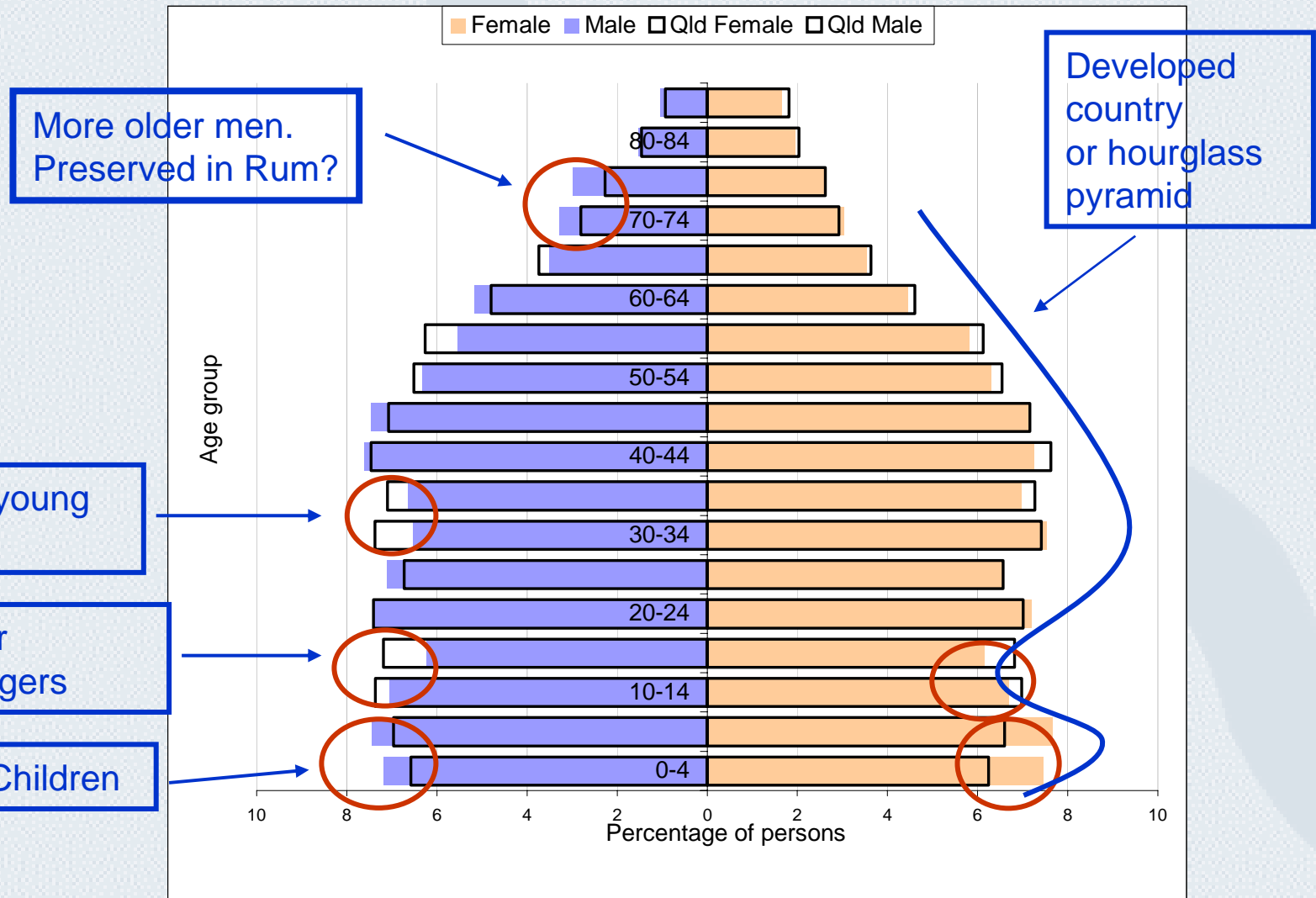


Indications of 3rd World or Indigenous pyramid

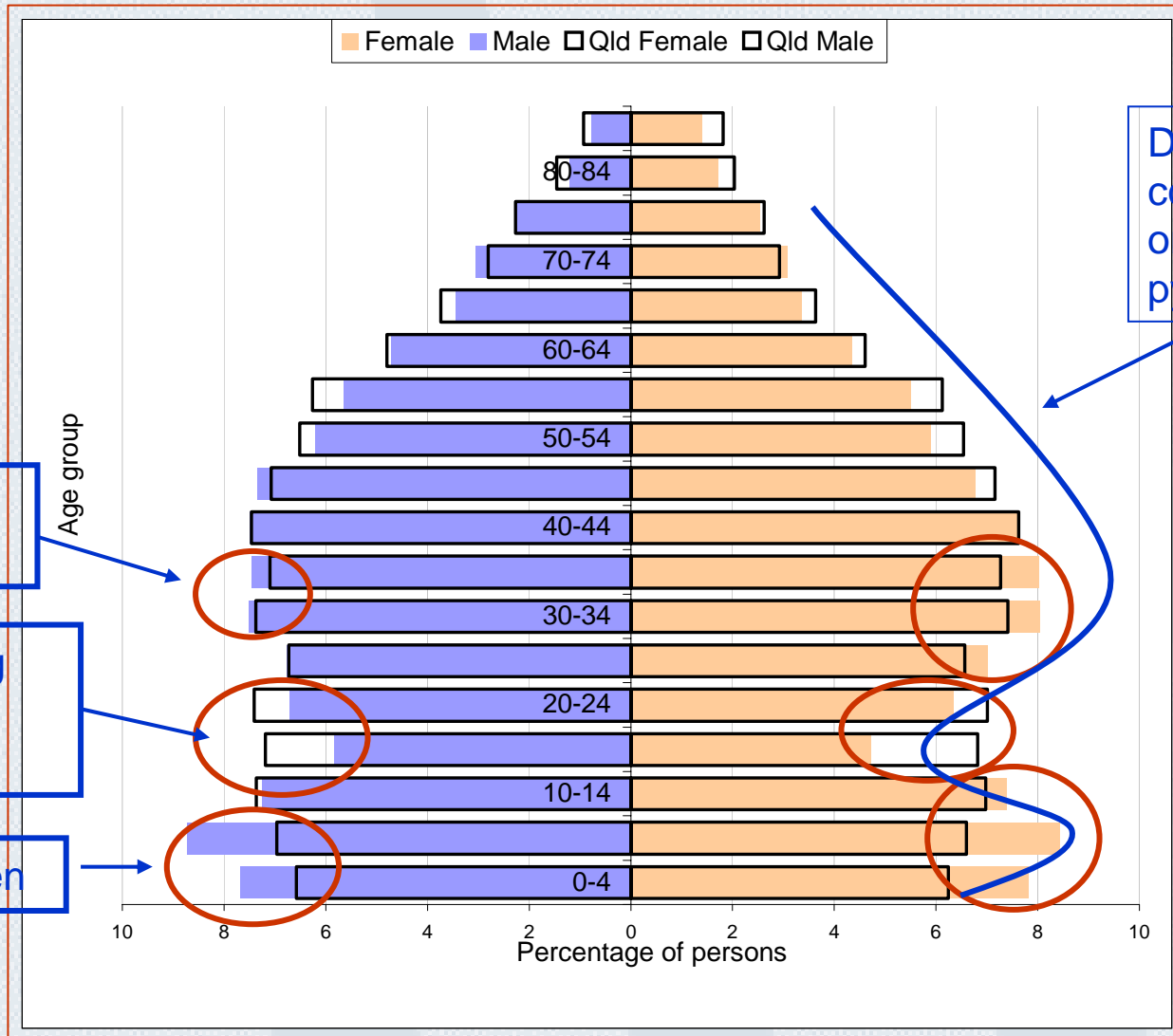
Fewer adults & older persons

More Children

Age & Gender Profiles Central West - 2005 ERP



Age & Gender Profiles South West - 2005 ERP



Developed country or hourglass pyramid

More young adults

Fewer young people & teenagers

More Children

Selected Demographic Data

	Mt. Isa	Central West	South West
Population ERP 2005	31,023	13,278	26,938
Percent of Qld Pop ⁿ (%)	<i>0.8</i>	<i>0.3</i>	<i>0.7</i>
Proj. Pop ⁿ growth ¹ (%)	<i>0.0</i>	<i>- 0.1</i>	<i>0.1</i>
Indigenous % (2001)	<i>20.6</i>	<i>5.1</i>	<i>9.2</i>
One parent families ² (%)	<i>16.2</i>	<i>10.5</i>	<i>12.1</i>
Area Sq. Km.	223,447	396,600	322,655
