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DATA SOURCES FOR MORTALITY ESTIMATION

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Data sources (general / cause specific)

◆ Vital registration systems

◆ **Complete (70 countries)**

- ◆ completeness > 95 %, med certified cause of death

◆ **Incomplete (50 countries) – two dimensions**

- ◆ Low completeness and/or poor quality cause attribution

◆ Population censuses

- ◆ Denominators, sometimes numerators (direct / indirect)

◆ Sample registration systems – India, China, Bangladesh

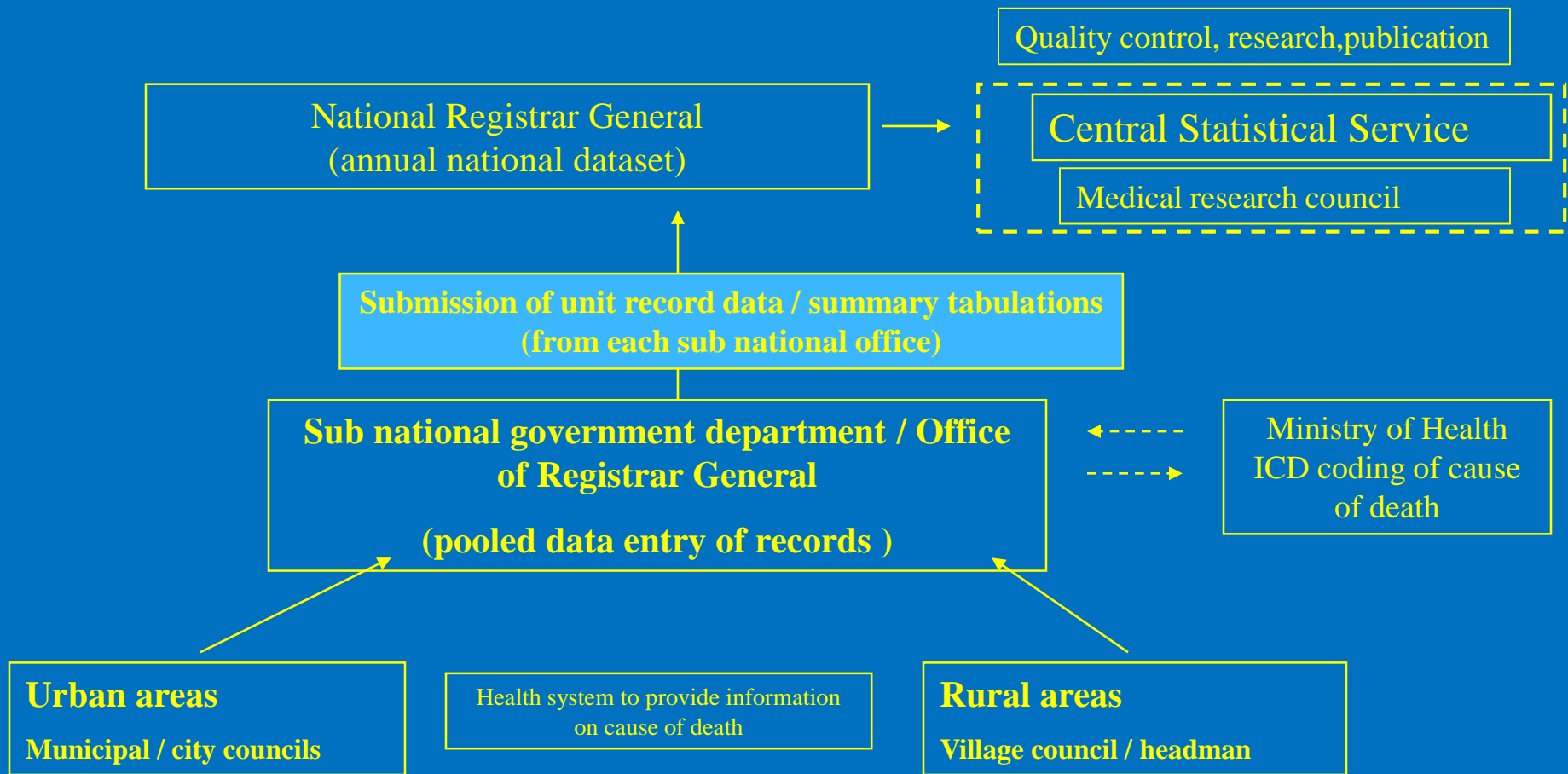
◆ Demography and Health Surveys – child mortality, maternal mortality (sisterhood method), adult mortality (sibling survival, orphanhood), causes of death

