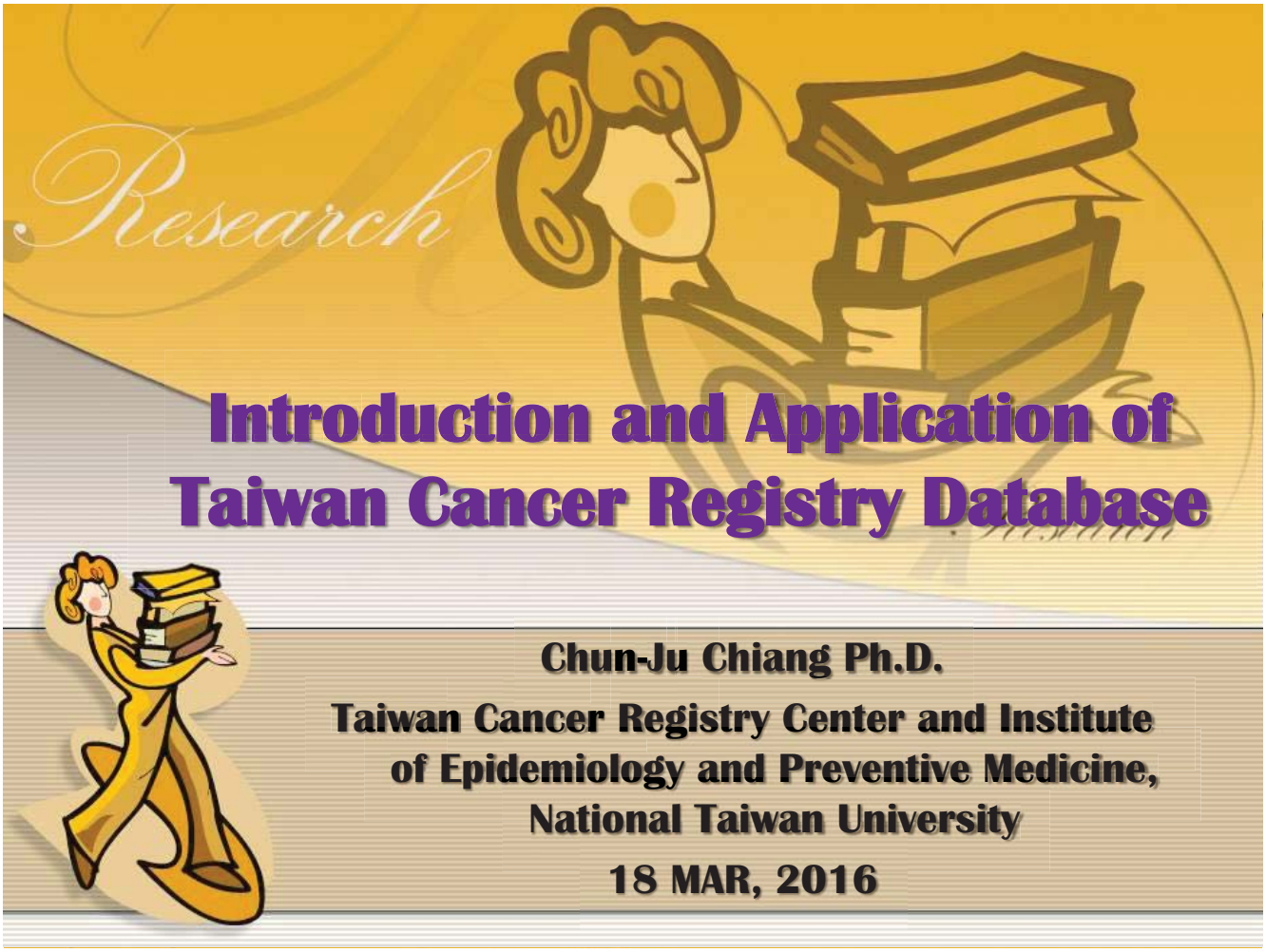

Introduction and Application of Taiwan Cancer Registry Database

Chun-Ju Chiang Ph.D.

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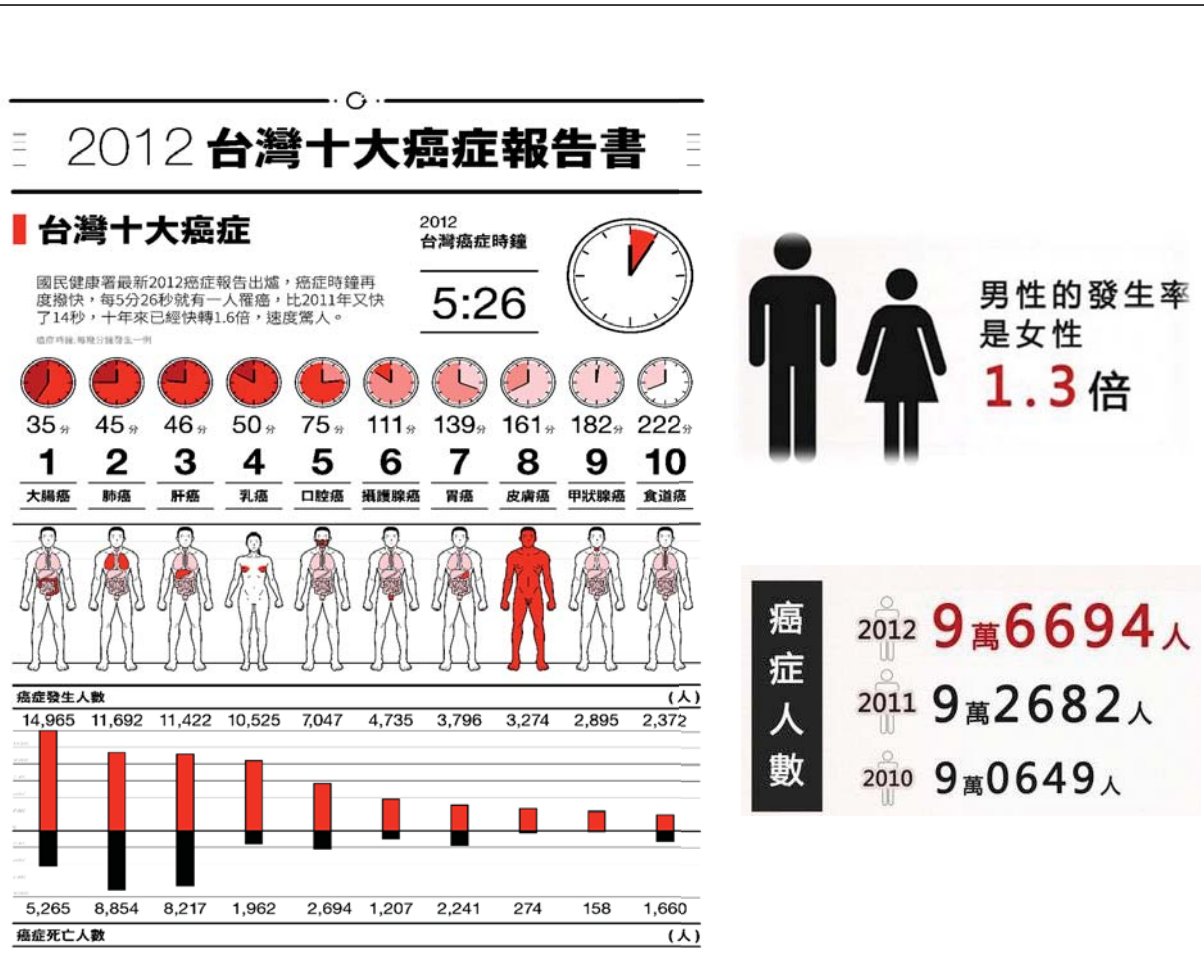
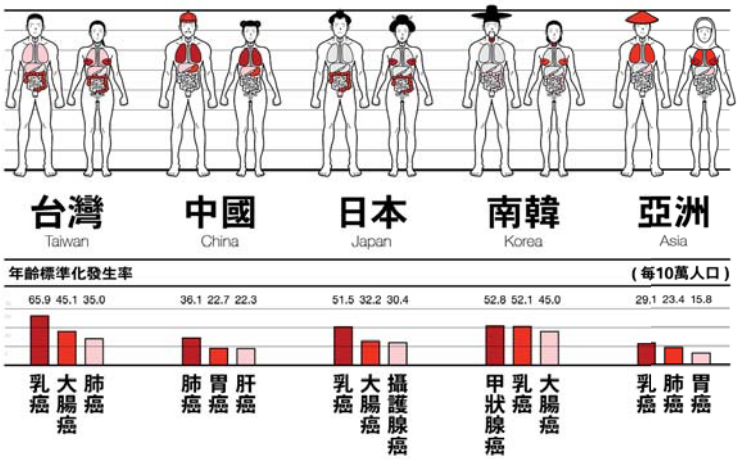
18 MAR, 2016



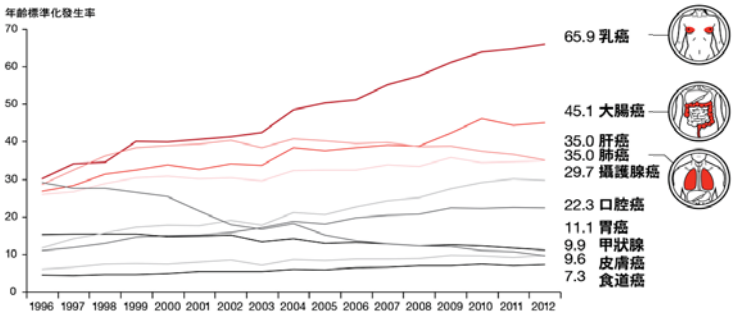
101年癌症登記報告可參考:
http://www.hpa.gov.tw/BHPNet/Web/Stat/StatisticsShow.aspx?No=201504290001

東亞各國前三大癌症發生率

▼ 年齡標準化發生率係以西元2000年世界標準人口為標準人口計算



台灣重要癌症發生率長期趨勢



103年 十大死因排行榜

	死亡人數		死亡時鐘
1	惡性腫瘤	4萬6094	11分24秒
2	心臟疾病	1萬9400	27分05秒
3	腦血管疾病	1萬1736	44分47秒
4	肺炎	1萬0352	50分46秒
5	糖尿病	9845	53分23秒
6	事故傷害	7123	1時13分47秒
7	慢性下呼吸道疾病	6430	1時21分44秒
8	高血壓性疾病	5459	1時36分16秒
9	慢性肝病及肝硬化	4962	1時45分55秒
10	腎炎、腎病症候群及腎病變	4868	1時47分58秒