Pop ⁿ density/ Sq. Km.	0.14	0.03	0.08

¹ Projected population growth 2001 to 2026, Office of Economic and Statistical Research

² 12.2% Australian one parent families (2001)

Indigenous gradient – 21% → 9% → 5% MI → SW → CW

One parent family gradient – 16% → 12% → 11%

Evidence of Socio-economic Disadvantage

Socio-economic Indexes for Areas (SEIFA) by Health Service District** based on 2001 Census Data,

Queensland					
Health Service District Name**	Population	Advantage / Disadvantage	Disadvantage	Economic Resources	Education and Occupation
Mt Isa	32,631	984.80	1 939.28	1038.88	934.96
Central West	14,566	955.84	3 985.60	960.96	940.80
South West	26,596	946.40	2 976.48	949.20	939.36
QUEENSLAND	3,592,612	984.60	991.50	986.60	982.60

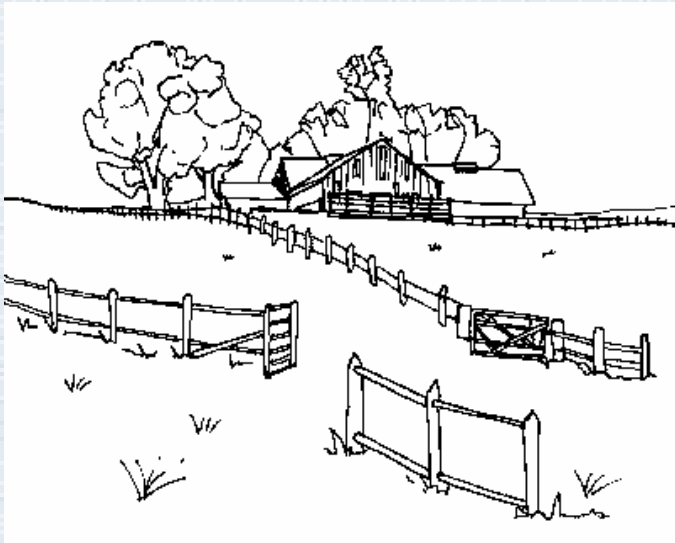
**Where District boundary does not follow SLA boundaries, Collection Districts (CDs) have been aggregated to create the District.

Source: CDA TA 01, 2001 Census of Population and Housing, Australian Bureau of Statistics

Prepared by: Client Services, Health Information Centre, Queensland Health Ph: 3234 1867 (Feb 27, 2007)

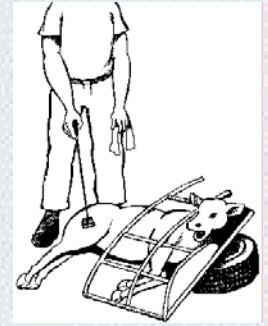
Socio-economic Disadvantage in all districts but not evenly distributed. Have notes - MI → SW → CW

Add Features of Rural/Remote Areas



- Farming/grazing
- Long Distances
- Roads & weather
- Low Pop'n density
- Fewer centres & services
- Cost/access to food
- Socio-economic disadvantage
- Ethnicity