◆ Population laboratories / epidemiological studies

Vital Registration

- ◆ Compulsory recording of vital events under legal provision
- ◆ Dual function – establish civil status, collect data for planning
- ◆ Citizen's / government responsibility
- ◆ Passive system, as opposed to special registration activities (e.g. Zim)
- ◆ Multiple government agencies responsible
 - ◆ Data transmission losses, need for inter-sectoral collaboration
- ◆ Difficulties in cause attribution in some situations
- ◆ Nevertheless, 'gold standard', should be promoted

General scheme of vital registration process



Queensland Vital Registration system

- ◆ Governed by legal Act

 - ◆ <http://www.justice.qld.gov.au/ourlaws/bills/bdm.pdf>

- ◆ Registrar General of Births, Deaths and Marriages

- ◆ Funeral directors – important role in registration, liaison between families and legal process

- ◆ Doctors – responsible for certifying cause, except when death under coronial investigation

Attributes of efficient registration systems



◆ Sound legal framework

- ◆ up to date laws
- ◆ applicable to entire population

◆ Clear administrative (business) process

- ◆ Duties, responsibilities, reporting mechanisms

◆ Uniform system design for entire country

- ◆ Forms, tabulations, data access policy

◆ Adequate data standards

- ◆ Births - definitions, live / still births, duration of gestation, birth weight categories etc
- ◆ Deaths - ICD coding procedures, computerized data management systems

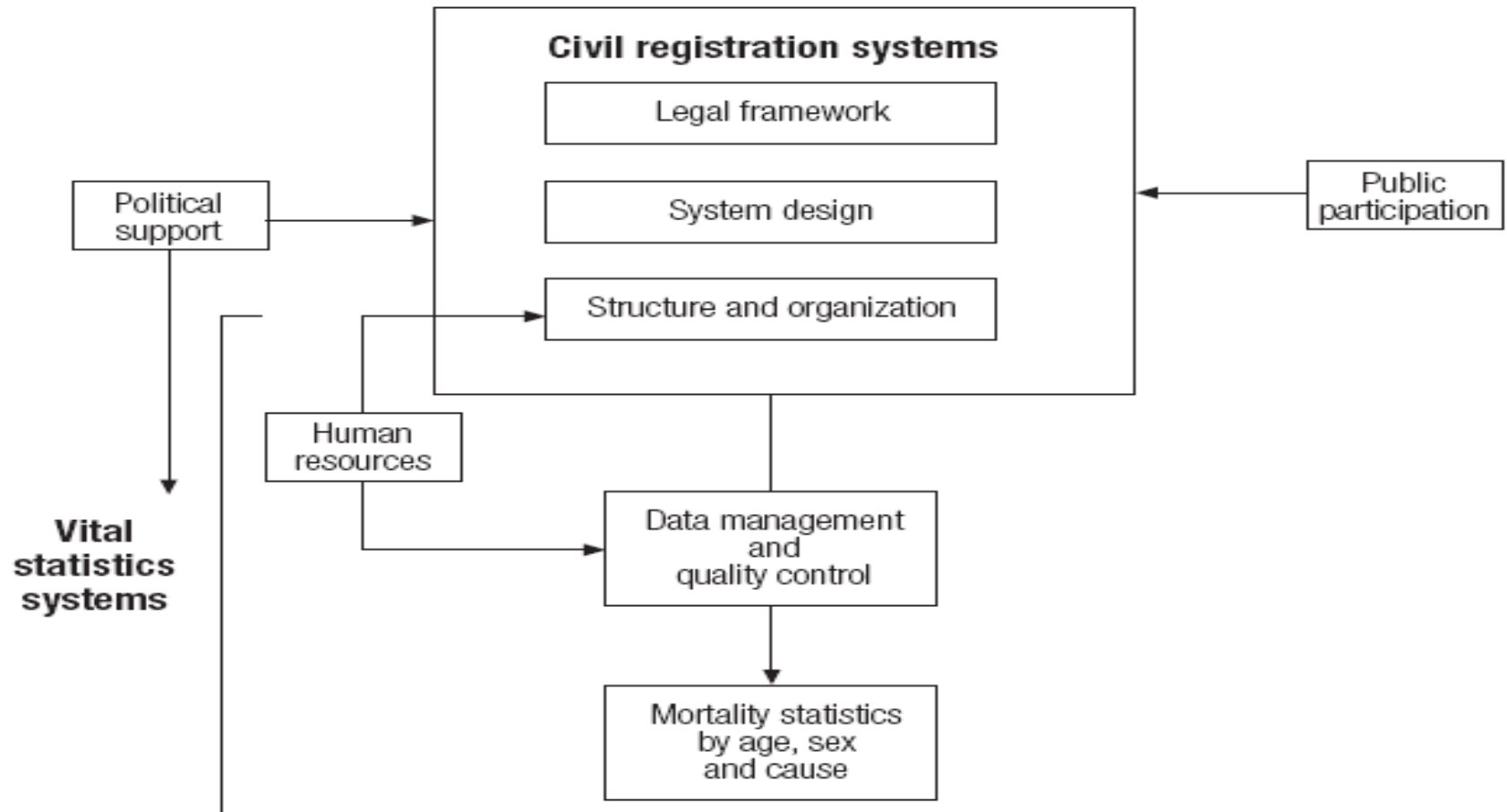
Attributes of efficient registration systems



