6th Capacity Building Seminar in Health Insurance
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Critical Illness: Product Design & Pricing – Considerations for deriving incidence rates

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Agenda

- Introduction to Critical Illness insurance
- Product Design contours
- Importance of Definitions
- Considerations for deriving incidence rates using population data
- Derivation of incidence rates using hospital data

Introduction to Critical Illness

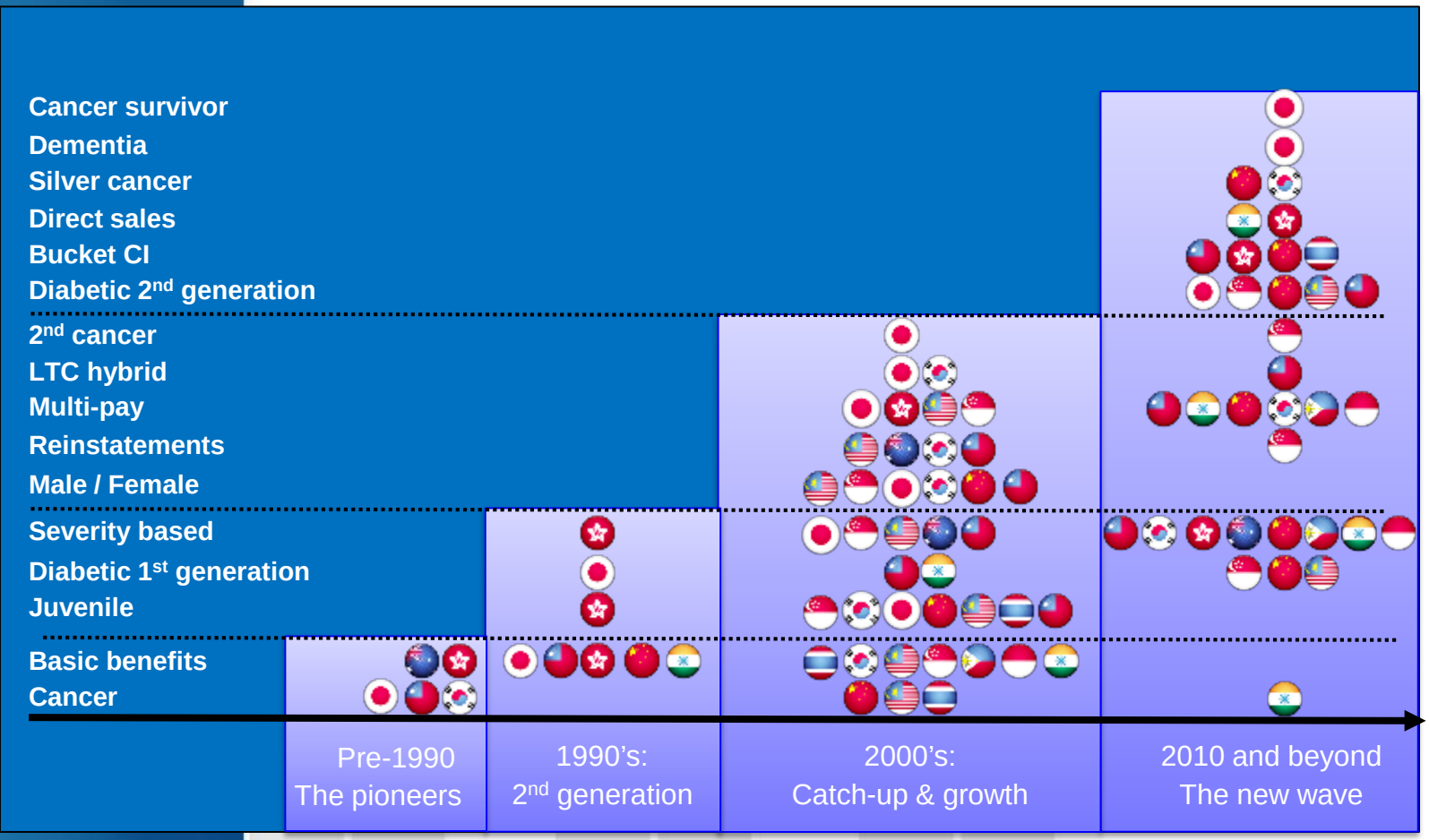
Introduction to CI

- First emerged in South Africa in 1983 under the name of “dread disease insurance”
- Developed to cover cost of lifestyle adjustments required after suffering a critical illness. e.g. assistive devices, home alterations, etc.
- CI covers pay a pre-defined benefit if the insured person suffers a serious condition (depending on the definitions stipulated in the policy wording) such as
  - Cancer
  - Heart Attack (Myocardial infarction)
  - Stroke
  - Coronary Artery (Bypass) Graft
- Since then significant ‘innovation’ in product design and features.

Need

- Suitable for people with limited social security support, or as an additional benefit for people with enough social insurance.
- Allows for financial independence and medical affordability even when struck with a serious illness
- Helps meet changed circumstances necessitated after CI occurrence such as changed living conditions / needs a car / helper
- CI can reduce long term ability of a person to work.
- It can be used to pay off debts.

Evolution of CI in Asia



- Japan
- Hong Kong
- Australia
- Taiwan
- Korea
- China
- India
- Malaysia
- Singapore
- Philippines
- Thailand
- Indonesia

List of Conditions

Typical list of conditions include:

- Cancer
- Heart Attack
- Stroke
- Coronary Artery Bypass Graft
- Kidney Failure
- Major Organ Transplant
- Benign Brain Tumour
- Paralysis
- Coma
- Total Blindness
- Major Burns
- Heart Valve Surgery
- Surgery of Aorta

- Motor Neurone Disease
- Multiple Sclerosis
- Aplastic Anaemia
- End Stage Lever Disease
- Chronic lung disease
- Alzheimer Disease
- Parkinson's disease
- Loss of speech
- Major Head Trauma
- Primary Pulmonary Hypertension
- Systemic Lupus Erythematosus with Lupus Nephritis
- Apallic Syndrome

And many more….

Standard definitions have been provided for 22 conditions in the 2016 health regulations

Product Design Considerations

- Payout
  - Accelerated (Pre-payment)
  - Additional
- Variations
  - Graded / Tiered CI
  - Multi-pay CI
- Waiting period
- Survival period
- Underwriting
  - Medical
  - Non-Med : Long form / Short Form / Declaration of Health

Importance of CI definitions

Importance of sustainability of Definition

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Heart Attack definition as per 2013 regulation

The first occurrence of myocardial infarction which means the death of a portion of the heart muscle as a result of inadequate blood supply to the relevant area.
The diagnosis for this will be evidenced by all of the following criteria:
i. A history of typical clinical symptoms consistent with the diagnosis of Acute
Myocardial Infarction (for e.g. typical chest pain)
ii. New characteristic electrocardiogram changes
iii. Elevation of infarction specific enzymes, Troponins or other specific biochemical markers.

II. The following are excluded:
i. Non-ST-segment elevation myocardial infarction (NSTEMI) with elevation of Troponin I or T
ii. Other acute Coronary Syndromes
iii. Any type of angina pectoris.

