International methodological guidelines for civil registration and vital statistics with emphasis on quality assurance and assessment

Chalapati Rao

Department of Global Health

Research School of Population Health

❑ **<u>Dimension 1</u> – Evaluation of quality assurance systems and processes**

   ❑Civil registration structural design

   ❑ Business processes

   ❑ Infrastructure

   ❑ Management and operations

   ❑ Internal audits

   ❑ Overall assessment

❑ **<u>Dimension 2</u> - Data quality assessment**

   ❑ Accuracy

   ❑ Relevance

   ❑ Comparability

   ❑ Timeliness

   ❑ Accessibility

- *<u>Centralized civil registration system</u>*

- central agency with national responsibility for directing, coordinating and monitoring the nationwide civil registration and vital statistics systems

- VIETNAM – Ministry of justice responsible for CR and VS across the country

- *<u>Decentralized civil registration system</u>*

- Several countries having decentralized systems have made provisions to outline a national model law and its regulations, with provision for each major civil division may promulgate its own laws and regulations according to local situations, but in close conformity with the recommended model

- E.g INDIA: Registrar General (Ministry of Home Affairs) at central level; but CRVS operationalised at state level by different local ministries (e.g. health/economics and statistics/local administration/education etc), with different models for CR service provision as well as VS data flow

- Review of legal framework including laws and operational regulations

- Check for definitions of vital events

- Review guidelines to ensure universal coverage

- Ensure the mention of a list of recognized notifiers of vital events

- Assess rules for timelines for registration, delayed registration, penalties

- Identify the specific nomination of institutions / personnel to serve as registrars at local/regional/central level

- Evaluate design of forms/statistical reports/electronic resources against international standards

- Check for guidelines for issuance of registration documents/ certificates/ and submission of statistical returns

- ESTABLISH INTERDEPARTMENTAL COORDINATION COMMITTEE WITH ASSIGNED ROLES AND RESPONSIBILITIES TO MEMBERS
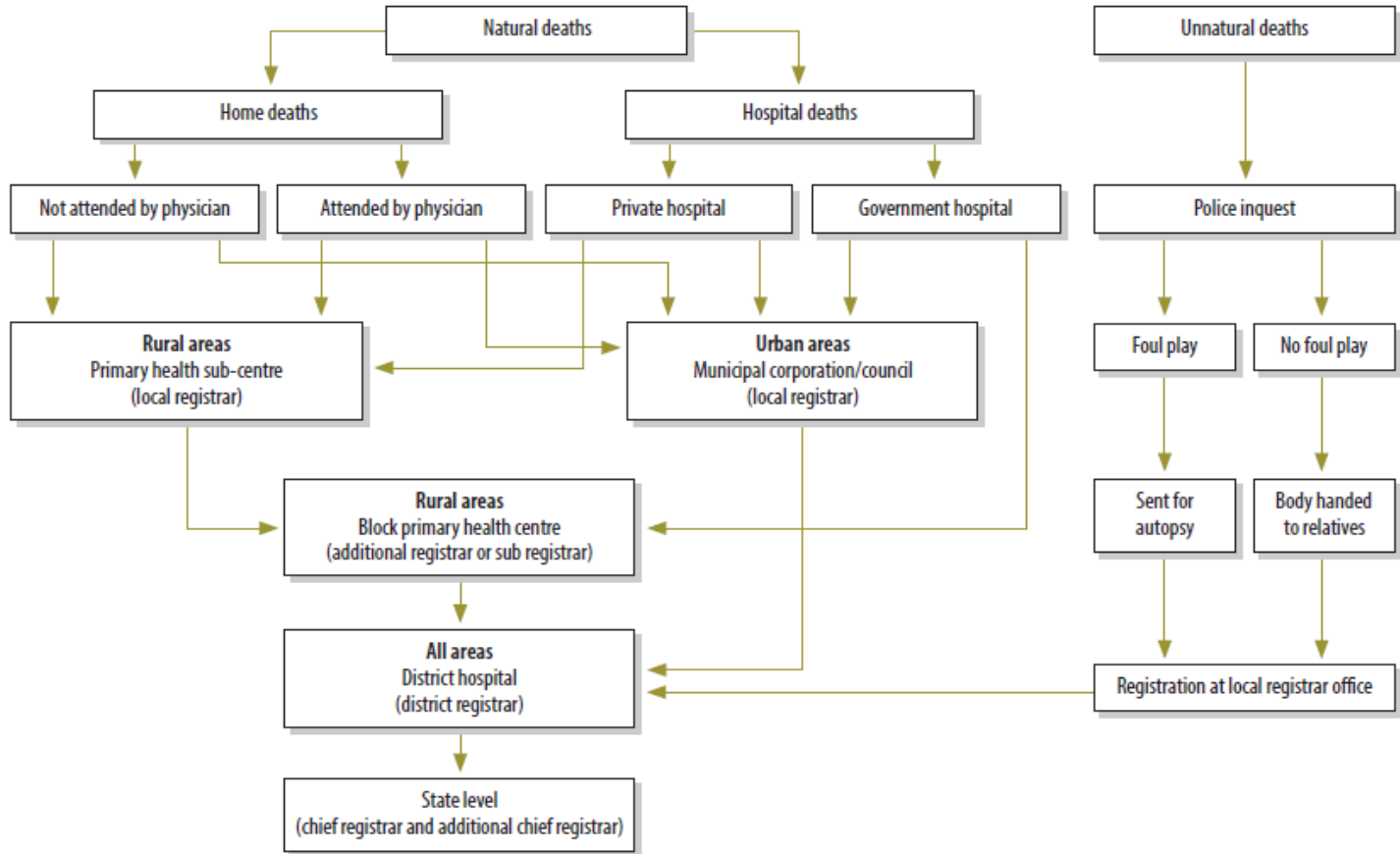
- develop flow chart of CRVS operations