- ◆ Quality control mechanisms
- ◆ Adequate human capacity
- ◆ Underlying political will and support - ? Indonesia
- ◆ High public awareness and participation – e.g. Zimbabwe

Conceptual framework for CR & VS operations

Fig. 1. **Conceptual framework of elements that govern civil registration and vital statistics system operations in Viet Nam**



Tasks in conducting assessment of CR & VS systems

- ◆ Review legislation / regulations
- ◆ Map out administrative process
 - ◆ Duties, responsibilities, certifying procedures, reporting mechanisms
- ◆ Check uniformity of system design for entire country
 - ◆ Forms, tabulations, data access policy
- ◆ Evaluate data standards
 - ◆ Definitions, coding procedures, computerized data management systems
- ◆ Conduct human resources and training needs assessment
- ◆ Gauge underlying political will and support
- ◆ Assess need to improve public awareness and participation

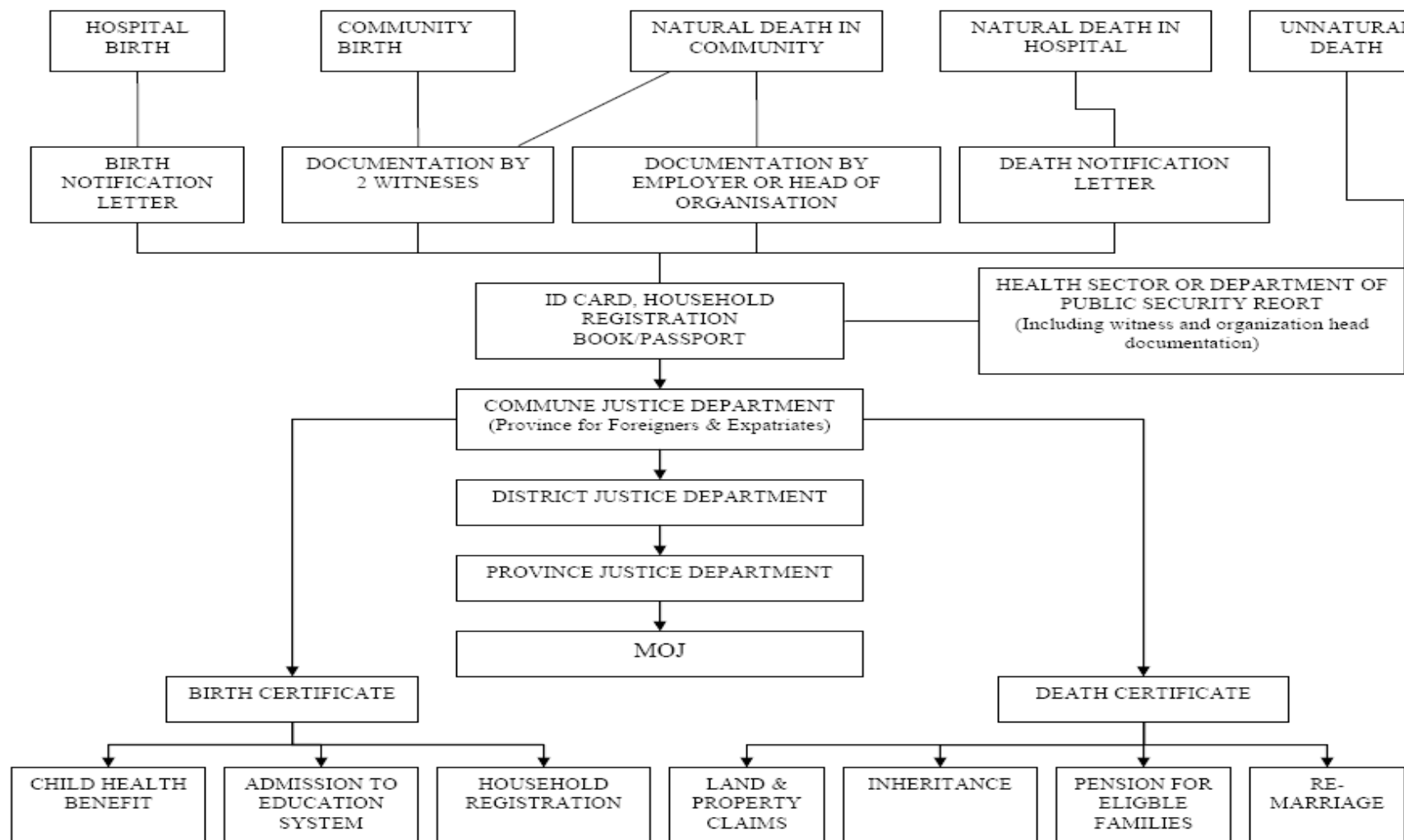
Assessment of legal framework

Characteristic of legal framework	Historical evolution
Duties and responsibilities for registration and vital statistics	<ul style="list-style-type: none"> • 1956–1998: death re • 1956–1998: registrat certificates. • 2005 decree provides corrections, submissio with the Ministry of Fc
Coverage Reporting responsibilities and penalties	<ul style="list-style-type: none"> • Vietnamese decrees a • 1956–1998: duty of r by law. • 1998–2005: notificati financial penalties. • 2005: death notice m registration.
Reporting period	<ul style="list-style-type: none"> • 1956–1961: death re death registration. • 1961–1998: death re • 1998–2005: death re areas. • 2005 onwards: death
Definitions for early age mortality	<ul style="list-style-type: none"> • No definitions of fetal • 1956 onwards: (accor require both birth and • 2005 onwards: (accor registration. • 2005 onwards: infant
Requirements for reporting cause of death	<ul style="list-style-type: none"> • 1956–1961: no ment • 1961–1998: declarar • 1998: “doubtful death of death. • In 2005 decree, cause opinion as to the caus
Compilation and submission of vital statistics	<ul style="list-style-type: none"> • 1998: compilation and Government. • 2005: submission of s summarizing the even achieved for 2007.