Heart Attack definition as per 2016 regulation

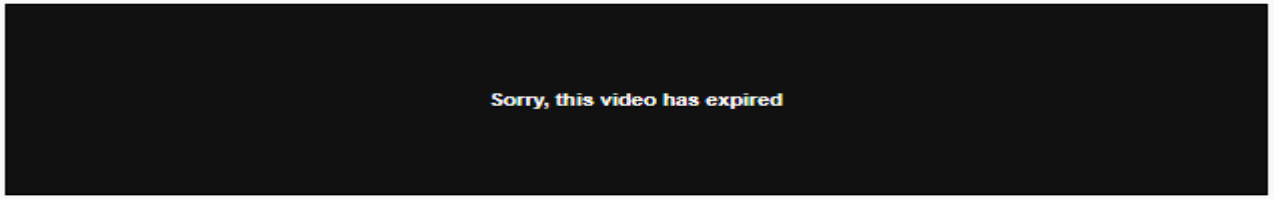
The first occurrence of heart attack or myocardial infarction, which means the death of a portion of the heart muscle as a result of inadequate blood supply to the relevant area.
The diagnosis for Myocardial Infarction should be evidenced by all of the following criteria:
i. A history of typical clinical symptoms consistent with the diagnosis of acute myocardial infarction (For e.g. typical chest pain)
ii. New characteristic electrocardiogram changes
iii. Elevation of infarction specific enzymes, Troponins or other specific biochemical markers.

II. **The following are excluded:**
i. Other acute Coronary Syndromes
ii. Any type of angina pectoris
iii. A rise in cardiac biomarkers or Troponin T or I in absence of overt ischemic heart disease OR following an intra-arterial cardiac procedure

CommInsure denies heart attack claims by relying on outdated medical definition

Four Corners By Adele Ferguson, Mario Christodoulou and Klaus Toft

Updated 7 Mar 2016, 4:28pm



VIDEO: James Kessel's heart attack was so severe his heart stopped, but CommInsure rejected his claim. (ABC News)

The Commonwealth Bank is facing fresh allegations of unethical and unscrupulous behaviour in its life insurance business CommInsure, as it tries to rebuild its reputation after a damaging scandal in its financial planning division.

PHOTO: The Commonwealth's insurance arm is rejecting claims by using an outdated definition to determine the severity of a heart attack. (ABC News: Margaret Burin)

The bank's insurance arm is denying legitimate heart attack claims by continuing to use an outdated definition that is buried in the fine print of its policy documents.

Leading cardiologists say CommInsure's policy definition is years out of date and should not be used in isolation to determine the severity of a heart attack.

Key points:

- CommInsure uses outdated definition to deny heart attack claims
- Victim's heart stopped but he was still denied a payout
- Leading cardiologist says heart attack definition is wrong

The joint investigation by Four Corners and Fairfax can reveal that CommInsure's senior staff had been told the heart attack definition was problematic.

Heart attacks are one of the largest and most expensive claim areas in the life insurance industry. They are also the biggest killers in Australia, with 55,000 people having a heart attack each year.

Do you know more about this story? Email christodoulou.mario@abc.net.au

'Have another heart attack, better luck next time'

James Kessel, 46, had his $1.1 million life insurance claim refused after he had a major heart attack in September 2014.

The heart attack was so severe his heart stopped and he had to be revived by nurses using a defibrillator.

The bank denied his claim because he did not have enough of a protein called Troponin in his blood.

"I couldn't believe it ... It just simply states that your Troponin levels were not at the right level so you don't get it, goodbye, have another heart attack, better luck next time."

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Derivation of incidence rates

Data sources

- Own data – indemnity health claim data with appropriate ICD coding
- Population data
- Hospital discharge data
- Data / information from specialized institutions e.g. Centre for Chronic Disease Control (CCDC)

Deriving Cancer incidence rates using Indian population data

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- Population based Cancer Registry (PBCR) maintained by National Centre for Disease Informatics and Research under the National Cancer Registry Programme, Indian Council of Medical Research
- **PBCR** systematically collects data on all new cases of cancer occurring in a well defined population from multiple sources such as Government Hospitals, Private Hospitals, Nursing Homes, Clinics, Diagnostic Labs, Imaging centres, Hospices and Registrars of Births & Deaths. The coverage is about **10% of the population of India.**
- The latest report available is for the years 2012-14 from 27 PBCRs across the country.
- The report provides cancer incidence by age, gender and Cancer sites (which is ICD-10 coded)