Fig. 2. **Flow chart depicting the structure and organization of the civil registration and vital statistics system in Viet Nam, 2006**
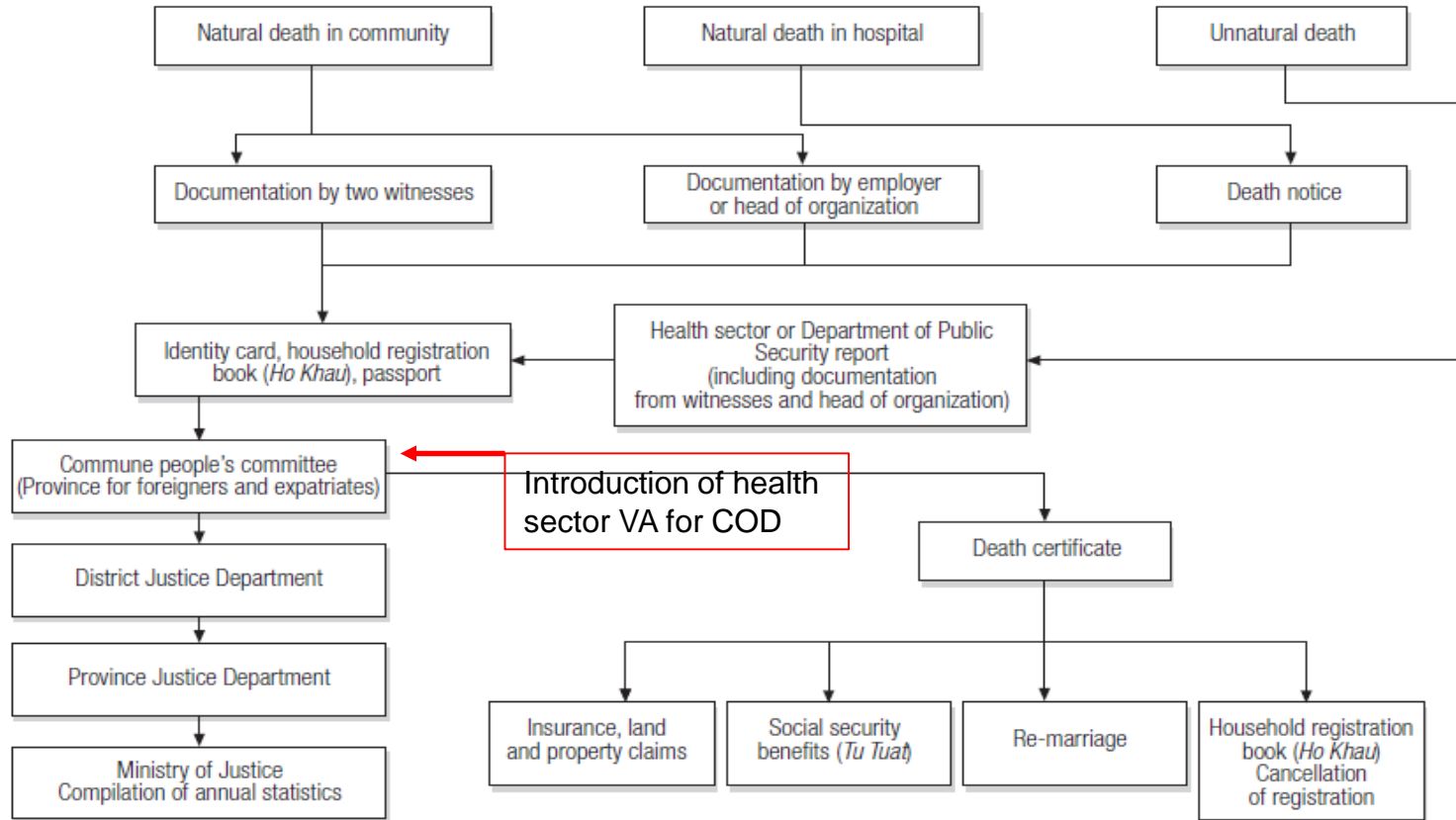
Fig. 1. **Organizational flowchart of the civil registration and vital statistics system to report deaths in Punjab, India, 2013**