Traits associated with Rural/Remote Areas



- Farming/grazing
- Long Distances
- Roads & weather
- Low Pop'n density
- Fewer centres & services
- Cost/access to food
- Socio-economic disadvantage
- Ethnicity

- Machinery/animals
- Cars/heavy machinery
- Social isolation, ATODs
 - Less social support
- Less access to services
 - Medical & specialists
- Less fruit/ veg.
- Fewer work options
- More Risk factors

Health Outcomes Associated with Traits

Traits

- Machinery/animals
- Cars/heavy machinery
- Social isolation
- Less access to services
 - Medical & specialists
- Less fruit/ veg.
- Fewer work options
- More Risk factors, ATODS

Health Outcome

- Injury/deaths
- MVA/deaths
- Mental Health
- Chronic Health problems
- CVD/Cancer
- CVD/Resp./Cancer
- Resp. problems
diabetes, CHD

Socio-economic disadvantage & Social Gradient

Variables, Risk factors Range of Outcomes

Poor education attainment/ Lack skills/ jobs/ Stress ATODS, T'port Physical inactivity Poor housing/nutrition BMI/Obesity	CVD, Premature Death, DV, Chronic disease Cancer, CHD Mental Health Diabetes, Renal, STDs, Injury
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Rural Health Problems from Social Determinants Point

Farming

machinery/stock
family/economic stress
sun/chemicals

Injuries/death
CVD/Mental health
cancers

Distance/weather

cars/fatigue/ATODS

MVAs/deaths

Low Pop'n density

isolation
Lack social support

Mental Health
CVD, CHD

Fewer Pop'n centres
Fewer services
Health, T'port, Ed'n

Accommodation/T'port
Poor infrastructure

Not address chronic
issues, CHD, Diabetes

Commodity prices

Lack fruit/veges.

CVD, Cancer

Socio-economic disadvantage
Ethnicity

Poor Ed'n attainment
Unemployment/housing
T'port/Service access
ATODS, life skills
Social exclusion,

CVD, CHD,
Mental Health, premature
deaths, Diabetes,
Respiratory problems,
STDs, DV

Can List Health Determinants & BOD for Socio- Demographic groups

Example:

Children

– Health Determinants

- Poor nutrition
- Overweight & obesity
- Physical inactivity
- Sun protection
- Vaccination
- Oral health
- Social determinants

– Burden of Disease

- Low birth weight
- Birth trauma & asphyxia
- Other chromosomal anomalies
- Congenital heart disease
- SIDS
- Attention-deficit hyperactivity disorder
- Autism & Asperger's syndrome
- Asthma
- Depression
- Road traffic injury
- Dental conditions

All 3 Districts

Demography and Health Outcomes

Example: Socioeconomic Disadvantaged

– Health Determinants

- Harmful alcohol consumption
- Poor nutrition
- Overweight & obesity
- Physical inactivity
- Cervical cancer screening
- Social determinants
- Smoking

– Burden of Disease

- All causes
- Diabetes
- Diseases of the digestive system
- Intentional injury (DV)
- Unintentional injury
- Mental disorders
- Musculoskeletal diseases
- Chronic respiratory disease
- Infectious & parasitic diseases & acute respiratory infections
- Neonatal causes
- Endocrine & metabolic disorders

All 3 Districts

What do We Know about Demography and Health Outcomes?

Example: Indigenous status

– Health Determinants

- Harmful alcohol consumption
- Illicit drugs
- Poor nutrition
- Overweight & obesity
- Less breast & cervical cancer screening
- Sexual health
- Physical inactivity
- Vaccination
- Social determinants

– Burden of Disease

- All causes
- CHD
- Diabetes & complications including renal failure, blood pressure issues,
- Unintentional injury
- Suicide & self-inflicted injury
- Mental health, Domestic violence
- Chronic Health problems, Respiratory problems, premature deaths,
- Pregnancy, birth health, teen pregnancy, sexual health, Poor growth,