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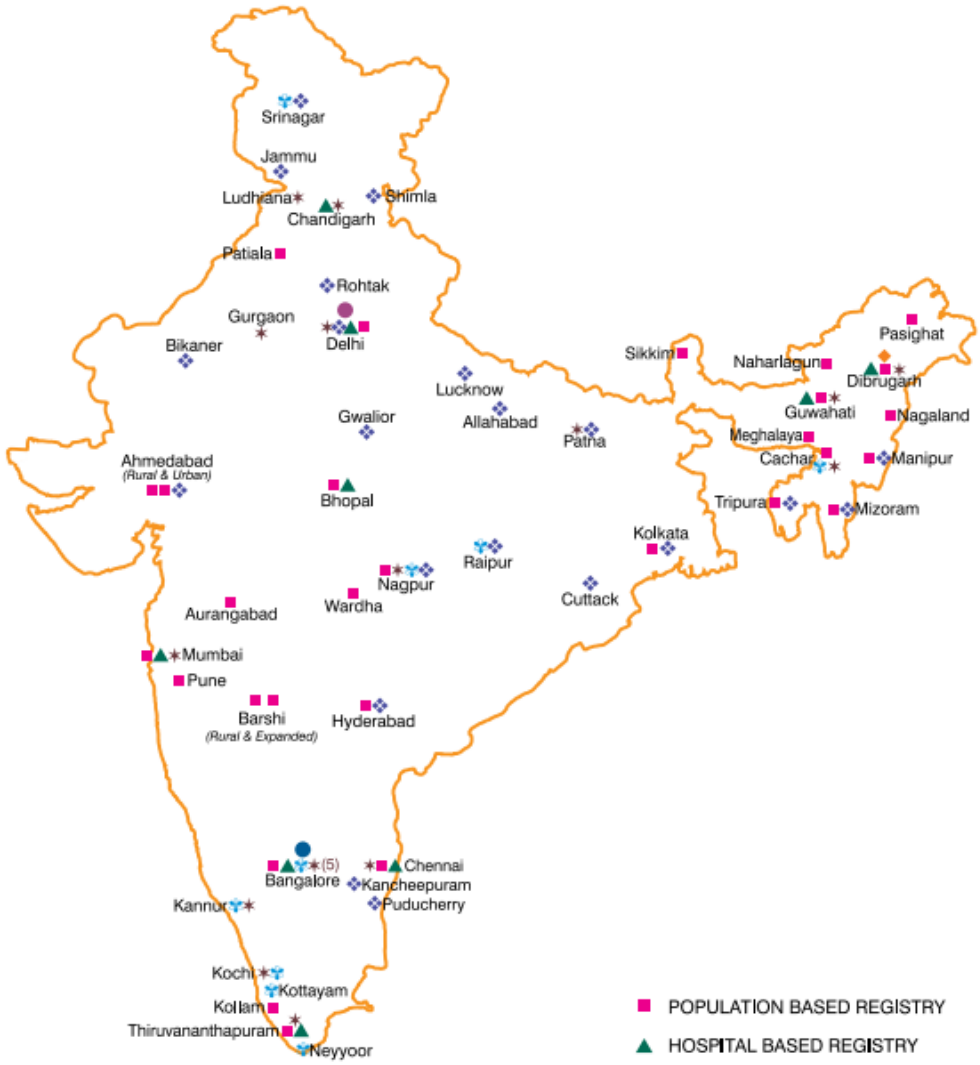
NATIONAL CENTRE FOR DISEASE INFORMATICS AND RESEARCH

NATIONAL CANCER REGISTRY PROGRAMME

(Indian Council of Medical Research)



Cancer Definition as per the IRDA Health regulations

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I. A malignant tumor characterized by the uncontrolled growth and spread of **malignant cells** with **invasion and destruction of normal tissues**. This diagnosis must be supported by histological evidence of malignancy. The term cancer includes leukemia, lymphoma and sarcoma.