Administrative process of civil registration

Figure 16: The Administrative Structure of the Vital Registration System



Key findings from system assessment

◆ Legal framework

- ◆ No specific mention of need for medical certification of cause of death
- ◆ Only summary statistics to be reported, three age groups, four categories of causes

◆ Structure and Organisation

- ◆ Uniform throughout the country, but with local differences in interpretation of responsibilities, or conduct of functions ; particularly with reference to registration of deaths in migrants

◆ Data definitions/forms

- ◆ Stillbirths and neonatal deaths < 24 hrs need not be registered
- ◆ Standardised birth and death certificates
- ◆ Only single cause of death, as reported by family member

◆ No formal vital statistics system in place

Recommendations from assessment

System attribute	Recommendations
Legal framework	<ul style="list-style-type: none">• Clear definitions of live births and fetal deaths in the civil code and professional guidelines• Registration of stillbirths mandated in the civil code• Clear instructions in professional guidelines on registration of births, stillbirths and deaths• Uniform instructions on registration of temporary residents and migrants
Structure and organization	<ul style="list-style-type: none">• Active involvement of village headman and health staff as notifiers of vital events to the commune justice clerk to improve completeness of official death records• Health facilities periodically report institutional vital events directly to Ministry of Justice• Responsibilities given to local health staff for ascertaining cause of deaths that occur at home• Statistical agencies at district and provincial level facilitate data management and quality control
System design	<ul style="list-style-type: none">• Implementation of international form of medical certificate of cause of death in health facilities• Design new form to support legal instructions for reporting of stillbirths• Adoption of international perinatal death certificate for perinatal deaths in health facilities• Use of international standard verbal autopsy protocols for ascertaining causes for deaths outside health facilities• Formats for statistics on deaths by age, sex and cause according to international standards

Recommendations (contd)

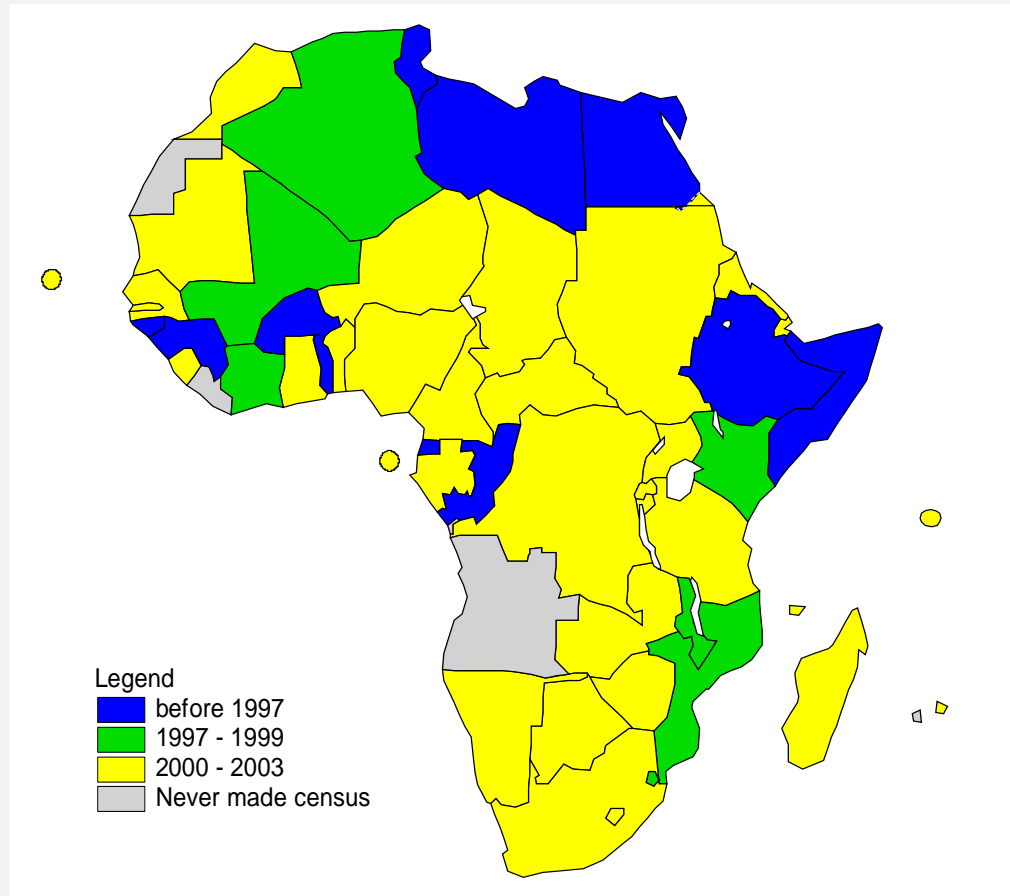
System attribute	Recommendations
Data management and quality control	<ul style="list-style-type: none">• Introduction of International Classification of Diseases-based coding of underlying causes of death• Computerization of vital records• Establishment of procedures for collation, verification and processing of vital statistics at each level• Periodic evaluation of data quality according to standard criteria
Human resources	<ul style="list-style-type: none">• Review of staff deployment for vital registration• Training programmes for registration staff, health personnel and statisticians to support reforms in structure, system design and data management processes
Political will and support	<ul style="list-style-type: none">• Establishment of interagency coordination committee (including the Ministries of Justice and Health, the General Statistics Office and other stakeholders in civil registration and vital statistics)• Specified charter of activities, and dissemination of proceedings of committee meetings• Workshops on registration reforms, data quality evaluation, analysis and interpretation for health bureaucrats and health policy analysts, to enhance political support for improvements in vital registration
Public awareness and participation	<ul style="list-style-type: none">• Review of registration process to facilitate public participation• Publicity campaigns to highlight responsibilities towards and benefits from birth and death registration

