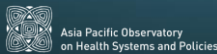


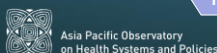
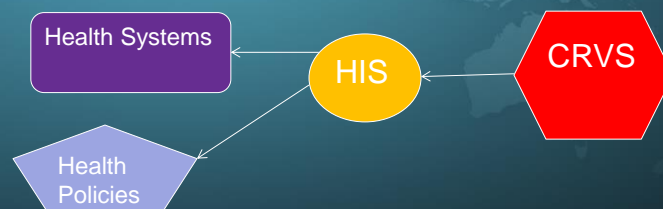
## Improving knowledge about causes of death and disease burden in the Asia Pacific region: critical role of vital statistics

Professor Alan Lopez  
Melbourne Laureate Professor  
& Rowden-White Chair of Global Health and Burden of Disease Measurement  
The University of Melbourne



### Role of CRVS in health systems/health policy debates and priority setting

- What can we do, given country capacity and state of health statistical development, to improve our knowledge about causes of death for policy and planning, research, monitoring development goals, etc?
- In a Policy Brief prepared for the **Asia Pacific Observatory for Health Systems and Policies**, we propose a strategic framework to respond to this challenge, focussing on practical interventions in **five** distinct areas, and suggest a series of specific interventions for **three** different groups of countries, depending on their needs and capabilities

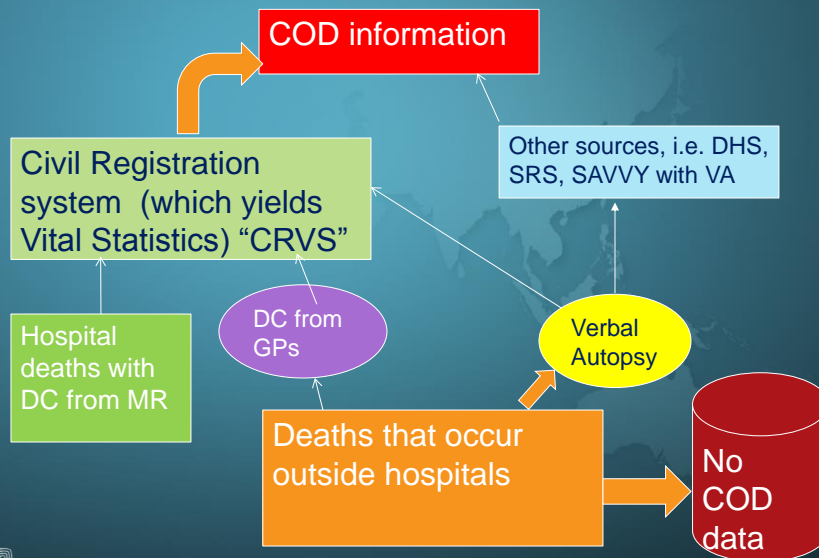


## APO Policy Brief on strengthening cause of death information for policy dialogue (2014)



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## Data systems for continuous generation of cause of death (COD) statistics



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## Evaluation of the mortality output of CRVS systems in APO countries, VSPI scores, 2005-2012

APO countries	Best year	VSPI score	APO countries without data to calculate VSPI scores
New Zealand	2007	0.94	Cambodia
Australia	2005	0.92	Cook Isl
Japan	2005	0.88	DPRK
South Korea	2011	0.87	Indonesia
Singapore	2005	0.79	Lao
Malaysia	2008	0.75	Micronesia
Philippines	2005	0.64	Nauru
Thailand	2007	0.57	Nepal
Maldives	2011	0.52	Niue
Brunei	2011	0.40	Palau
Sri Lanka	2006	0.36	Samoa
Fiji	2011	0.30	Solomon
China	2012	0.25	Tokelau
Kirbati	2005	0.18	Tuvalu
Mongolia	2010	0.15	Vanuatu
Tonga	2005	0.10	Vietnam
Bhutan	2005	0.06	
India	2006	0.05	
Marshall Isl	2006	0.03	
Myanmar	2006	0.02	
Bangladesh	2005	0.00	
PNG	2005	0.00	

Classification of countries based on VSPI	
<25	Very weak
25-49	Weak
50-69	Medium
70-85	Good
85+	Very good
No data	

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## Framework to improve knowledge about causes of death (COD) in countries

Five critical areas to strengthen:

- 1) registration of deaths
- 2) medical record practices
- 3) certification of COD
- 4) coding of death certificates
- 5) diagnosing causes of deaths that occur outside medical settings in a reliable and cost-effective way



### First challenge for CRVS systems



- How can I improve death registration completeness in my country?