II. The following are excluded –

i. All tumors which are histologically described as carcinoma in situ, benign, pre-malignant, borderline malignant, low malignant potential, neoplasm of unknown behavior, or non-invasive, including but not limited to: Carcinoma in situ of breasts, Cervical dysplasia CIN-1, CIN - 2 and CIN-3.

ii. Any non-melanoma skin carcinoma unless there is evidence of metastases to lymph nodes or beyond;

iii. Malignant melanoma that has not caused invasion beyond the epidermis;

iv. All tumors of the prostate unless histologically classified as having a Gleason score greater than 6 or having progressed to at least clinical TNM classification T2N0M0

v. All Thyroid cancers histologically classified as T1N0M0 (TNM Classification) or below;

vi. Chronic lymphocytic leukaemia less than RAI stage 3

vii. Non-invasive papillary cancer of the bladder histologically described as TaN0M0 or of a lesser classification,

viii. All Gastro-Intestinal Stromal Tumors histologically classified as T1N0M0 (TNM Classification) or below and with mitotic count of less than or equal to 5/50 HPFs;

ix. All tumors in the presence of HIV infection.

Basis of diagnosis of Cancer – Population data

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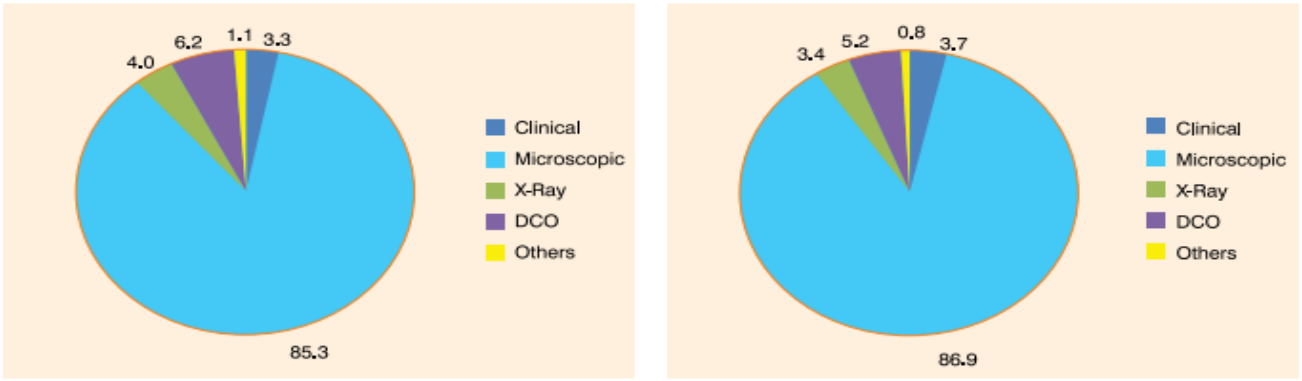
BASIS OF DIAGNOSIS

The relative proportion (%) of cancers based on different methods of diagnosis, considered as most valid are represented in Figure 5.1 for the pooled data of all the 27 registries.

Figure 5.2 gives the number and relative proportion of cancers based on different methods of diagnosis. The proportion of microscopic verification in males varied from 72.1% in Patiala PBCR to 97.5% in Nagaland PBCR. Among males, clinical diagnosis was the highest in Pune at 10.0% and X-ray and Imaging as a form of diagnosis was the highest in Kollam (13.3%). Among females, the microscopic proportion varied from 75.5% in Kolkata PBCR to 98.5% in Nagaland PBCR. Among females, clinical diagnosis was highest in Pune at 9.5% and X-ray and Imaging as a form of diagnosis was the highest in Dibrugarh District with a relative proportion of 9.3%.