Population censuses



- ◆ Usually once every decade
- ◆ Mortality related components
 - ◆ Retrospective questions on
 - ◆ individual deaths during preceding 12–36 months, birth histories (direct)
 - ◆ cumulative number of events – children ever born / surviving (indirect)
surviving parents / spouse / siblings (indirect)
 - ◆ Compilation of HH lists, with follow up ‘surveys of population change’ to assess deaths, pop growth rates, migration
- ◆ Census should be validated using concurrent sample surveys
- ◆ Census provides best sampling frame for sample registration systems

Latest year of census in Africa around 2005



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Sample registration systems



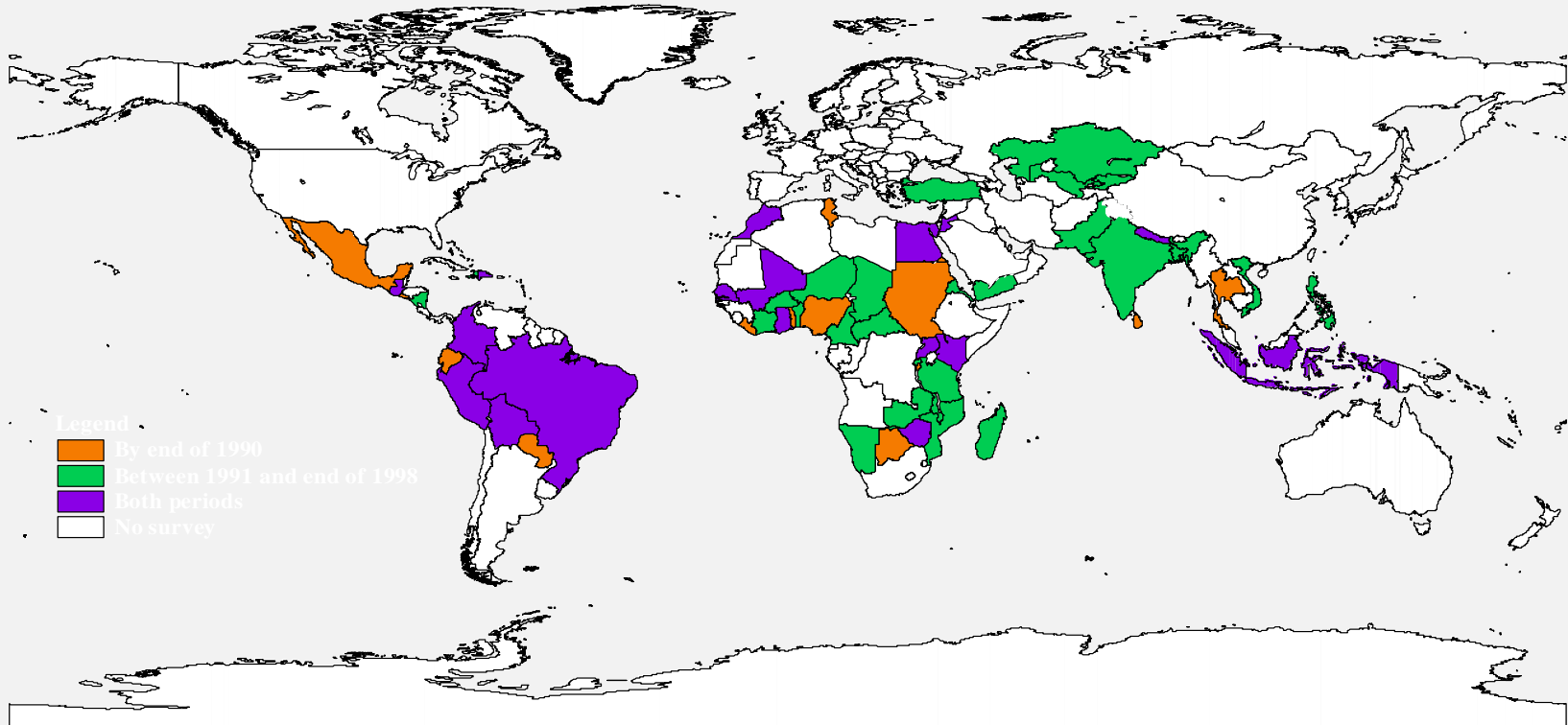
- ◆ Adopted by India, China (diff sampling strategies)
- ◆ Complete VR costly, difficult to administer
- ◆ In India, combines features of vital registration and censuses
- ◆ In sample population clusters
 - ◆ Fresh sampling following every census
 - ◆ Baseline population survey – demographic, SE data, etc
 - ◆ Continuous monitoring of vital events
 - ◆ Half yearly population enumeration, independent recording of events, followed by matching, and reconciliation of unmatched events
 - ◆ Verbal autopsy based cause of death ascertainment since 2003
 - ◆ Direct measures of age sp death rates, with measurable sampling errors