癌症連33年榜首

十大癌症

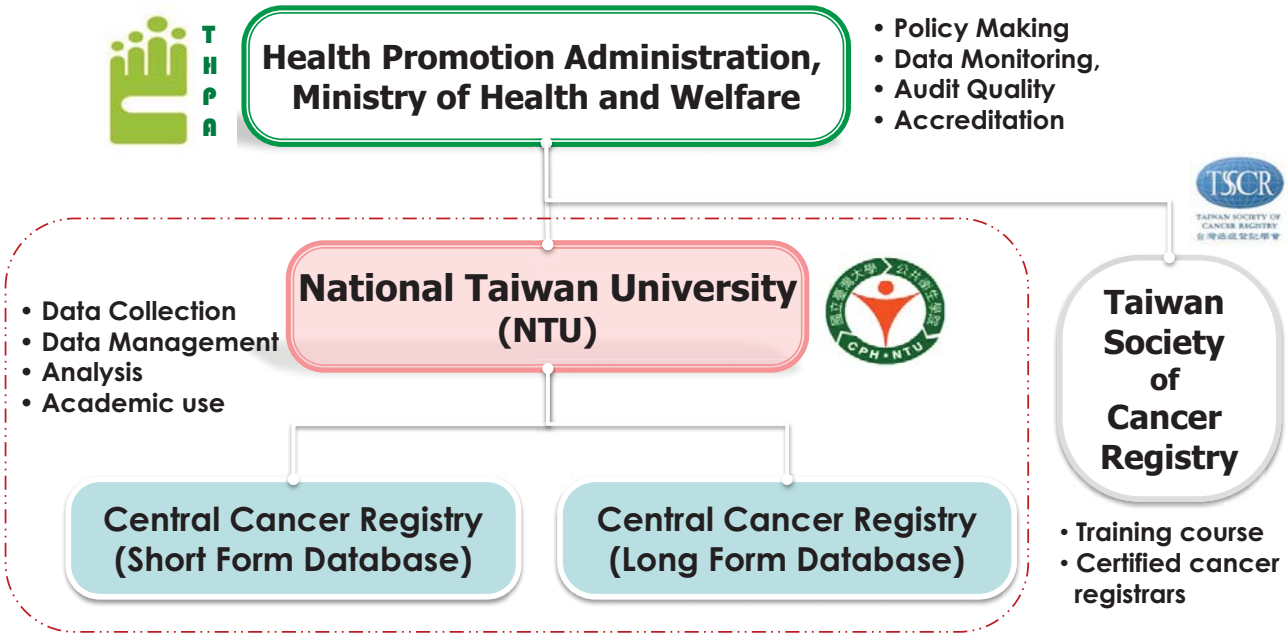
1. 氣管、支氣管和肺癌
2. 肝和肝內膽管癌
3. 結腸、直腸和肛門癌
4. 女性乳房癌
5. 口腔癌
6. 前列腺(攝護腺)癌
7. 胃癌
8. 胰臟癌
9. 食道癌
10. 子宮頸及部位未明示子宮癌

資料來源：衛福部統計處　整理：李樹人　■聯合晚報

TOPIC I:

Introduction of Cancer Registry Database

Overview of Cancer Registry System in Taiwan



Taiwan Cancer Registry:
Phase I (1979-2001)

- **Hospitals (≧50 beds) report in situ and invasive newly incident cancer cases within 1 year after their diagnosis**
  - No recurrent cancer included
  - For example: Hospitals report 2015 diagnosed cancer cases in 2016
- **20 items "short form" are reported**
  - Items required：case demography, diagnostic age and methods, site and morphology, summary of treatment and death
- **MOHW contracts out TCR to operate since 1983**
  - 1983-1987- Taipei Veterans General Hospital
  - 1989-1995- run by MOHW
  - 1996- National Taiwan University (1st Chien-Jen Chen, 2nd Mei-Shu Lai)
- **The quality of TCR has a speed breakthrough since 1996**

Taiwan Cancer Registry:
Phase II (2002-now)

- **Cancer Control Act was promulgated in 2003 which requests MOHW to promote the cancer care quality, and hospitals to report cancer data to MOHW**
- **To know the treatment patterns, we extended reported items from 20 to 65 in 2002 and further to 95 in 2007 and to 114 in 2011, which is called "long form" and modified from US FORDS**
  - Applied to 6 leading cancers (cervix, breast, colon-rectum, oral-pharynx, liver, lung) beginning in 2002
  - Has extended to 10 leading cancers in both genders (esophagus, stomach, prostate, bladder, nasopharynx, corpus, ovary, lymphoma and leukemia) since 2009
  - Items added **TNM staging, detail treatment information, recurrent data**
  - 80+ hospitals submit long form information for 16 major cancers now which **covered 90%+ of those cancer patients**

Taiwan Cancer Registry:
Phase II (2002-now)

- **Cancer registrar accreditation has begun since 2004**
- **Cancer site-specific factors (SSF) and risk factors were included in 2011**
  - Major Risk factors including smoking, betel nut chewing, alcohol consumption, BMI data
  - SSF like estrogen receptor and progesterone receptor in breast cancer
  - Information is used to develop the predictive/prognostic factors that is important for risk population and individualized medicine
- **Annual report would be completed at the end of the year**
  - For example: 2014 annual report will be finished in 2016. (2-year lag)
  - Available database: **1979-2013 (2013 data will be released this year)**

Cancer Registry Annual Report

http://www.hpa.gov.tw/BHPNet/Web/Index/index.aspx

Summary of Central Cancer Registry Database

Year of Diagnosis	1979-2001	2002-2003	2004-2006	2007-2010	2011-2015
Long Form Database	**PHASE I**	**PHASE II - Pilot**	**PHEASE II - Stable**	**PHASE II - Extended**	
	–	**65 items**		**95 items**	**114 items (SSF)**
	–	REQUIRED: Cervix **OPTIONAL:** Oral, colon & rectum, liver, lung, breast	REQUIRED: Oral, colon & rectum, liver, lung, breast, cervix (**total 6 major sites**)	REQUIRED: (2007 – 6 sites) Oral, colon & rectum, liver, lung, breast, cervix ADD: (2008 – 10 sites) Esophagus, stomach, bladder, prostate ADD: (2009 – 15 sites) Salivary gland, nasopharynx, corpus, ovary, lymphoma & leukemia ADD: Larynx (2013 – **16 sites**)	
	–	AJCC staging 6th edition (2002-2009)			AJCC staging 7th edition
	–	15-17 hospitals	27- 33 hospitals	42-76 hospitals	78-88 hospitals
Short Form Database	**20 items**	**20 items**		**33 items**	**42 items**
	All sites	All sites (except for 6 major cancers from long-form reporting hospitals)		All sites (except for 16 major cancers from long-form reporting hospitals)	
	100-230 hospitals	All except for LF hospitals		All except for LF hospitals	

Table 2. Reporting items[a] collected in the cancer registry database

Item name	Short form	Long form	Item name	Short form	Long form
Reporting hospital code	○	○	TNM—Pathological stage group		○
Personal identity number	○	○	Other staging system		○
Sex	○	○	Other staging—Clinical		○
Date of birth	○	○	Other staging—Pathological		○
Age at diagnosis	○	○	Surgical procedure of primary site		○
Date of initial diagnosis	○	○	Radiotherapy target summary		○
Primary site (ICD-O)	○	○	Date of first course of treatment		○
Laterality	○	○	Date of first surgical procedure	○	○
Histology (ICD-O)	○	○	Date of radiotherapy started	○	○
Grade/differentiation	○	○	Data of chemotherapy started	○	○
Diagnostic confirmation	○	○	Date of hormone/steroid therapy started	○	○
Surgical diagnostic and staging procedure		○	Date of immunotherapy started	○	○
Tumour size		○	Date of hematologic transplant and endocrine procedure started	○	○
Regional lymph nodes examined		○			
Regional lymph nodes positive		○	Data of target therapy started	○	○
AJCC cancer staging edition		○	Palliative care performed	○	○
TNM—Clinical T		○	Date of first recurrence		○
TNM—Clinical N		○	Type of first recurrence		○
TNM—Clinical M		○	Cancer status		○
TNM—Clinical stage group		○	Date of death		○
TNM—Pathological T		○	Cause of death		○
TNM—Pathological N		○	BMI/smoking/betel nut/drinking habit	○	○
TNM—Pathological M		○	Cancer site-specific factor		○

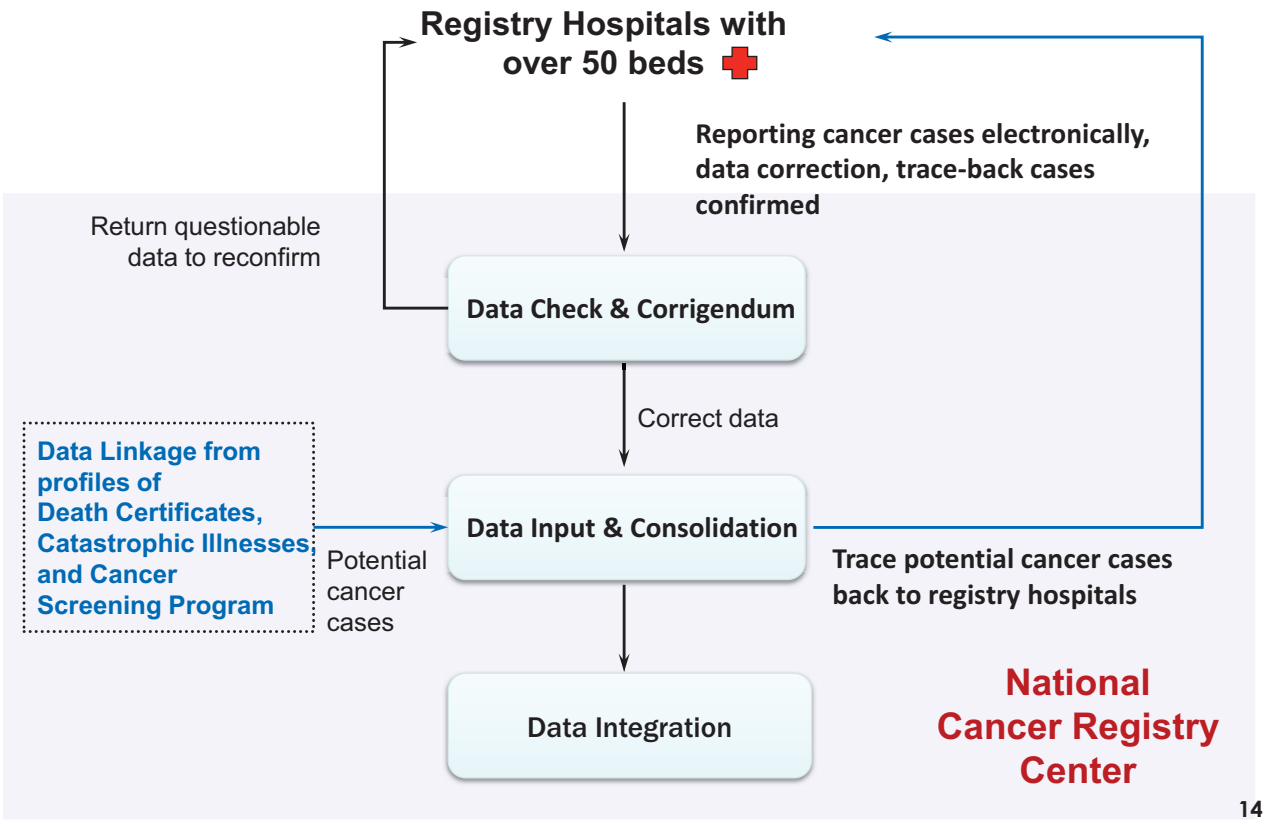
[a]More detailed and completed reporting items information are available at the Taiwan Cancer Registry website: http://tcr.cph.ntu.edu.tw/main.php?Page=A6. The symbol "○" indicates the item is needed to report in the Short form or Long form database.

CJ Chiang et al., Jpn J Clin Oncol 2015;45:291-6.