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## Civil Registration & Vital Statistics Systems

- Various strategies exist for improving the completeness of death registration and avoiding duplication of effort (MoH and NSO) in CRVS
- There is a clearly defined *Regional Strategy* to support countries to improve registration completeness
- A *series of tools* are available that countries can use to assess their system gaps and develop improvement plans
- A comprehensive *CRVS Resource Kit* summarising materials drawn from many sources is available to assist countries in implementing improvement plans
- Act now: increasing evidence of high-level political commitment and donor interest to strengthen CRVS



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## Second major CRVS systems challenge



- What set of strategies can I use to get better quality cause of death information from hospitals? This will likely involve improving:

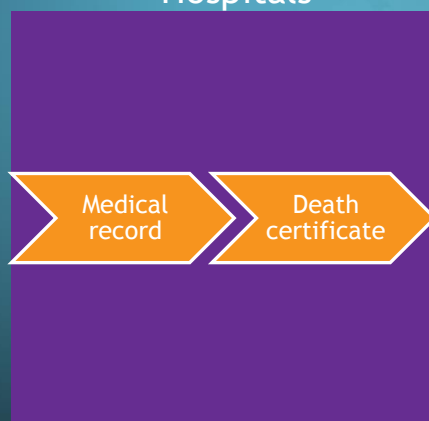
1. COD medical certification
2. Hospital medical records
3. COD coding



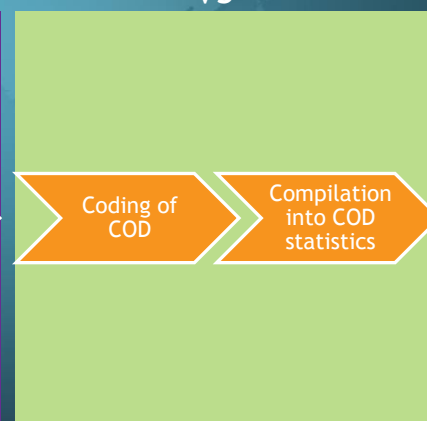
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## Data systems need system thinking and comprehensive action

### Hospitals



### Transformation into VS



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## Strategy 1: Improve medical records procedures

### The importance of good Medical Records

- If medical records in hospitals are *not*:
  - accurate,
  - up-to-date,
  - complete, and
  - easily retrievable, THEN:

patient care, hospital management & planning as well as health statistics, and particularly cause of death information, will all be less efficient and accurate than they should be.

- Periodic review of Medical Record practices in hospitals needs to be a key part of any effort to improve the quality of COD data.
- The framework lists 10 key actions to improve medical record keeping in hospitals.

## Key actions to improve medical record practices in hospitals

- Ensure/establish national standards, procedures and policies regarding medical records
- Review patient forms used, from admission to discharge, to verify usability and fit-for-purpose
- Provide adequate training to medical record staff in compiling and coding statistical items
- Ensure relevant hospital staff know the importance of timely, accurate and accessible patient care data
- Introduce routine quality assurance procedures to systematically check data accuracy, completeness and filing/retrieval of medical records
- Introduce computerized applications into the Medical Records Department to facilitate access and use



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## Strategy 2: Improve medical certification



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## Improving the accuracy of the cause of death obtained from death certificates from doctors

- As death certificates are the most important source of COD data, critically important that COD is *certified* by a doctor. Only doctors are qualified to identify the underlying cause and the sequence that led to death
- Deaths that take place in hospitals are (in principle) medically certified, and hence *assumed* to be correct
- Closer examination of the medical certificates often reveals substantial *misdiagnosis* of the underlying COD by doctors
- Why? Doctors do not always have the tools to help them certify the cause correctly; poor (or no) training; lack of *understanding* of public health importance of cause of death data, etc.



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## Main reasons why COD are often incorrectly reported from hospitals

- Physicians have never been taught how to correctly *certify* the cause of death according to ICD rules and procedures
- The *medical records* used for assisting doctors to certify the cause of death are too poor and incomplete to be useful
- The death certificate form is not aligned with the International Medical Certificate of COD
- Poor coding practices to select the *underlying* COD from conditions mentioned on the DC