Demography and Health Surveys



- ◆ Nationally representative random sample household survey (5000 hh)
- ◆ many modules, costly, high quality data, wealth of information
- ◆ Over 60 countries since 1985, approx once every 5 yrs per country
- ◆ Focus on maternal and child health
- ◆ Birth histories yield direct estimates of child mortality
- ◆ Sibling survival data for adult mortality in some countries
- ◆ Other uses of DHS data in BoD

Geographic coverage of DHS program



Legend

- By end of 1990
- Between 1991 and end of 1998
- Both periods
- No survey

Projection: Geographic
Data source: ESRI (Boundary)
data) GBD (mortality)
Operator: Ehener, Lozano

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Additional File 1: Data sources for estimating mortality indicators in Indonesia, 1971-2007

Data source	Data availability (enumeration years)		
	Child mortality ^a	Adult mortality ^b	Causes of death ^c
Demographic and Health Survey (DHS)	87, 91, 94, 97, 03, 07	94, 97, 03, 07	-
Population Census	71, 80, 90, 00	00	-
Inter-Censal Survey (SUPAS)	76, 85, 95, 05	85	-
National Socio-Economic Survey (SUSENAS) ^d	80, 86, 92, 95, 01, 07	80, 86, 92, 95, 01, 07	80, 86, 92, 95, 01, 07
Baseline Health Survey RISKESDAS)	07	07	07

^a DHS provides direct child mortality estimates based on detailed birth histories, all other sources produce indirect estimates based on the 'children ever borne and surviving' method

^b DHS provides adult mortality estimates based on sibling survival methods; all other sources provide estimates based on direct household recall of deaths during specified reference periods