TOPIC II:

Quality Control of Cancer Registry Database

Data Collection and Management Procedure of TCR in NTU



Cancer Control Act: Milestone for TCR Quality

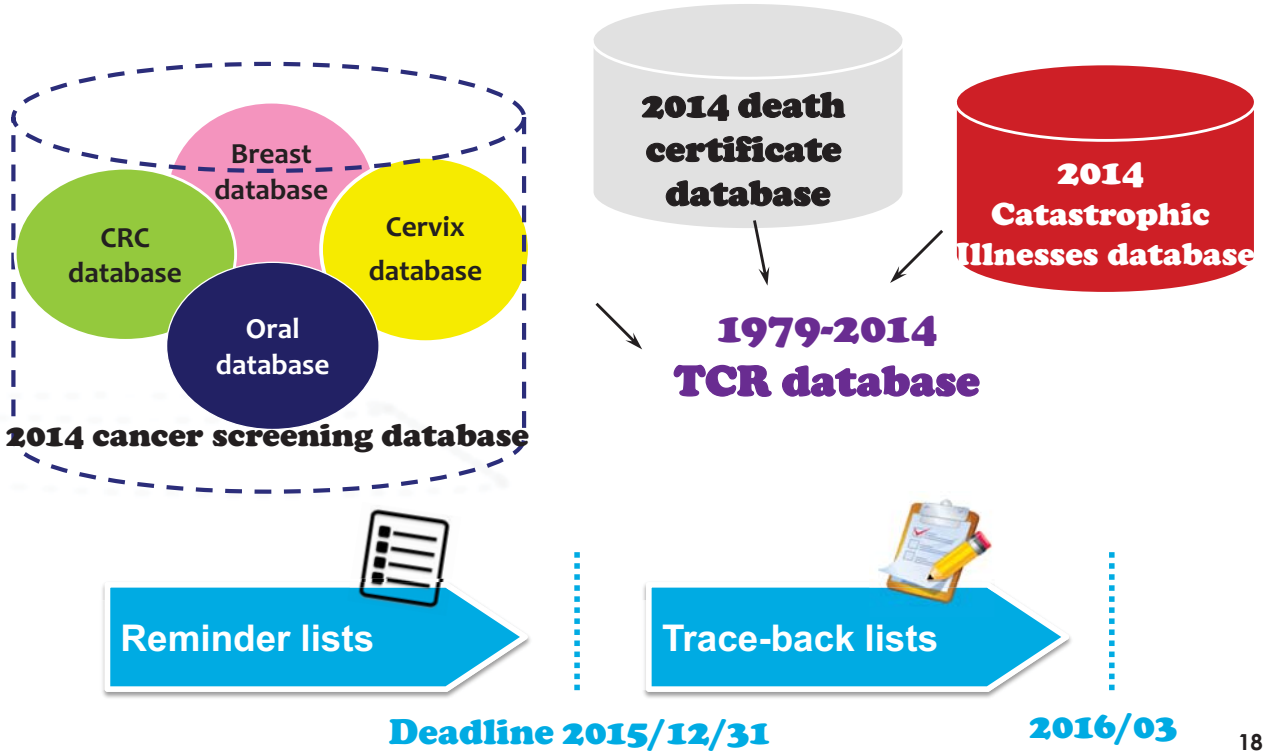
- **Cancer Control Act requires hospitals to follow MOHW rules on CR and there is penalty of 300-1600 US dollars for not report**
- **MOHW's rules for CR require**
  - Dr. lead and report before 1 year after diagnosis
  - Manpower: 1 registrar/1000 cases
  - Perform self-audit and 10% (Class1～2) reviewed by cancer committee
  - Should be used in care quality improvement
- **MOHW has performed cancer care quality accreditation program since 2008**
  - Hospital must pass it before apply to be a Medical Center
  - Cancer registry is a necessary crucial item for it

Consolidate the Quality of Cancer Registries

- **Taiwan Society of Cancer Registry (TSCR) was set up in 2006**
  - Cancer Registrar Professional Certification
  - Experienced registrars are trained as tutors to provide consultation, training and carry out data audit
- **Implement periodically medical chart review to ensure data accuracy since 2010**
- **Monitor the accuracy and completeness of cancer registration data from hospitals reporting**
- **Audit Data Quality Indices for TCR**
- **Quality of cancer registry was required in accreditation for comprehensive cancer care quality by NHRI**

Relationship with other cancer-related organizations

Reminder and Trace-back Procedure for Cancer Reporting



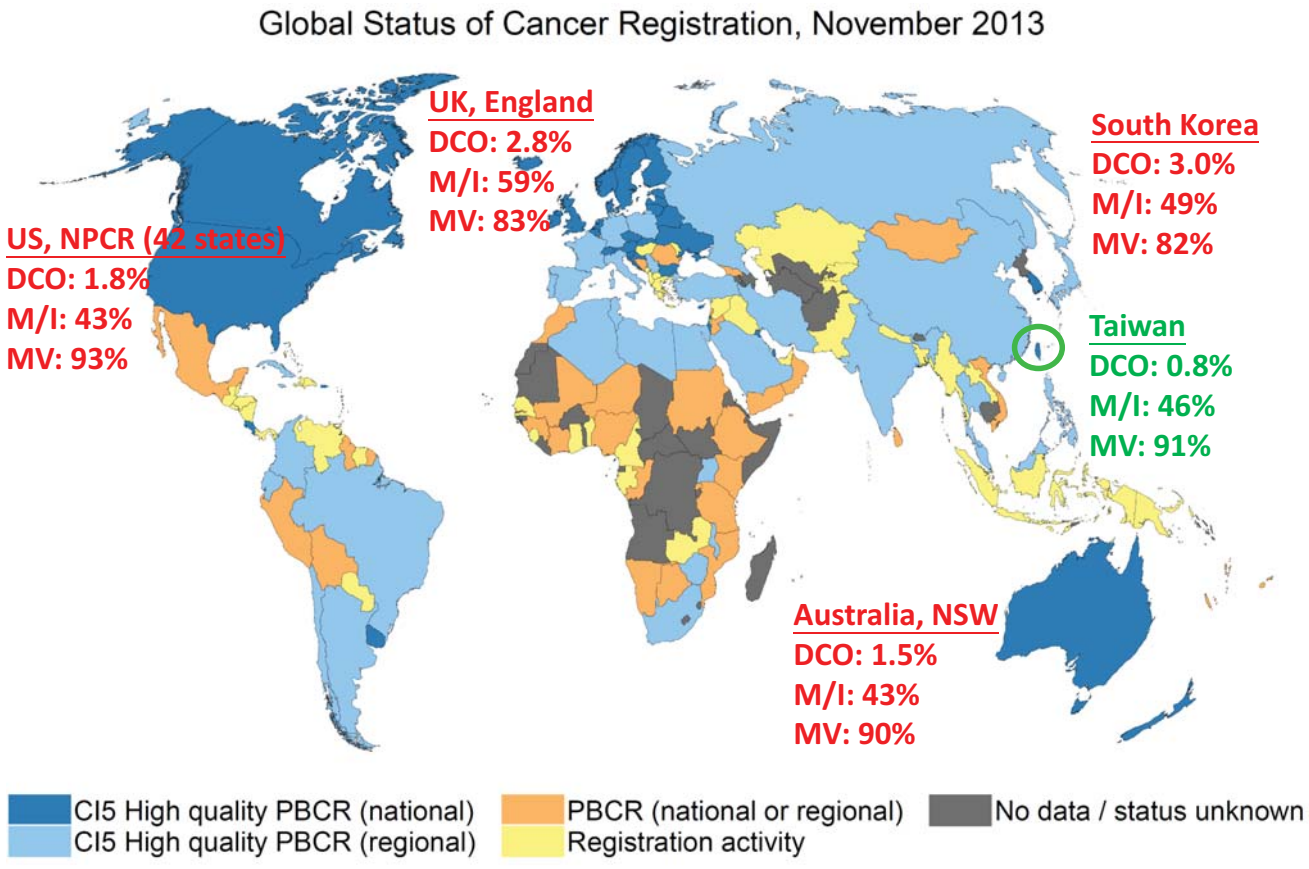
Data Quality Indices for Taiwan Cancer Registry Subsequent to "Cancer Control Act" Enacted

Criterion	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Completeness,%	92.8	95.5	94.3	96.7	97.6	97.8	97.6	97.6	97.0	97.6
DCO %	2.9	2.6	2.3	1.7	1.4	1.3	1.2	1.1	0.9	0.8
M/I %	54.8	54.4	55.6	51.8	50.2	50.7	47.4	44.7	44.4	45.9
MV %	87.4	87.1	88.0	88.1	88.8	89.5	90.1	90.5	91.0	91.3
Timeliness, months	24	24	23	17	17	17	17	17	17	17

Note: 1. Death Certificate Only (DCO) percentage
2. Mortality : Incidence ratio (only included invasive cancer cases)
3. Microscopically Verified (MV) percentage

The Quality of Data is awarded with Gold Standard from NAACCR

CJ Chiang et al., Jpn J Clin Oncol 2015;45:291-6.

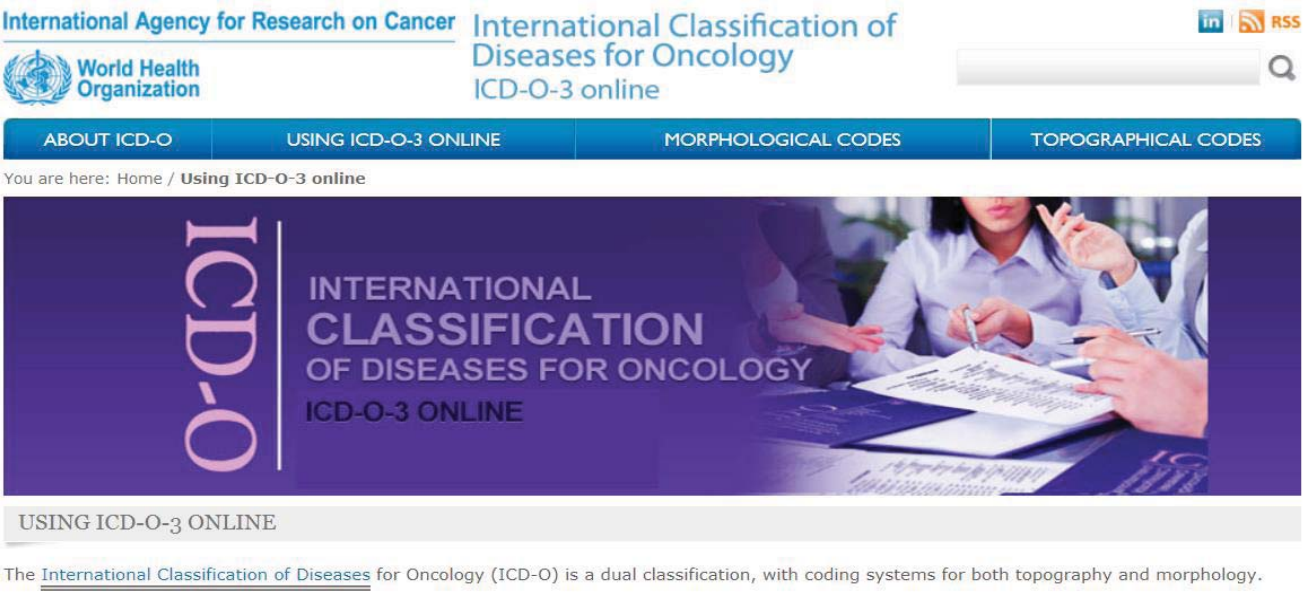


NOTE: Data from IARC website

TOPIC III:

Information in Long-Form Cancer Registry Database

Manual for Cancer Registration



- 1979-2001: ICD-O-FT (ICD 9)
- 2002-now: ICD-O-3 (ICD 10)

Long Form Database

Difference between 65, 95 and 114 items:

	65 items	95 items	114 items
Cancer Site	6 major cancers	6 → 10 → 15 major cancers	15 major cancers
Cancer Staging	AJCC 6th (2002-2006)	AJCC 6th (2007-09) AJCC 7th (2010)	AJCC 7th (2011-2016)
Other Staging	FIGO, MAC, Okuda, CLIP, Ann Arbor	FIGO **(2007 REQUIRED)** BCLC **(2010 REQUIRED)** MAC, Okuda, CLIP, Ann Arbor	FIGO **(REQUIRED)** BCLC **(REQUIRED)** MAC, DSS, Rai
First Course of Treatment	Only given at **reporting hosp**: Surgery RadiationTx ChemoTx HormoneTx	Both given at **reporting and other hosp**: Surgery, CT, HT, **ImmunoTx** Only given at **reporting hosp:** RT, **Transplant/Endocrine, Palliative Care**	**Same with 95 itmes** **Add: Target therapy**
Special Recruit	**ER, PR for breast**	-	**Site-Specific Factors**

NOTE: The 8 edition of the Cancer Staging Manual, which is expected to be published in late 2016 for patients diagnosed with cancer after January 2017.