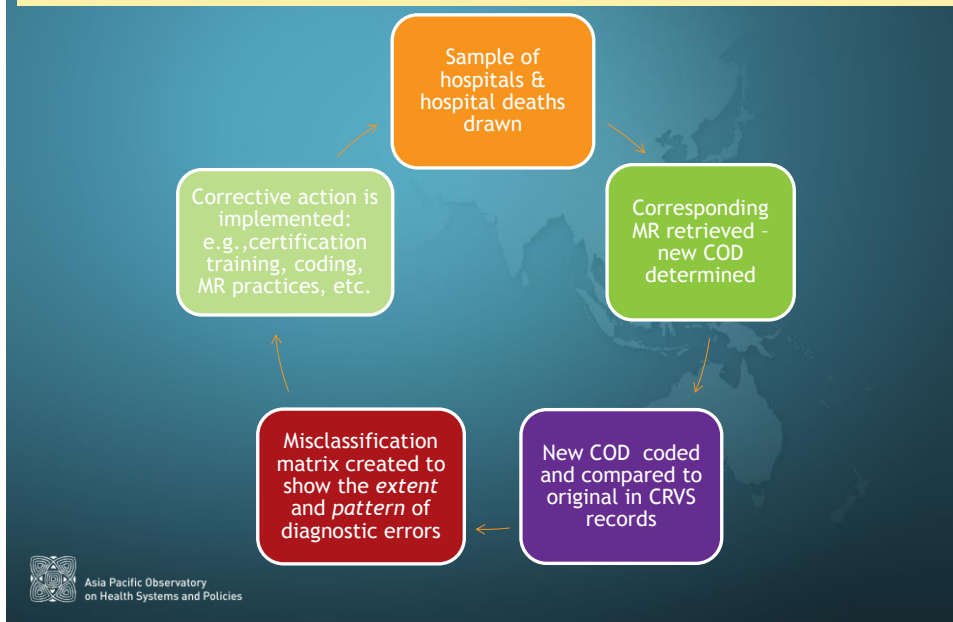
*COD data will ALWAYS be wrong!! Important to know how wrong if they are still to be useful for policy.*



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## Validation of accuracy of hospital cause of death data: medical record review



## Diagnostic misclassification of hospital deaths: example of Thailand 2005

Causes of death *	Medical records diagnoses															All other causes	Total
	20	31	34	46	52	66 <sup>1</sup>	67	68	69	74	76	80	81	84	96		
<b>Vital registration diagnoses</b>																	
Seppticaemia (12)	44	2	3	3	53	6	8	3	55	38	16	27	19	47	2	144	470
Ill defined conditions (94)	16	6	7	5	27	16	75	36	25	14	39	10	14	13	9	135	447
Cerebrovascular diseases (69)			1		7	1	4	5	203						1	9	31
Ischaemic heart diseases (67)	1		2		26	5	138	9	3	2	3		3	6		16	214
Pneumonia (74)	40		3		9	1	4	2	25	44	21	7	1	10	3	37	207
All other external causes (103)					1	1	2	1	25	1					93	61	185
Genitourinary diseases (84)	1	1		1	37	24	2	3	3	1	1	5	2	58		17	156
Lung cancer (34)		1	85	6					1	4						5	102
Transport accidents (96)							1								91		92
Liver diseases (80)	2	2			1		2		2			63	2	1		11	86
HIV/AIDS (20)	79											1				3	83
Other cancers (46)	1	14	3	24					2					1		34	79
COPD (76)	1	2			2		3	3	2	3	54			2		5	77
Other digestive diseases (81)	3	1	2			2	1		2		1	16	17	1	1	27	74
Other respiratory diseases (77)	5		2	1	4	1	5		8	3	12	3		3	1	25	73
Other heart diseases (68)	1		1		1	4	15	14	4	1	4	1	1	5	1	18	71
Liver cancer (31)		58		2			1					3				4	68
Other infectious diseases (25)	18			1	3			1	5	1	1	1	1	3		17	52
Tuberculosis (5)	20				1						2					17	40
Other nervous system disorders (61)	10				2			1	4			1				10	28
Diabetes (52)				1	16		2		1	1				2	1	2	26
All other causes	14			8	9	8	5	3	18	1	1	9	4	6	2	294	424
<b>Total</b>	<b>256</b>	<b>85</b>	<b>111</b>	<b>52</b>	<b>199</b>	<b>69</b>	<b>267</b>	<b>82</b>	<b>386</b>	<b>112</b>	<b>159</b>	<b>147</b>	<b>64</b>	<b>159</b>	<b>213</b>	<b>955</b>	<b>3316</b>

## Strategy 3: Improve cause of death coding



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### Coding of cause of death data

When the quality of COD data is poor it is often blamed on poor coding practices by the coders who code the medical certificate

- Coding practices and coding accuracy should be regularly checked and remedial training implemented as needed
- COD coding evaluation is a key part of the framework to improve COD data quality

Note: Coders can *not* select a valid COD if information provided by doctors on the death certificate is poor, incomplete or illegible



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## Key actions to improve COD coding

- Ensure that robust national coding policies and procedures are in place
- Ensure that coding staff are formally trained in mortality coding (network of WHO ICD Centres)
- Good coding requires complete and original source documentation, i.e. the complete death certificate
- Facilitate contact between physicians and coders to resolve queries
- Undertake regular coding audits to assess quality
- If coding software is used, ensure it is for mortality and *not* morbidity coding



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### *Third* major challenge for CRVS systems

- How can I get useful information on causes of death when deaths occur outside medical systems, particularly at home?