Fig. 5.1: Relative Proportion (%) of Cancers Based on Different Methods of Diagnosis - All PBCRs (Pooled Data)



Adjustments to population Cancer incidence data

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- Insurance definition of cancer
- Underwriting – medical questionnaire
- Geographical spread of business
- Socio-economic profile
- “First ever” occurrence to numerator and denominator (i.e. exposure)
- Survival post cancer
- Adjustment for anti-selection
- Trend adjustment

Deriving Crude Rates

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Microsoft Excel
Worksheet

Graduation of incidence rates

- Whittaker Henderson
- Heligman Pollard
- Gompertz Makeham
- Cubic Splines

Sense Check

- Own experience from indemnity data provided ICD coding is reliable
- CIBT
- Population cancer incidence of other countries (using GLOBOCAN)

Deriving incidence rates for Heart Attack using Hospital discharge data

Data Source

- The NIS is the largest publicly available all-payer inpatient health care database in the United States, yielding national estimates of hospital inpatient stays.
- Unweighted, it contains data from more than 7 million hospital stays each year. Weighted, it estimates more than 35 million hospitalizations nationally.
- The NIS approximates a 20-percent stratified sample of all discharges from U.S. community hospitals, excluding rehabilitation and long-term acute care hospitals.

Deriving the Crude Annual Discharge Rate

Item		Description
Numerator	Number of Operations or Illnesses	- Age information for NIS are available up to last age band of 90 and above.
Denominator	US population	- Age information for population are available up to last age band of 85 and above. - Estimate the US population to correspond with the NIS Data

Adjustments are required to both the numerator as well as the denominators before it can be further used to derive incidence rates

Heart Attack Definition

Heart Attack definition as per 2016 regulation

The first occurrence of heart attack or myocardial infarction, which means the death of a portion of the heart muscle as a result of inadequate blood supply to the relevant area. The diagnosis for Myocardial Infarction should be evidenced by all of the following criteria:
i. A history of typical clinical symptoms consistent with the diagnosis of acute myocardial infarction (For e.g. typical chest pain)
ii. New characteristic electrocardiogram changes
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II. **The following are excluded:**
i. Other acute Coronary Syndromes
ii. Any type of angina pectoris
iii. A rise in cardiac biomarkers or Troponin T or I in absence of overt ischemic heart disease OR following an intra-arterial cardiac procedure

ICD 10 codes applicable for Heart Attack

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Codes

- I20 Angina pectoris
- I21 Acute myocardial infarction
- I22 Subsequent ST elevation (STEMI) and non-ST elevation (NSTEMI) myocardial infarction
- I23 Certain current complications following ST elevation (STEMI) and non-ST elevation (NSTEMI) myocardial infarction (within the 28 day period)
- I24 Other acute ischemic heart diseases
- I25 Chronic ischemic heart disease

Codes

- I21 Acute myocardial infarction
  - I21.0 ST elevation (STEMI) myocardial infarction of anterior wall
    - I21.01 ST elevation (STEMI) myocardial infarction involving left main coronary artery
    - I21.02 ST elevation (STEMI) myocardial infarction involving left anterior descending coronary artery
    - I21.09 ST elevation (STEMI) myocardial infarction involving other coronary artery of anterior wall
  - I21.1 ST elevation (STEMI) myocardial infarction of inferior wall
    - I21.11 ST elevation (STEMI) myocardial infarction involving right coronary artery
    - I21.19 ST elevation (STEMI) myocardial infarction involving other coronary artery of inferior wall
  - I21.2 ST elevation (STEMI) myocardial infarction of other sites
    - I21.21 ST elevation (STEMI) myocardial infarction involving left circumflex coronary artery
    - I21.29 ST elevation (STEMI) myocardial infarction involving other sites
  - I21.3 ST elevation (STEMI) myocardial infarction of unspecified site
  - I21.4 Non-ST elevation (NSTEMI) myocardial infarction
  - I21.9 Acute myocardial infarction, unspecified
  - I21.A Other type of myocardial infarction
    - I21.A1 Myocardial infarction type 2
    - I21.A9 Other myocardial infarction type

Adjustments to the crude incidence

- “First Ever” adjustment
- Smoker Adjustments
- Socio-economic Adjustments
- Underwriting Effects
- Adjustments for anti-selection
- Waiting period and survival period
- Existing experience, if any
- Adjustment for trend
- Finally, adjustments for local population

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Thank you very much for your attention !!