Variable Definition

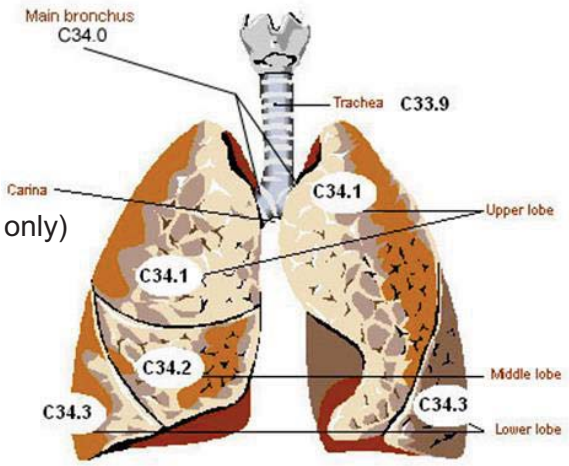
- Class of Case
- Cancer site & Histology (ICD-O-3 T-code & M-code)
- **Grade** / Differentiation
- **Laterality**
- Diagnostic confirmation
- AJCC staging
  - TNM, tumor size, regional lymph node examined/positive
- First course of treatment
  - Date of the initial treatment for each therapy
  - Refused reasons of each therapy
- Recurrence status **(re-report 3-year & 5-year follow up data)**
  - Date of **first** recurrence
  - Type of first recurrence (local / regional / distant)

個案分類的定義

Case	Includes
Class 0	申報醫院診斷，但於外院接受全部之首次療程或決定不治療。 • 個案於申報醫院診斷，但選擇到他院治療。 • 個案於申報醫院診斷，但被轉介至他院治療。
Class 1	申報醫院診斷，並於申報醫院接受全部或部份的首次療程。 • 個案於申報醫院診斷，其治療計畫是不予治療或是再密切觀察。 • 個案於申報醫院診斷，但個案拒絕治療。 • 個案於申報醫院診斷，但個案因年長、疾病嚴重或其他醫療狀況而無法治療或接受緩和照護。 • 個案於申報醫院診斷，但不知道是否有建議作治療或有接受治療。 • 個案於申報醫院診斷，有建議作治療，但不知道是否有接受治療。 • 個案於主治醫師(Staff physician)的診所診斷，並於申報醫院接受首次療程。所謂「主治醫師」是指在申報醫院有簽住院權的醫事人員。 • 個案於申報醫院診斷，在主治醫師的診所內接受全部或部份的首次療程。
Class 2	外院診斷，於申報醫院接受全部或部份的首次療程。 • 外院診斷，於申報醫院接受緩和照護為其首次療程（或作為部份的首次療程）。
Class 3	外院診斷並接受全部的首次療程。 • 個案於申報醫院治療，但並不知道其首次療程的相關資訊。 • 個案於申報醫院建立治療計畫或提供「第二意見」的服務，但於外院診斷與治療。 • 個案因之前診斷的癌症復發或惡化而到申報醫院作治療。

Cancer Site & Histology

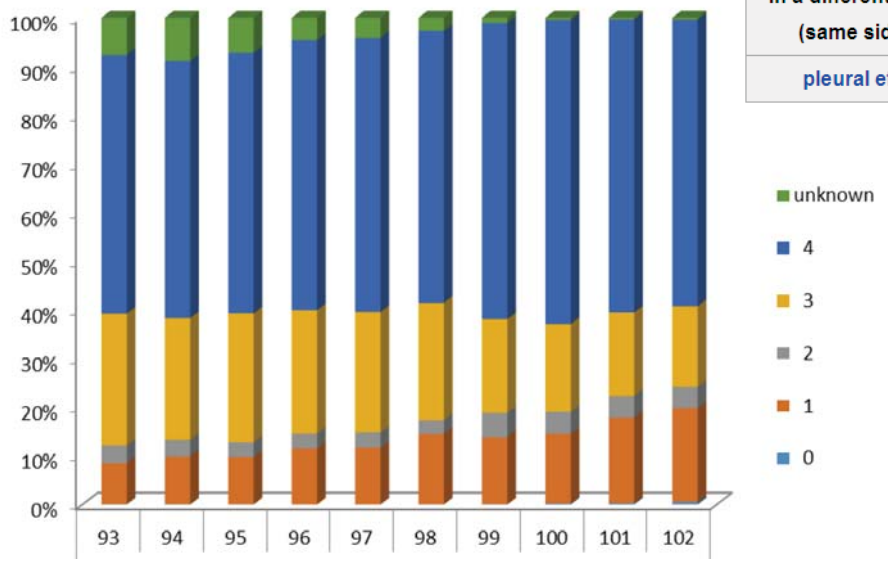
ICD-O-FT	ICD-O-3	Term
162.0	C33.9	Trachea, NOS
162.2	C34.0	Main bronchus
162.3	C34.1	Upper lobe, lung
162.4	C34.2	Middle lobe, lung (right lung only)
162.5	C34.3	Lower lobe, lung
162.8	C34.8	Overlapping lesion of lung
162.9	C34.9	Lung, NOS



Morphology	Term
80703	Squamous cell carcinoma, NOS
80702	Squamous cell carcinoma **in situ**, NOS
81403	Adenocarcinoma, NOS
80123	Large cell carcinoma
80463	Non-small cell carcinoma

Comparison of AJCC 6th vs. 7th Edition in Lung Cancer

description	AJCC 6th edition classification	AJCC 7th edition classification
additional nodule(s) in the same lobe	T4	T3
extension (local invasion of certain structures)	T4	T4
additional nodule(s) in a different ipsilateral (same side) lobe	M1	T4
pleural effusion	T4	M1a



First Course of Treatment

- The first course of treatment was given **within 4 months** of the first diagnosis of cancer and included all methods of treatment recorded in the treatment plan and administered to the patient **before disease progression or recurrence**

- Treatment types:
  - Surgery (primary site, regional lymph node, other site)
  - Radiotherapy (modality, dose, fraction…etc.)
  - Chemotherapy (local / systemic)
  - Hormone / Steroid therapy
  - Immune therapy
  - Transplant / Endocrine therapy
  - Palliative therapy

Lung
C340–C349
(Except for M9727, 9733, 9741-9742, 9764-9809, 9832, 9840-9931, 9945-9946, 9950-9967, 9975-9992)

Codes

00 None; no surgery of primary site; autopsy ONLY

19 Local tumor destruction or excision, NOS
Unknown whether a specimen was sent to pathology for surgical events coded 19 (used principally for cases diagnosed prior to January 1, 2003)

15 Local tumor destruction, NOS
- 12 Laser ablation or cryosurgery
- 13 Electrocautery; fulguration (includes use of hot forceps for tumor destruction)

No specimen sent to pathology from surgical events 12-13 and 15

[SEER Note: Assign code 15 for radiofrequency ablation (RFA).]

20 Excision or resection of less than one lobe, NOS
- 23 Excision, NOS
- 24 Laser excision
- 25 Bronchial sleeve resection ONLY
- 21 Wedge resection
- 22 Segmental resection, including lingulectomy

Specimen sent to pathology from surgical events 20–25

30 Resection of [at least one] lobe or bilobectomy, but less than the whole lung (partial pneumonectomy, NOS)
- 33 Lobectomy WITH mediastinal lymph node dissection

The lymph node dissection should also be coded under *Scope of Regional Lymph Node Surgery*
(癌登欄位序號 #4.16 or 4.17).

45 Lobe or bilobectomy extended, NOS
- 46 WITH chest wall
- 47 WITH pericardium
- 48 WITH diaphragm

55 Pneumonectomy, NOS
[SEER Note: Code 55 includes the following procedures: complete pneumonectomy, sleeve pneumonectomy, standard pneumonectomy, total pneumonectomy, resection of whole lung]

56 WITH mediastinal lymph node dissection (radical pneumonectomy)
The lymph node dissection should also be coded under *Scope of Regional Lymph Node Surgery*
(癌登欄位序號 #4.16 or 4.17).

65 Extended pneumonectomy
- 66 Extended pneumonectomy plus pleura or diaphragm

70 Extended radical pneumonectomy
The lymph node dissection should also be coded under *Scope of Regional Lymph Node Surgery*
(癌登欄位序號 #4.16 or 4.17).

[SEER Note: An extended radical pneumonectomy is a radical pneumonectomy (including removal of mediastinal nodes) and the removal of other tissues or nodes]

80 Resection of lung, NOS

90 Surgery, NOS

99 Unknown if surgery performed; death certificate ONLY

Newly Items from 2011 Diagnosed Year

- **Target Therapy** (YES/NO)
- Five Important Risk factors:
  height, weight, smoking, drinking, betel quid chewing
- Cancer Site Specific Factors (SSF)

Cancer Site Specific Factors (SSF)

Site	Number	Example
Head & Neck	8	I-III, IV-V, VI-VII lymph nodes
Esophagus	4	PET-CT examination, MIE
Stomach	3	CEA, HP infection
Liver	8	AFP, fibrosis score, Child Pugh, HBV/HCV status
Lung	6	EGFR gene mutation
Colon / Rectum	8	CEA, CRM, perineural invasion
Breast	9	ER, PR, Her2 value
Cervix	2	SCC
Corpus	2	ER, PR value
Ovary	3	CA-125
Prostate	8	PSA, Gleason score
Bladder	2	WHO/ISUP grade
Leukemia / Lymphoma	9	GVHD, CMV infection

癌症登記長表資料

102 年長表個案申報量與重複筆數分類狀況

癌症部位	長短表申報筆數	長表申報筆數	(%)*	長表資料庫可分析筆數† 申報筆數	申報1筆	重複2筆	重複3筆以上	實際分析筆數	醫院家數
口腔癌	7642	7329	95.90	5491	4784	636	71	4945	81
口咽癌	1995	1917	96.09	1423	1334	86	3	1366	77
下咽癌	1464	1402	95.77	1017	934	80	3	967	77
喉癌	930	880	94.62	677	657	20	0	666	69
主唾液腺癌	341	327	95.89	265	233	32	0	239	59
鼻咽癌	2219	2095	94.41	1471	1381	90	0	1419	80
食道癌	3641	3382	92.89	2352	2200	152	0	2255	81
胃癌	5281	4773	90.38	3332	3100	232	0	3158	81
結腸癌	13717	12534	91.38	10249	9096	1008	145	9386	81
直腸癌	8251	7578	91.84	6074	5536	520	18	5662	81
肝癌	15104	14335	94.91	9943	9431	512	0	9578	80
肺癌	15129	14310	94.59	10612	9884	704	24	10174	81
乳癌	18584	17405	93.66	13971	11541	2348	82	12142	81
子宮頸癌	5696	5173	90.82	4225	4007	212	6	4066	81
子宮體癌	2683	2553	95.15	1993	1852	138	3	1889	80
卵巢癌	1523	1480	97.18	1252	1196	56	0	1203	74
攝護腺癌	6421	5873	91.47	4576	4059	496	21	4216	81
膀胱癌	3644	3236	88.80	2736	2465	268	3	2544	81
惡性淋巴瘤	3474	3350	96.43	2545	2389	156	0	2415	80
合計	117739	109932	93.37	84204	76079	7746	379	78290	81
				100.00%	90.35%	9.20%	0.45%	92.98%	