MI > SW > CW

Socio-demographic groups

	Young children (0-14 years)	Young people (15-24 years)	Adults (25-59 years)	Older people (65 years & older)	Females	Males	Indigenous	Socioeconomic disadvantaged
Burden of disease and injury	<p>Asthma Low birth weight Attention-deficit hyperactivity disorder Birth trauma & asphyxia Other chromosomal anomalies Congenital heart disease SIDS Depression Road traffic injury Autism & Asperger's Syndrome Dental conditions</p>	<p>Road traffic injury Depression Bipolar affective disorder Heroin dependence & harmful use Suicide & self-inflicted injury Social phobia Schizophrenia Borderline personality disorder Alcohol dependence & harmful use Eating disorders</p>	<p>CHD COPD Suicide & self-inflicted injuries Diabetes Lung cancer Depression Breast cancer Stroke Colorectal cancer Road traffic injury</p>	<p>CHD Stroke Alzheimer & other dementias COPD Lung cancer Colorectal cancer Diabetes Vision disorders Prostate cancer Hearing loss Falls</p>	<p>Stroke CHD Depression Breast cancer Anxiety disorders Dementias Asthma Diabetes Osteoarthritis COPD</p>	<p>CHD Stroke Lung cancer Suicide & self-inflicted injury COPD Road traffic injury Diabetes Substance use disorders Depression Colorectal cancer</p>	<p>All causes CHD Diabetes & complications including renal failure Unintentional injury Suicide & self-inflicted injury Mental health</p>	<p>All causes Diabetes Diseases of the digestive system Intentional injury Unintentional injury Mental disorders Musculoskeletal diseases Chronic respiratory disease Infectious & parasitic diseases & acute respiratory infections Neonatal causes Endocrine & metabolic disorders</p>
Health determinants	<p>Poor nutrition Overweight & obesity Physical inactivity Sun protection Vaccination Oral health Social determinants</p>	<p>Harmful alcohol consumption Illicit drugs Sexual health determinants</p>	<p>Harmful alcohol consumption Smoking Overweight & obesity</p>	<p>Poor nutrition Overweight & obesity Physical inactivity Influenza vaccination Social determinants</p>	<p>Smoking Poor nutrition Overweight & obesity Physical inactivity Breast & cervical cancer screening</p>	<p>Harmful alcohol consumption Smoking Sun protection</p>	<p>Harmful alcohol consumption Illicit drugs Poor nutrition Overweight & obesity Breast & cervical cancer screening Sexual health Physical inactivity Vaccination Social determinants</p>	<p>Harmful alcohol consumption Poor nutrition Overweight & obesity Physical inactivity Cervical cancer screening Social determinants Smoking</p>

Comparison of Predicted to Hospital Data

- Match was close except data highlighted
 - **Hospital separations**
 - **Mental & behavioural Disorders ▼**
 - (Consider access, service availability, etc.)
 - Hospital data predicts low levels of mental health disorders, but this should be viewed against a background of access (transport, distances & availability of services) & stigma
 - ***Incidence***
 - **Total Malignant Neoplasias ▼**
 - Total cancers are lower than Qld, but overall it is a younger population.

Comparison of Predicted to Hospital Data

- A background of burden of disease for all socio-demographic groups
- Looking for excess e.g. more children
- There is good comparability between both Predicted estimates and Recorded Data sets

In Summary for this Example

- Health outcomes associated with rural/remote health determinants
- Indigenous health issues
 - Gradient from MI > SW > CW
- Socio-economic disadvantage
 - All districts, not evenly spread
- Age profiles differ between districts
 - Health outcomes vary with population groups

Demographics and Socio-demographic groups Analysis

- Shows BOD
- Where extra services are needed
- Target preventative interventions
- Particularly useful for conditions with no central data collation or burden often hidden (mental health) or inconsistent coding

What Can be Done?

Address Social Determinants



- Health associated with position on social gradient
- Difficult to do a lot about poverty
- BUT can educate → ↑ gradient position
- Health closely associated with
 - “Control over life”
 - Social support & Relationships**
 - Community Capacity Building**
- Can educate, involve, support & empower
- Takes time.