- Assess location and distribution of registration points

- Evaluate need for expansion / outreach to improve access and availability of registration services

- Evaluate availability of office space, equipment, stationery

- Availability of human resources, training

- Check uniformity of forms and registration procedures across the country to conform to meet the essential requirements of both CR and VS

- Guidelines for inspection of registration units to review operations, performance and maintenance

- local travel budget for field verification

- etc

- Periodic review of reporting performance and submission of statistical returns
- Special attention to reports on stillbirths, neonatal and infant deaths

- Evaluate data standards

  – Definitions, coding procedures, statistical tabulations, computerization

- Conduct human resources and training needs assessment
- Gauge underlying political will and support (qualitative analysis)
- Plan activities to improve public awareness and participation

- Invite feedback from registration units about workload, specific infrastructure needs or troubleshooting regarding registration of difficult cases (migrants, medicolegal cases etc)

- Prepare annual overall assessment reports at local, regional and national level on the performance of CRVS

- ❑ Accuracy
- ❑ Relevance
- ❑ Comparability
- ❑ Timeliness
- ❑ Availability / accessibility

As per Para 576 of the P & R revision 3, 2015

- <u>Generalizability</u> (coverage and completeness)

- <u>Data quality of individual records</u>
  - Missing variables, incomplete entries / errors (e.g. sex/age/address etc)

- <u>Proportions of delayed registration</u>

- <u>Data validity</u> – triangulation with other data sources for the same event or variable, with one source as a reference standard

  - E.g. deaths in CRVS compared with deaths in health records
  - Validity can be measured using indicators such as sensitivity, specificity, and positive/negative predictive values

  Validity can also be evaluated through descriptive analysis of misclassification patterns

Australian National University

Causes of death / Vital registration diagnoses	Medical record diagnoses																
	HIV/AIDS	Liver cancer	Lung cancer	Other malignant	Diabetes	Hypertens	IHD	Oth heart	Stroke	Pneum	COPD	liver dis	Oth digest	Renal	RTA	All others	Total
Septicaemia	44	2	3	3	53	6	8	3	55	38	16	27	19	47	2	144	470
Ill defined	16	6	7	5	27	16	75	36	25	14	39	10	14	13	9	135	447
Stroke			1		7	1	4	5	203					1	9	31	262
IHD	1		2		26	5	138	9	3	2	3		3	6		16	214
Pneumonia	40		3		9	1	4	2	25	44	21	7	1	10	3	37	207
All other external causes					1	1	2	1	25	1					93	61	185
Genitourinary diseases	1	1		1	37	24	2	3	3	1	1	5	2	58		17	156
Lung cancer		1	85	6					1		4					5	102
Road traffic accidents								1							91	0	92
Liver diseases	2	2			1		2		2			63	2	1		11	86
HIV/AIDS	79											1				3	83
Other malignant neoplasms	1	14	3	24						2				1		34	79
COPD	1		2		2		3	3	2	3	54			2		5	77