*長表申報筆數佔長短表總申報筆數之百分比(%)。

¶長表申報筆數：個案分類為 0-3、5-6、9 的個案。

†可分析申報筆數：針對長表申報個案做治療和存活分析時，應以民國 102 年 1 月 1 日以後到申報醫院接受首次療程的個案為對象，並且只有個案分類為 1、2 時，才列為可分析個案。

Procedure of AJCC Combined Stage

圖 1 為 102 年度各癌 AJCC 整併期別流程(不包含惡性淋巴瘤)：

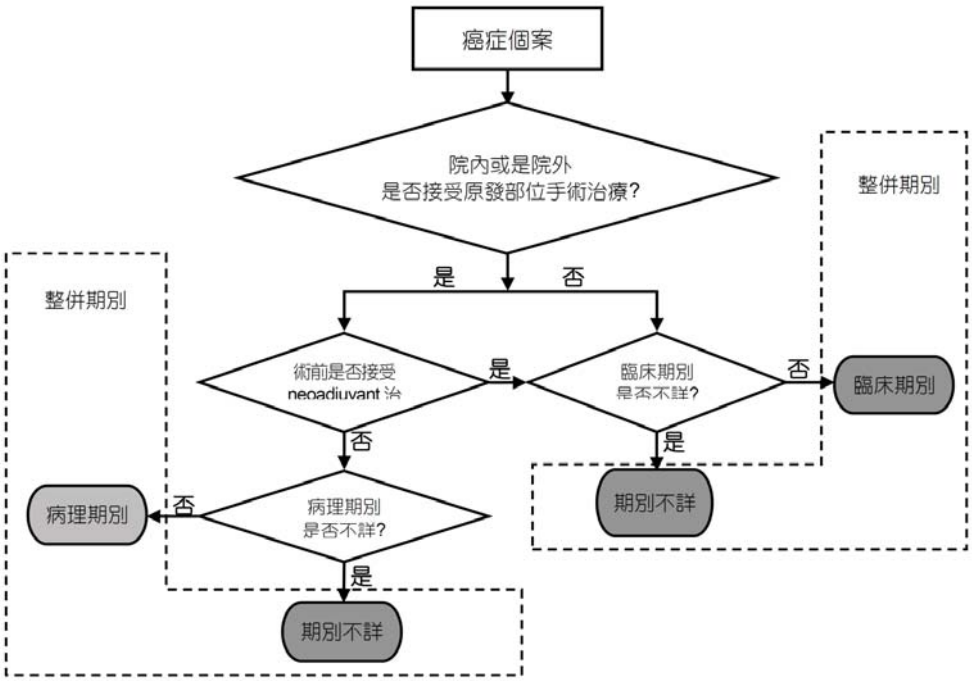


圖 1、102 年度臨床與病理期別(AJCC_7th)之整併流程說明

表十二之三　肺癌(小細胞癌)發生人數按臨床、病理、整併期別*分類

期別	臨床期別		病理期別		整併期別	
	申報數	%	申報數	%	申報數	%
合　計	775	100.00	775	100.00	775	100.00
0　期	0	0.00	0	0.00	0	0.00
I　期	17	2.19	9	1.16	16	2.06
II　期	11	1.42	0	0.00	10	1.29
III　期	181	23.35	15	1.94	184	23.74
IV　期	558	72.00	149	19.23	559	72.13
不　詳	8	1.03	602	77.68	6	0.77

表十二之四　肺癌(非小細胞癌)發生人數按臨床、病理、整併期別*分類

期別	臨床期別		病理期別		整併期別	
	申報數	%	申報數	%	申報數	%
合　計	9399	100.00	9399	100.00	9399	100.00
0　期	17	0.18	52	0.55	53	0.56
I　期	1824	19.41	1838	19.56	1950	20.75
II　期	407	4.33	375	3.99	438	4.66
III　期	1409	14.99	462	4.92	1473	15.67
IV　期	5422	57.69	1988	21.15	5456	58.05
不　詳	320	3.40	4684	49.84	29	0.31

表十二之八 肺癌(非小細胞癌)發生人數按整併期別[1]及治療方式分類

期別	分析數	手術[2]		手術 化療		手術 放療[3]		手術 化療 放療		化療		化療 標靶治療		標靶治療		放療		非同步 放療 標靶治療	
		申報數	%	申報數	%	申報數	%	申報數	%	申報數	%	申報數	%	申報數	%	申報數	%	申報數	%
合計	9399	1663	17.69	865	9.20	38	0.40	193	2.05	1340	14.26	498	5.30	1568	16.68	447	4.76	621	6.61
0 期	53	52	98.11	0	0.00	0	0.00	0	0.00	1	1.89	0	0.00	0	0.00	0	0.00	0	0.00
I 期	1950	1420	72.82	356	18.26	11	0.56	14	0.72	20	1.03	2	0.10	11	0.56	61	3.13	2	0.10
II 期	438	76	17.35																
III 期	0	0	0.00																
IIIA 期	775	75	9.68																
IIIB 期	698	3	0.43																
IV 期	5456	26	0.48																
不詳	29	11	37.93																

非同步 放療 化療		非同步 放療 化療 標靶治療		同步 放療 化療		同步 放療 化療 標靶治療		同步 放療 標靶治療		緩和治療[4]		未治療[5]		其他治療[6]	
申報數	%	申報數	%	申報數	%	申報數	%	申報數	%	申報數	%	申報數	%	申報數	%
612	6.51	201	2.14	463	4.93	69	0.73	22	0.23	443	4.71	89	0.95	267	2.84
0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
5	0.26	0	0.00	7	0.36	1	0.05	0	0.00	7	0.36	7	0.36	26	1.33
9	2.05	0	0.00	14	3.20	0	0.00	2	0.46	12	2.74	4	0.91	8	1.83
0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
20	2.58	1	0.13	104	13.42	7	0.90	5	0.65	21	2.71	7	0.90	48	6.19
56	8.02	2	0.29	196	28.08	17	2.44	15	2.15	28	4.01	6	0.86	13	1.86
522	9.57	198	3.63	141	2.58	44	0.81	0	0.00	370	6.78	65	1.19	172	3.15
0	0.00	0	0.00	1	3.45	0	0.00	0	0.00	5	17.24	0	0.00	0	0.00

Taiwan Cancer Registry Center Website
http://tcr.cph.ntu.edu.tw

TOPIC IV:

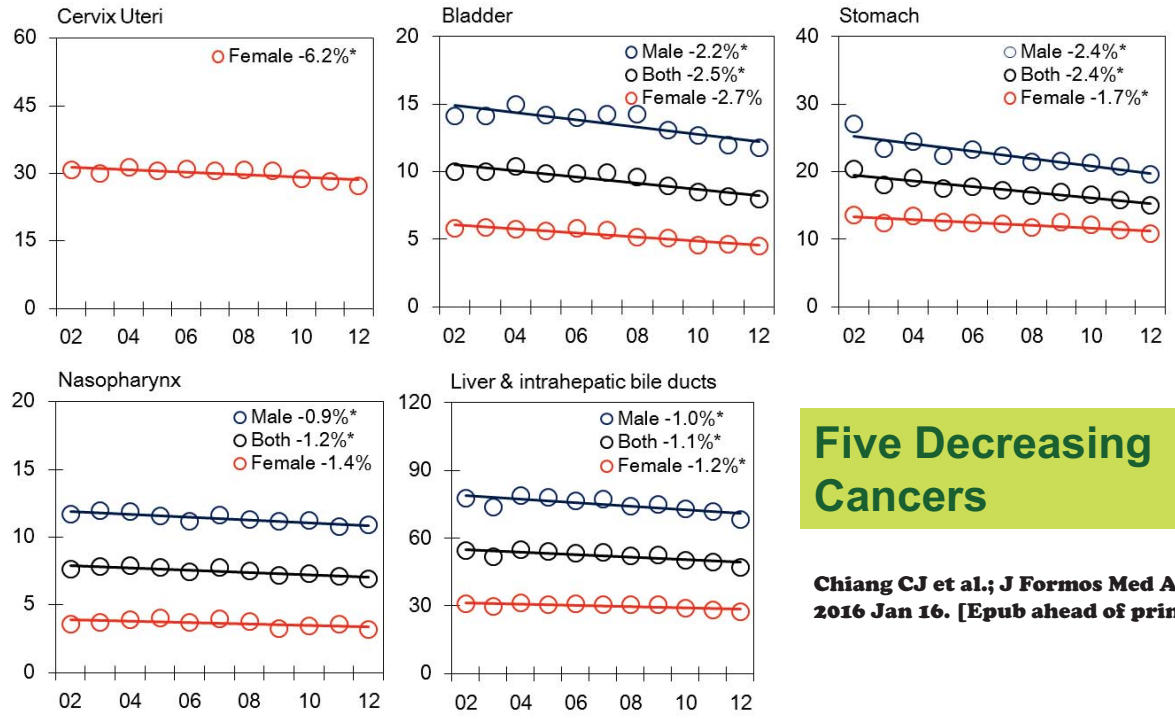
Application of Cancer Registry Database

Importance of TCR database

- **Educate general public**
  - Annually release incidence and education information
- **Draw up the Cancer Control schema**
  - National Cancer Control Plan, 2014-2018
- **Monitor and evaluate cancer control programs**
  - Screening quality
  - Cancer care quality (ex: survival are various across hospitals)
    - ✓ Develop **core measurement indicators** of cancer care to evaluate the performance of hospitals
    - ✓ Data analysis, feedback and monitoring
- **Academic researches**
  - apply to **Health and Welfare Statistics Application Center (HWSAC), MOHW**

衛生福利部統計處
Ministry of Health and Welfare

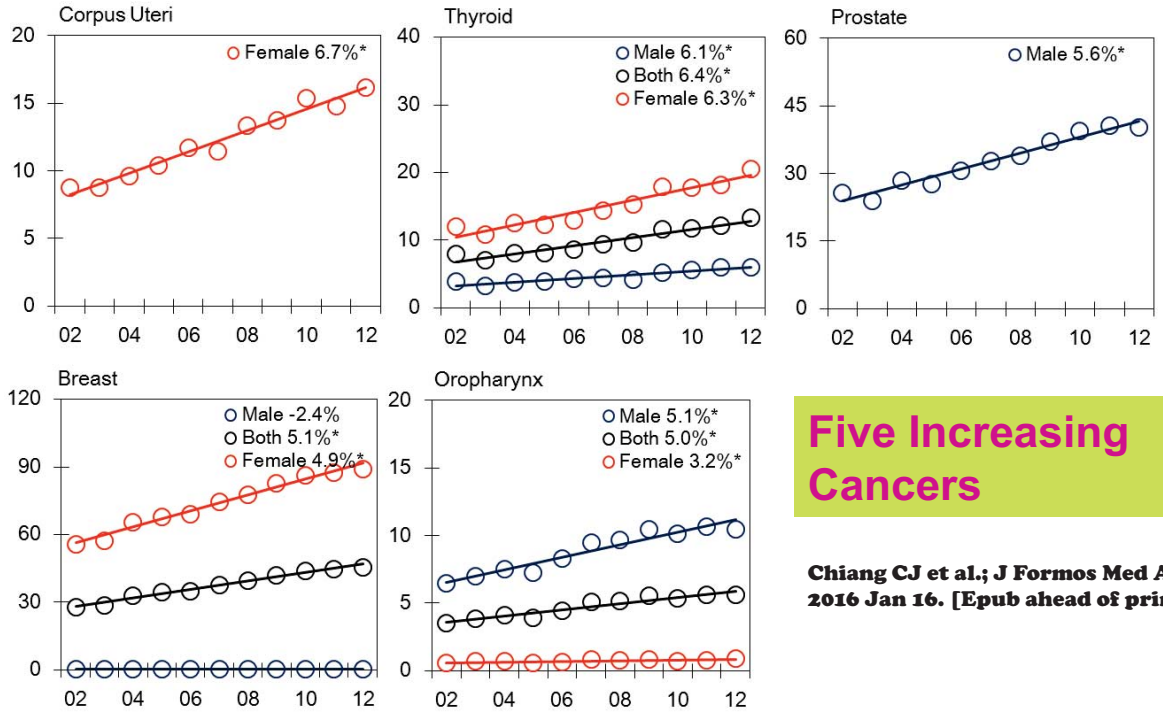
Incidence Trends and Average Annual Percentage Changes for Selected Cancers in Taiwan by Both Sexes, 2002-2012