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## Potential uses for Verbal Autopsy in CRVS systems

- In countries where the majority of deaths occur at home, Verbal Autopsy (VA) is the only viable option to obtain insight into cause of death patterns in the community
- VA is a method to ascertain the probable COD from an interview with relatives who are asked a series of questions about signs and symptoms experienced by the deceased prior to death
- VA can be carried out on all registered deaths which don't have a medical certified COD, or on a sample of these registered deaths (including deaths recorded in a sample registration system (SRS))



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## VA methods

- There are two basic components of a VA: the *questionnaire*, and the *diagnostic method* used to determine the probable cause of death from the responses
- A variety of VA questionnaires and diagnostic methods have been used (e.g. physician review, automated methods)
- Over the last decade WHO has introduced some standards and guidelines for questionnaires and their application in countries
- Until recently, no scientific evaluation attempted of different questionnaires and different diagnostic methods, including those recommended by WHO



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## Main challenges to wider application of verbal autopsy in routine CRVS systems

TWO key problems have been identified by countries:

- The length of the VA questionnaire (and time taken; > 50 min.) has been a key factor in acceptability
- The cause of death from a VA is usually diagnosed by asking physicians to review questionnaires and to then decide on the COD. Employing several doctors to do this in a timely fashion makes it too expensive for many countries

More recently *automated computer methods* which diagnose COD based on symptom patterns have been developed, making VA application affordable for all countries.

**But how reliable are these methods??**



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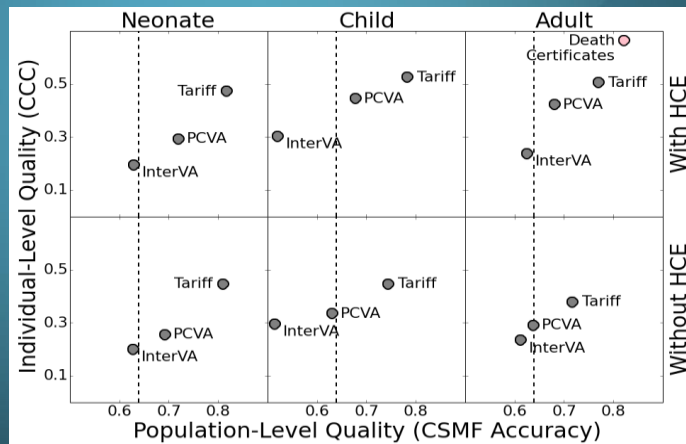
## Validating comparative performance of different VA diagnostic methods

- Until recently (2014) no formal scientific comparison of the performance ( i.e. accuracy) of various methods to diagnose VAs had been carried out
- The surprising finding of this research was: *automated methods are more accurate than doctors in getting the COD correct* (they are also quicker, cheaper and more standardised since they are NOT affected by different diagnostic skills/training/interest of doctors in different populations)



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## Comparison of accuracy of different VA diagnostic methods



Health Care Experience (HCE) i.e. contact with health system



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## Overall Conclusions

- Improvement of COD statistics needs a *systems* approach which addresses ALL underlying sub-systems as well as their interaction/interdependency
- The proposed framework has key improvement interventions for all the main component areas affecting the quality of COD data:
  - Improving completeness of death registration
  - Improving medical records (MR) practices
  - Improving hospital COD data through strengthening COD certification and coding, assisted by better MR practices
  - Routine application of automated VA on all out-of-hospital deaths registered in the CRVS system
  - Focused and reliable M & E of impact of COD interventions on quality and use of data generated by the CRVS system



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## Pathways for strengthening COD data for countries at different levels of CRVS capacity

Actions	Group 1 pathway	Group 2 pathway	Group 3 pathway	
Review legal and regulatory framework for COD registration				
Establish coordination mechanism between involved ministries				Very weak CRVS
Build awareness of registration obligation and introduce incentives for registration				Weak CRVS
Train staff in civil registration methods				
Expand registration facilities outside main urban areas				Medium CRVS
Facilitate registration in hospitals and through mobile registration points				
Use verbal autopsy in SRS and HDHS to generate cause specific data for deaths outside medical facilities				
Train staff in verbal autopsy methods				
Strengthen medical records departments in hospitals				
Train medical records and coding staff				
Review policies and mechanisms for collection of hospital data				
Integrate verbal autopsy methods into civil registration for deaths registered without a medically certified COD				
Use medical records reviews to verify hospital certification				
Train doctors in ICD certification				
Train staff in data verification and monitoring methods				