VR diagnosis	MR diagnosis																		
	TB	Septic	AIDS	Oth inf	Oth canc	Diab	Hypert	Isch HD	Oth heart	Stroke	Pneum	COPD	Oth GIT	Renal	Road trfc	Falls	Oth Inj	All others	Grand Total
TB	29		6			1					1	1						4	42
Septicaemia	8	34	12	16	7	50	2	14	8	19	43	17	16	37	5	2	2	99	391
Oth inf dis	1	1	5	31		5		3	1	2	4	1		2				5	61
other cancers		1			105			1		1	1			1				20	130
Diabetes				1		35	1	3	1		4		2	2	1			3	53
Isch heart dis	1			1	2	36	9	522	11	10	18	9	13	12	4	3	1	32	684
Other/ill def heart dis	4		2	1		4	10	37	62	8	3	2	2	6		3	1	34	179
Stroke	2	1		3		2	2	13	7	341	7	1	3	5	13	4	1	20	425
Pneumonia	13	3	13	15	6	42	5	22	19	86	291	67	20	18	8	5	4	94	731
Oth/ill def resp dis	4	2	1	1	1	4	1	7	4	77	15	13	2	5	4	2	2	42	187
Renal diseases	4	1	2	2	1	33	7	10	1	11	7		3	94	7	4		21	208
Ill defined diseases				1		4	2	22	2	4	5		5	1	2	2	2	13	65
Other/ill def injuries	1				1	3			2	6	1		1		94	7	27	24	167
All others	10	4	54	6	39	64	7	27	10	71	33	66	72	21	202	12	10	1010	1718
Grand Total	77	47	95	78	162	283	46	681	128	636	433	177	139	204	340	44	50	1421	5041

If hospital underlying causes accurate, then numbers would be concentrated along diagonal

Net under-reporting in VR – Stroke, diabetes, COPD, TB, AIDS, road traffic injuries

Issues with design and process of medical certification of cause of death in hospitals

Table 4 Misclassification matrix for communicable and non-communicable diseases, urban China, 2002

Registration diagnoses	Medical records diagnoses														Total registration deaths
	Cerebro-vascular diseases	IHD	Rheumatic heart disease	Hyper-tensive diseases	COPD	Pneumonia	Other respiratory diseases[b]	Diabetes Mellitus	Genito-urinary diseases	Viral hepatitis	Gastric and duodenal ulcer	Diseases of the liver	Other digestive diseases[c]	All other diseases	
Cerebrovascular diseases	**422**	12	4	6	4			10	4		1		3	11	477
Ischaemic heart disease	13	**195**		4	6		2	2	1				2	6	231
Rheumatic heart disease	2	3	24												29
Hypertensive diseases	5	3	1	11			1	3	1					1	26
Other heart diseases[a]	4	8	2	3	9		2						1	7	36
COPD	7	9	1	3	**178**	3	5	2	4				4	12	228
Pneumonia	10	15		3	15	**11**	7	6					2	7	76
Other respiratory diseases[b]	8	6		1	5	6	**18**	4			1	1	2	8	60
Nervous system diseases	8	3		1	2		4	1						34	53
Diabetes Mellitus	17	13		3	5		1	**65**	1				6	9	120
Genitourinary diseases	6	5		23	5		2	10	**45**		1	2	2	17	118
Viral hepatitis										**72**		8		9	89
Gastric and duodenal ulcer	1										11	2	1	1	16
Diseases of the liver										38	1	**56**		3	98
Other digestive diseases[c]	1	1			1		2	1	1		2	5	**42**	7	63
All other diseases	13	8	1	2	13		3	0	3	4	4	2	7	1137	1197
Total Medical Records deaths	517	281	33	61	242	20	47	104	60	114	21	76	72	1269	2917

Values in bold indicate matched cases in the cross tabulation for each diagnoses from the two sources.