Five Decreasing Cancers

Chiang CJ et al.; J Formos Med Assoc. 2016 Jan 16. [Epub ahead of print]

Incidence Trends and Average Annual Percentage Changes for Selected Cancers in Taiwan by Both Sexes, 2002-2012



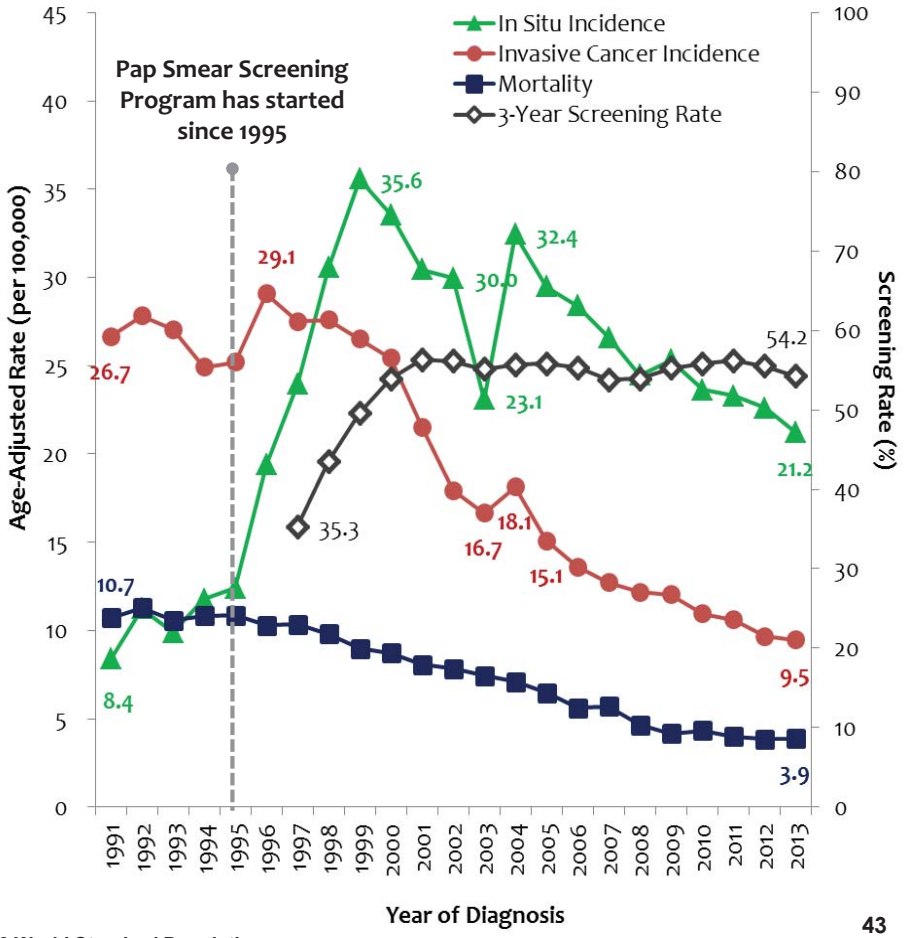
Five Increasing Cancers

Chiang CJ et al.; J Formos Med Assoc. 2016 Jan 16. [Epub ahead of print]

National Cancer Screening Program in Taiwan

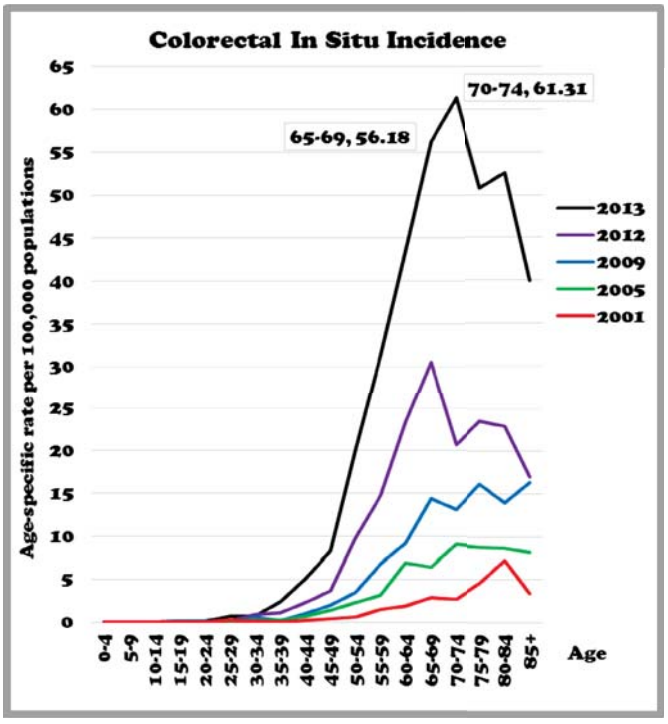
Item	Subject	Screening policy	2014 screening results
Cervical cancer	Women over age 30	Pap smear test once every three years	The rate of 30~69 year old women who have undergone a pap smear test within the last 3 years was 73.5% (Phone survey)
Breast cancer	1.45~69 year old women 2.40~44 year old women with a paternal grandmother, maternal grandmother, mother, daughter, or sister who had been diagnosed with breast cancer	One mammogram checkup every 2 years	The rate of 45-69 year old women who have undergone mammogram screening in the past two years was 38.5%
Oral cancer	1.Those aged 30 or above who chew areca quid (or have given up) or smoke tobacco. 2.Aboriginal people aged between 18 and 30 who chew areca quid (or have given up).	One oral mucus checkup every 2 years	The rate of those aged 30 or above who chew areca quid (or have given up) or smoke tobacco, and have undergone oral screening within 2 years was 54.3%.
Colorectal cancer	People aged 50-74	One fecal occult blood test every two years	The rate of those aged 50-69 who have undergone fecal occult blood test in the past two years was 40.7%.

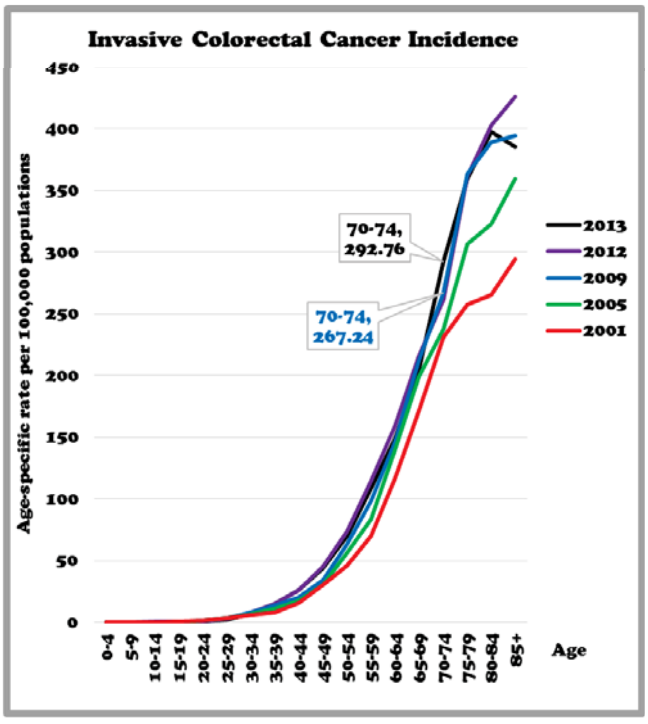
Secular Trend of Cervical Ca Incidence, Mortality and Screening Rate in Taiwan, 1991-2013



Note: Age-Adjusted Rate based on the 2000 World Standard Population

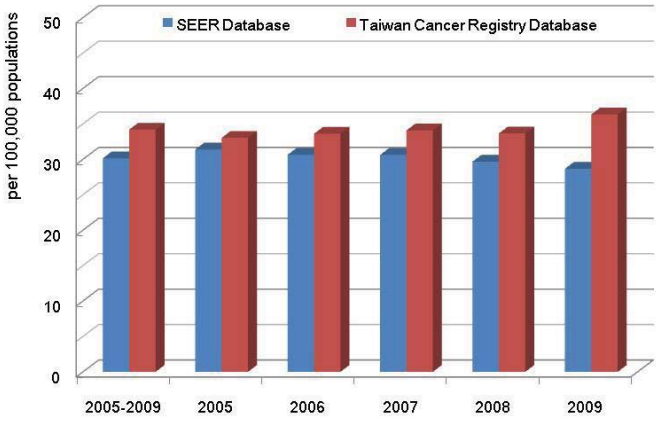
Screening Policy Impact on Age-Specific Incidence Rate in Colorectal Cancer



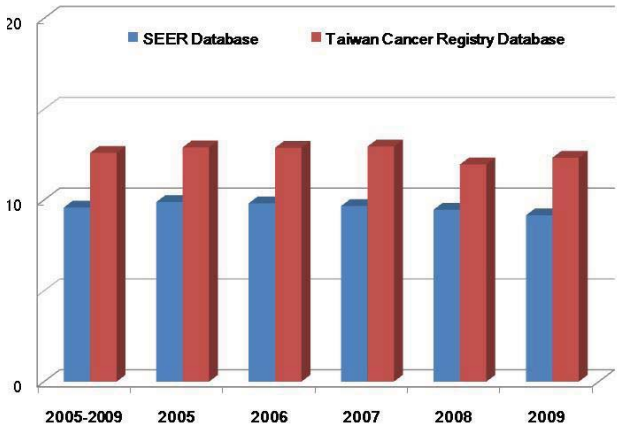


Incidence and Mortality rates of Colorectal Cancer Between US and Taiwan, 2005-2009