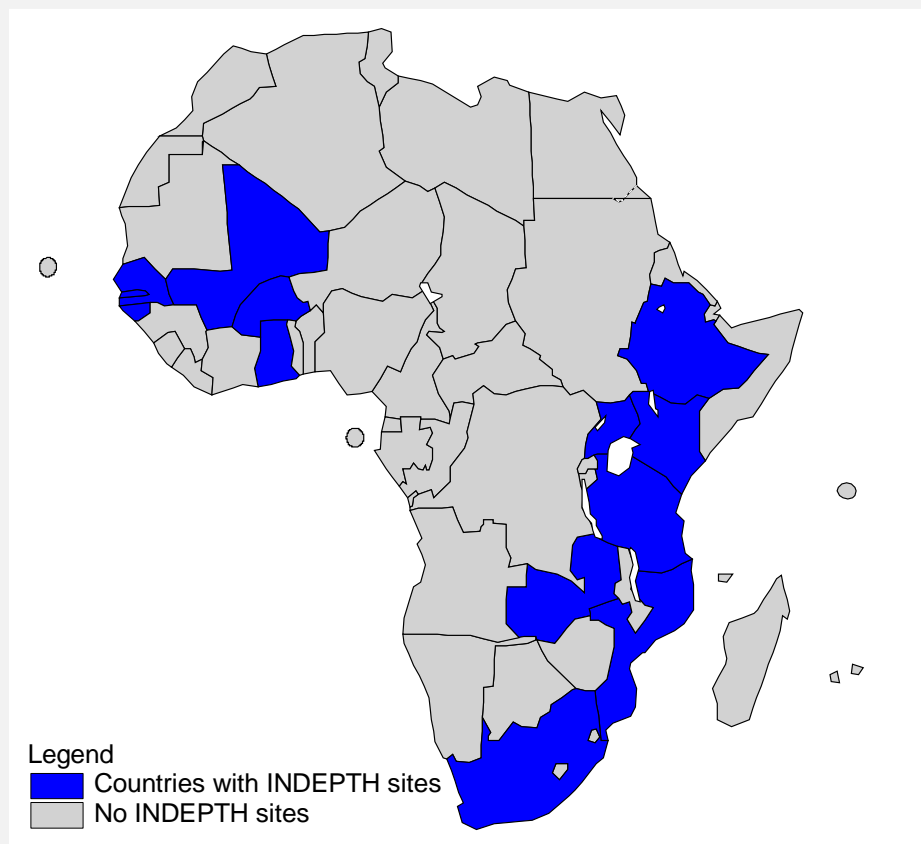
^c Based on verbal autopsy methods

^d The SUSENAS is conducted annually, but the population module is included on an intermittent basis

Demographic surveillance systems

- Selected populations, usually covered under specific health programs
- In some instances, data available from intervention and control groups
- Data aggregated over years, with smoothing of age specific death rates, can yield reasonable estimates of adult mortality
- Caution to be exercised while utilizing these data
- measures of case incidence and fatality help building disease specific epidemiological estimates
- Administrative experience from DSS valuable for attempting sample registration

INDEPTH Sites in Africa around 2005



Country	Total Population 2002	INDEPTH Fieldsite Population
Botswana	12206430	180000
Ethiopia	66038824	35000
Gambia	1369940	16400
Ghana	20174859	139000
Guinea-Bissau	1255756	101000
Kenya	31903510	55000
Mali	12017740	10000
Mozambique	18985579	35000
Senegal	9907107	18000
South Africa	44201610	146000
Uganda	24778979	12000
United Republic of Tanzania	36818687	470000
Zambia	10870938	10000

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Attributes of diff systems

<i>Criteria</i>	Census	Vital reg	Sample survey
Topical detail (richness and diversity)	Moderate	Weak	Strong
Accuracy	Moderate	Strong	Moderate
Precision (absence of sampling errors)	Strong	Strong	Weak
Timeliness of data	Weak	Strong	Strong
Sub national details	Strong	Strong	Weak
Information on population at risk	Strong	Weak	Strong
Ease of organization in dev countries	Moderate	Weak	Strong

Global summary of data sources

- ◆ Vital registration (1/3rd nations, 25% deaths)
- ◆ Incomplete VR (1/3rd nations, 25 % deaths)
- ◆ Sample Registration (2 nations, 33% deaths)
- ◆ DHS / DSS – (1/4th nations, 16 % deaths)

Conclusions

- ◆ Global cause specific mortality estimation poses a major epidemiological challenge
- ◆ Estimates useful for policy, local evidence needed for monitoring
- ◆ Routine data systems, even sample based, essential
- ◆ Much attention to be paid towards high quality cause attribution at time of death registration