[a] 126–151.

[b] J00–J06, J30–J39, J60–J98.

[c] K00–K22, K28–K66, K80–K92.

- Proportion of deaths assigned unknown or ill-defined causes (should be <10%)

- Incidence of misclassification of causes with clear-age sex dependency (should be zero)

- Plausibility of age-patterns of mortality by cause

- <u>Data reliability</u> – comparison with another source to measure agreement (when neither source can be used as a reference standard)
  - Often used in the context of interviews (e.g verbal autopsies) to measure repeatability of responses or inter-rater agreement on causes of death
  - Agreement measured using concordance or kappa statistics

- <u>Data comparability</u> to establish
  - Epidemiological consistency – between levels of mortality and cause of death patterns

  - Temporal consistency – trends in cause-specific mortality over time should be relatively smooth, with any spikes/troughs raising the possibility of potential problems with data quality, unless there is a genuine epidemiological reason

Trends in standardized mortality rates : Australia 1970 - 2000
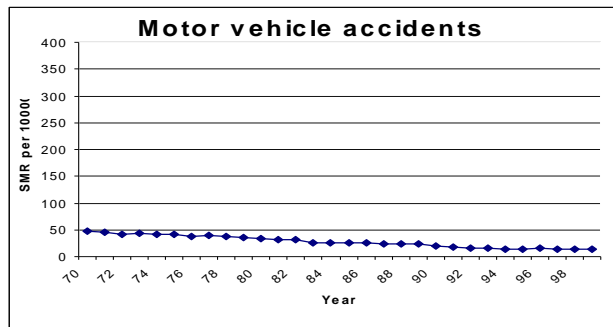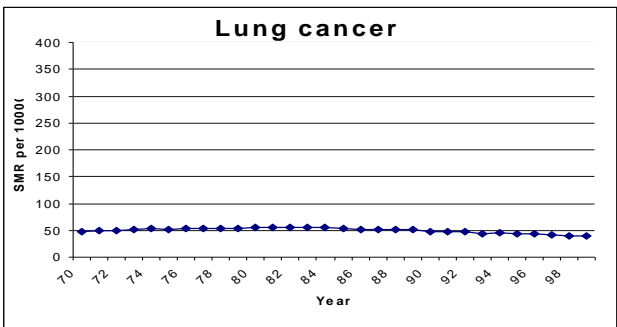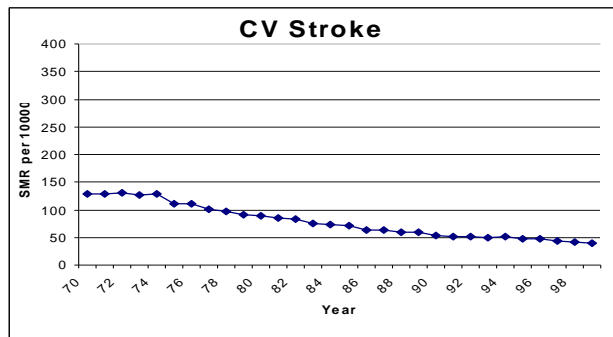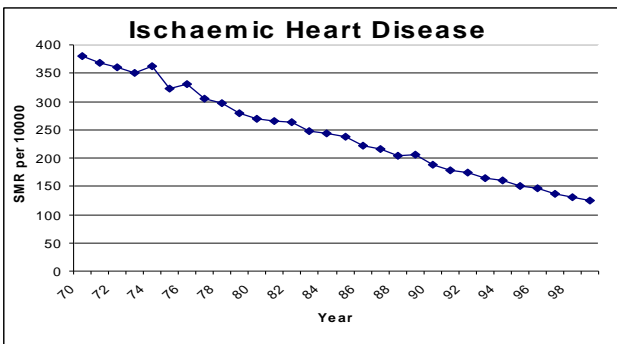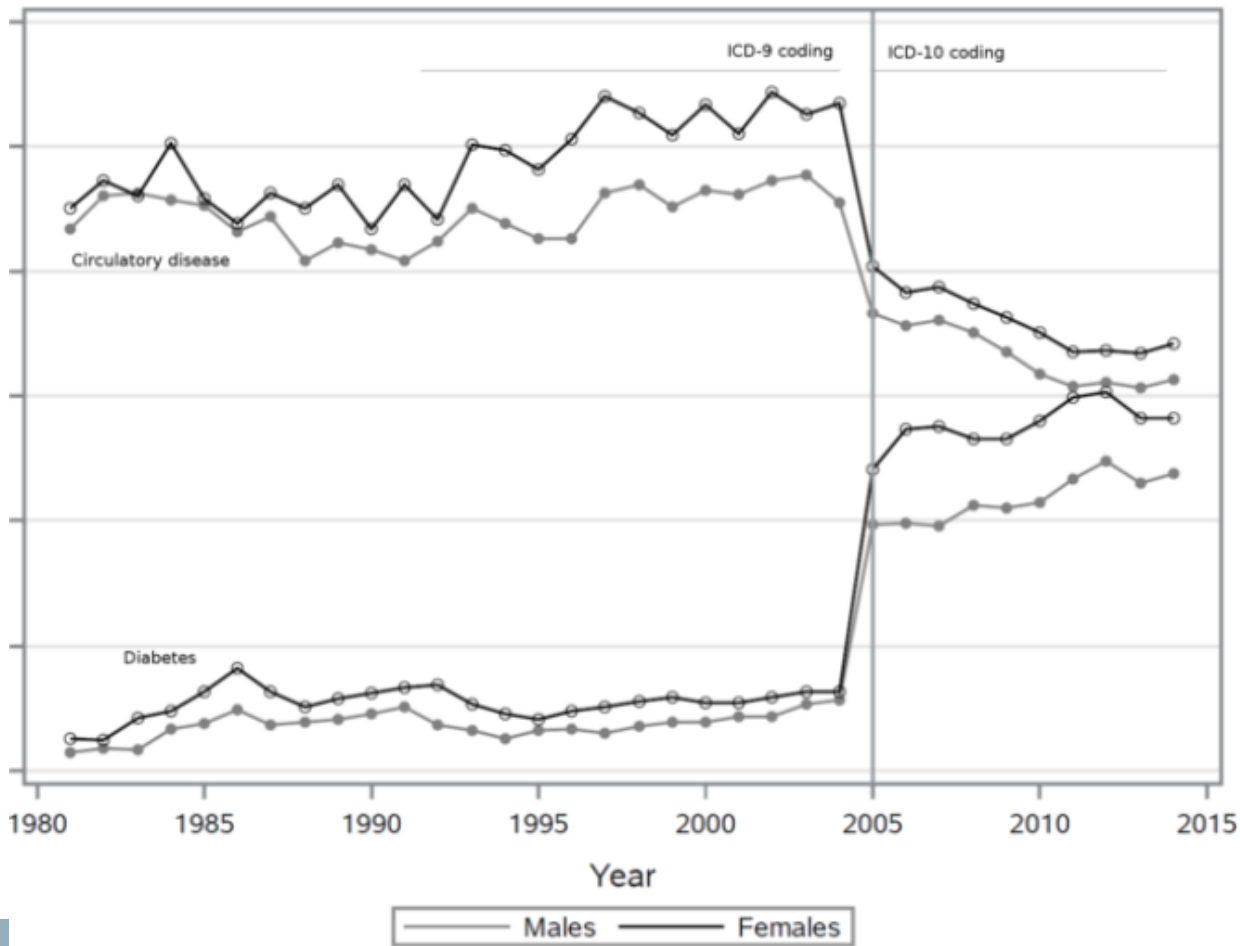
- Small area statistics for local health policy and planning

- Relevance to assess population dynamics and distribution for general services (housing, education etc)

- Local data is relevant as compared to modelled estimates

- Timeliness margin up to 1 to 1.5 years from reference year for data to be relevant

- Data should meet the users needs in terms of being easily accessible through reports / electronic files

- Citizens should be able to easily access their relevant registration documents/certificates

- There should be availability of anonymized microdata for research