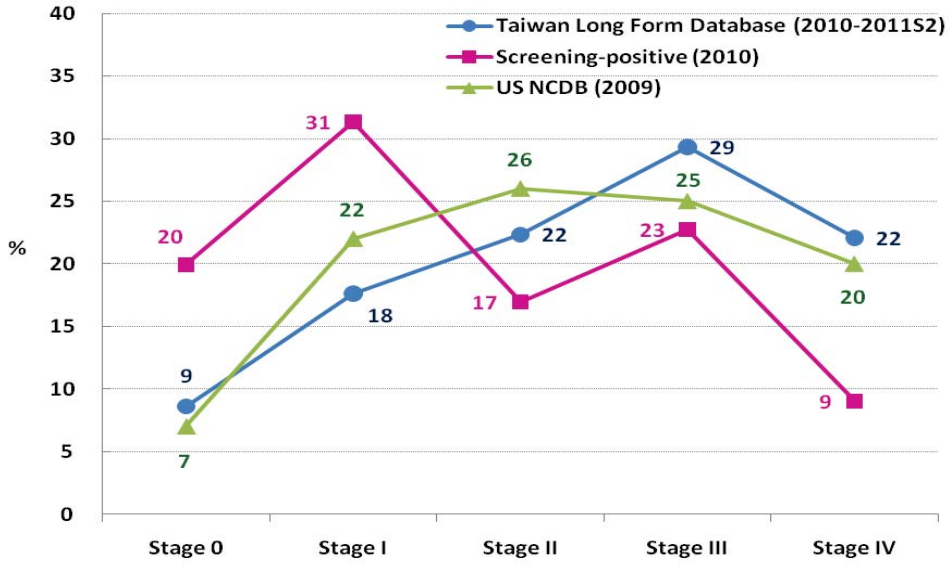
Age-Adjusted Incidence Rates of Colorectal Cancer Between US and Taiwan using WHO 1976 as Standard Population



Age-Adjusted Mortality Rates of Colorectal Cancer Between US and Taiwan using WHO 1976 as Standard Population



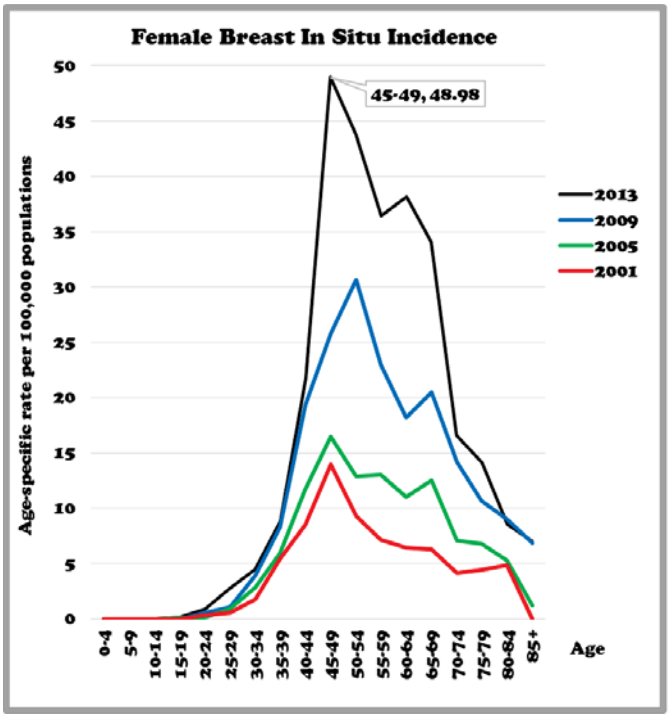
Stage Distribution of Colorectal Cancer Cases

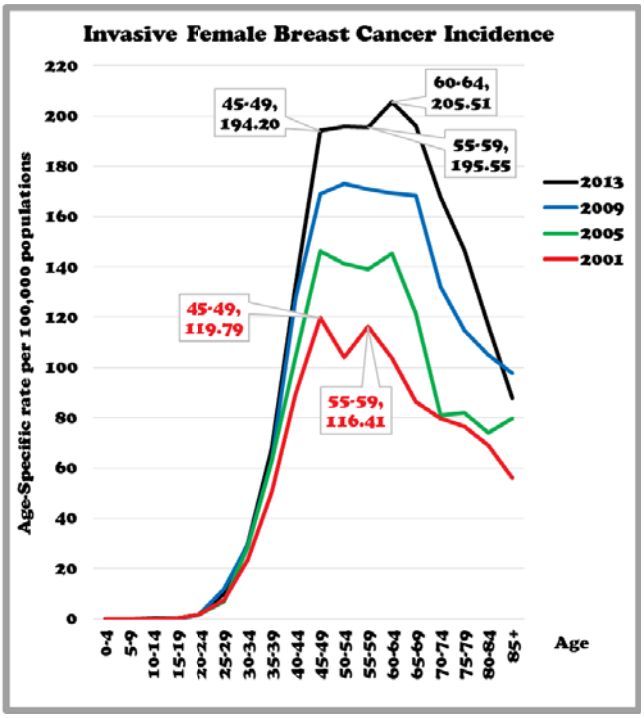


Source:

1. Staging of CRC cases from Taiwan Cancer Registry (TCR), 2010-2011 (mid-year)
2. Staging data from CR screening-positive cases diagnosed in 2010 were linkage with TCR Database

Screening Policy Impact on Age-Specific Incidence Rate in Female Breast Cancer

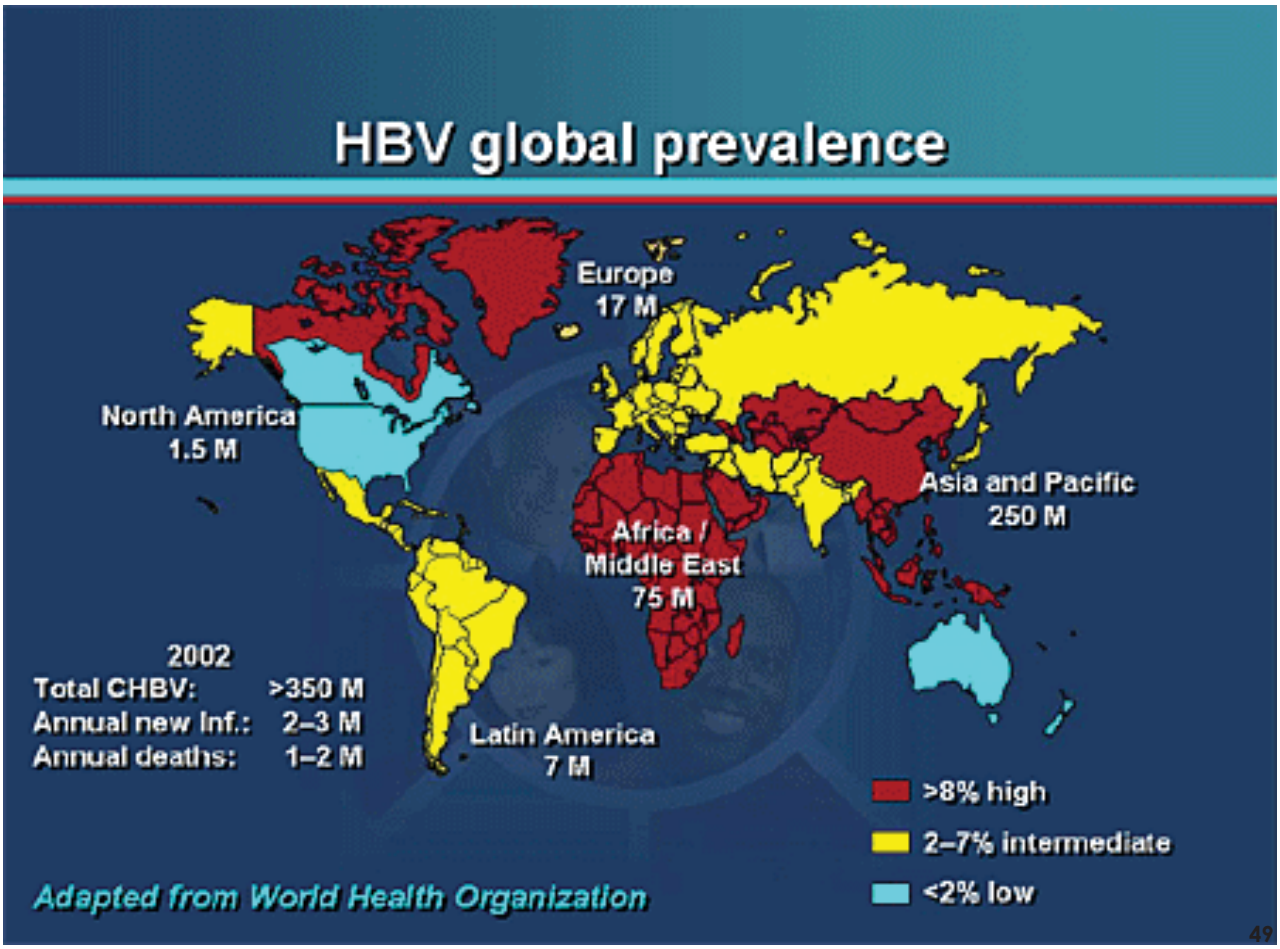




The More Screening are Performed, the More Early Stage Cancer will be Found

Cancer Site	Proportion (%) of Cancer Cases with Early Stage		
	Screening Detected Cases	Non-Screening Diagnosed Cases	Difference
Cervix (Stage 0-1)	89.3	39.5	51.2
Breast (Stage 0-2)	85.3	54.2	31.1
Oral Cavity (Stage 0-1)	34.5	31.0	3.5
Colon-Rectum (Stage 0-2)	60.1	31.6	28.6

Data Source：
- Data included in situ and invasive cases from Taiwan Cancer Registry Database
- Data from Cervical Cancer Screening Database using 2011-2012 and Oral-Colon-Rectum-Breast Cancers Screening Database using 2010-2012



Nationwide HBV Vaccine Prevent Liver Cancer in Children

TABLE 2. Summary of the nationwide hepatitis B vaccination program in Taiwan

Time period	Events and target populations	Remarks
1980		The National Hepatitis Control Steering Committee and the Hepatitis Control Committee were organized.
July 1984–June 1986	Newborns of HBsAg*-positive mothers	All newborns received four doses of plasma-derived hepatitis B vaccine at 0, 1, 2, and 12 months of age.
July 1986–now	All newborns	
June 1987		The first plasma-derived hepatitis B vaccine produced by a Taiwanese manufacturer was licensed for production and marketing.
1987–1989	Preschool children who did not receive vaccination at the neonatal stage, and susceptible medical personnel	
1988–1990	All elementary school children	
July 1991	Vaccine records checked for all elementary school entrants	
1992	Vaccination of teenagers and adults on a fee-for-service basis	After November 1, 1992, the vaccine was changed to a recombinant yeast vaccine, with three doses at 0, 1, and 6 months of age.

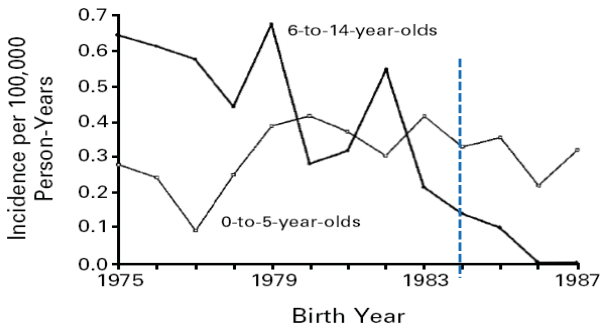
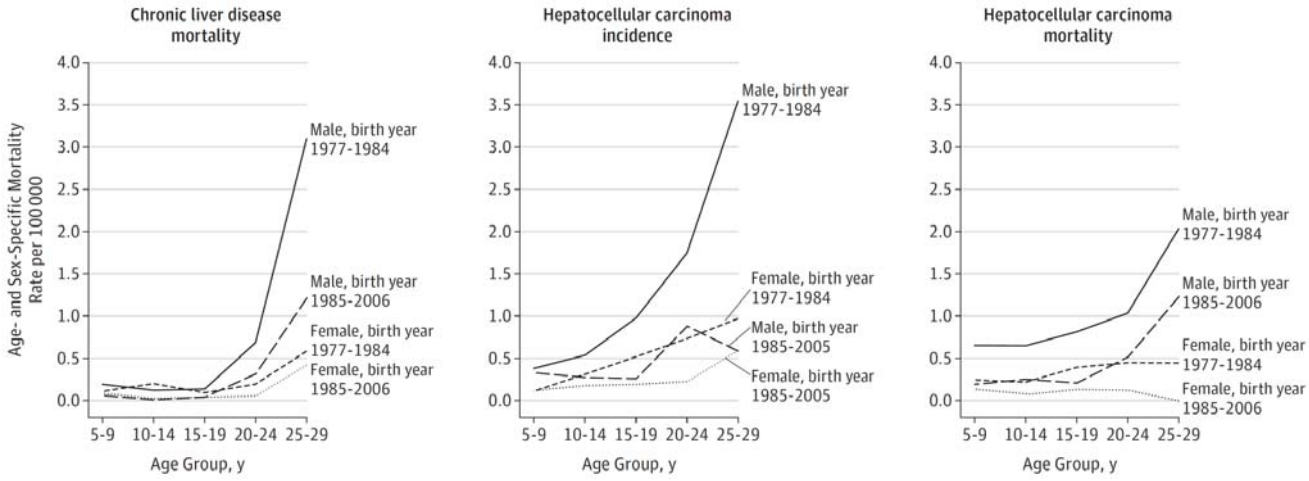


Figure 1. Comparison of the Incidence of Liver Cancer in Children 6 to 14 and 0 to 5 Years of Age, According to Birth Cohort. The incidence of liver cancer in children 6 to 14 years old declined, whereas the incidence in children 0 to 5 years old remained essentially unchanged. This may be explained by the reduction in the rates of both horizontal and perinatal transmission of HBV infection that resulted from the mass-vaccination program, which benefited the younger cohorts directly and the elder cohort indirectly by decreasing the reservoir of infection and reducing the risk of horizontal infection. The incidence of liver cancer in children between 6 and 14 years old declined to zero for children born in 1986 and 1987. The observed number of person-years for those born in 1986 was 613,837, and for those born in 1987 it was 313,311.

MH Chang et al., N Engl J Med 1997;336:1855-9

Thirty-Year Outcomes of the National Hepatitis B Immunization Program in Taiwan

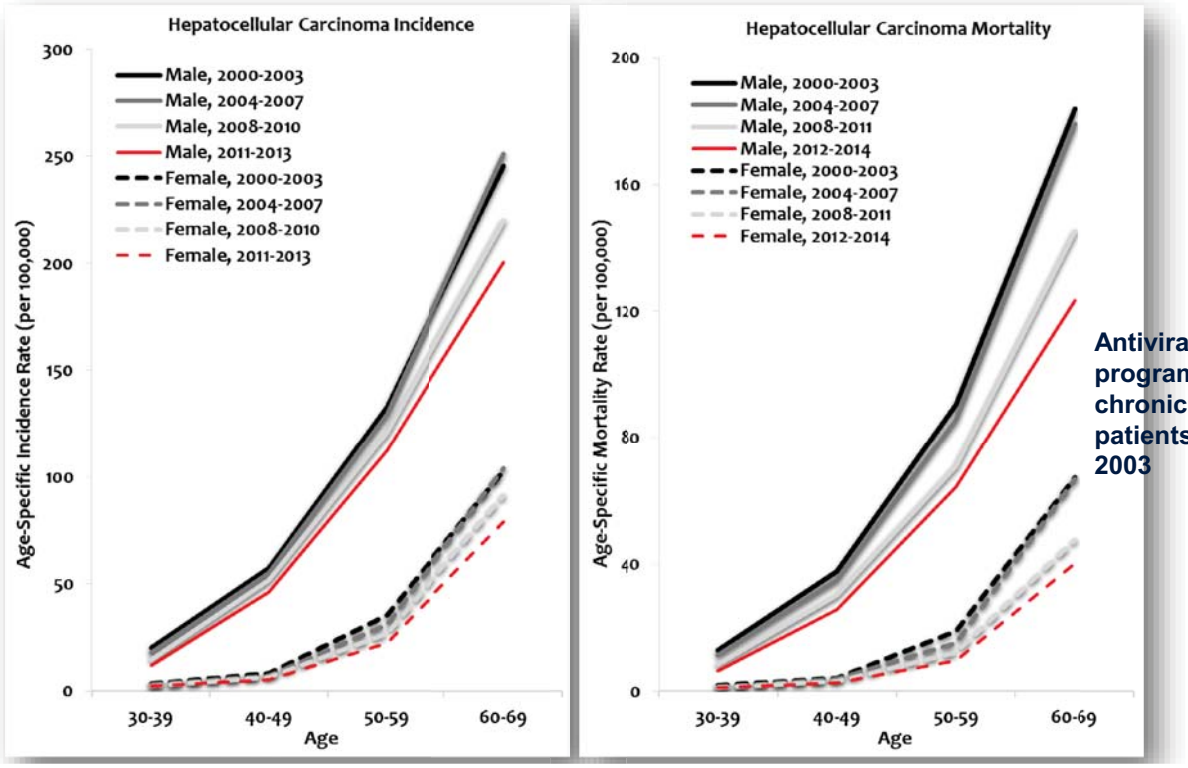
Figure. Age- and Sex-Specific Mortality and Incidence Rates of Chronic Liver Disease and Hepatocellular Carcinoma for Birth Cohorts Born Before and After the Launch of the Hepatitis B Immunization Program in 1984 in Taiwan



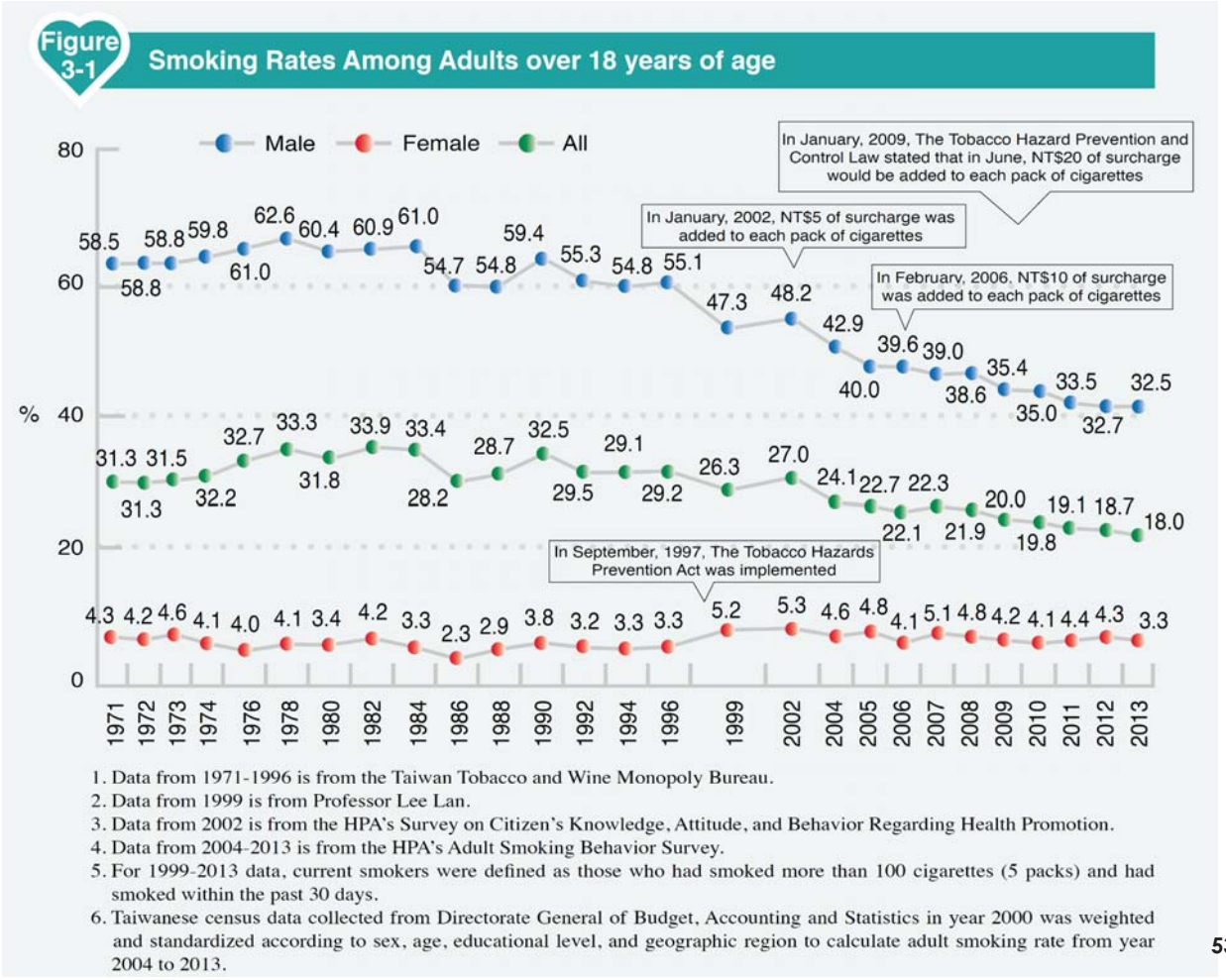
CJ Chiang et al.; JAMA 2013;310:974-976

Significant Reduction in End-Stage Liver Diseases Burden Through the National Viral Hepatitis Therapy Program in Taiwan

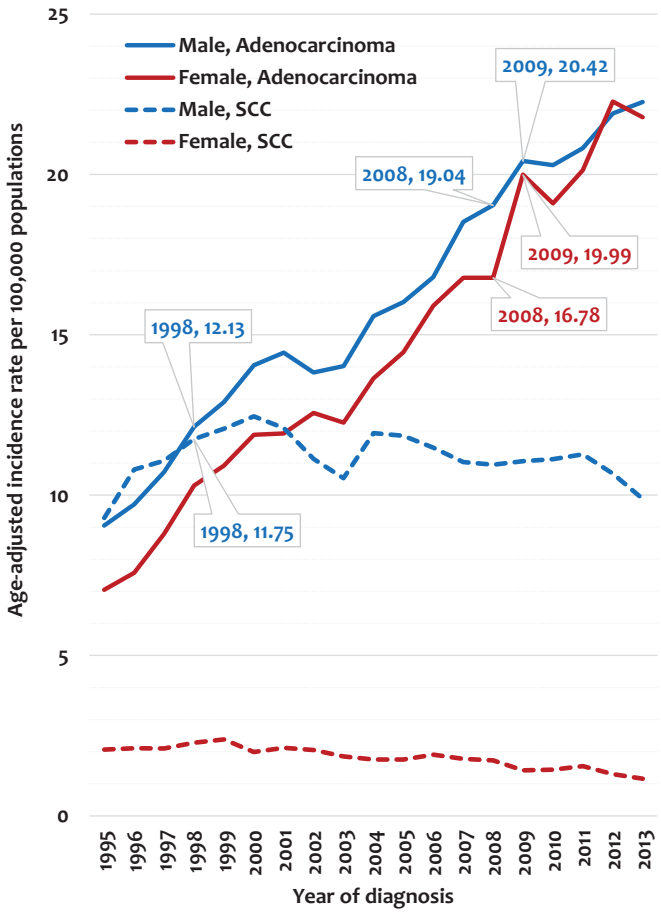
CJ Chiang et al., Hepatology 2015;16:1154-62



Antiviral therapy program for chronic hepatitis patients since 2003

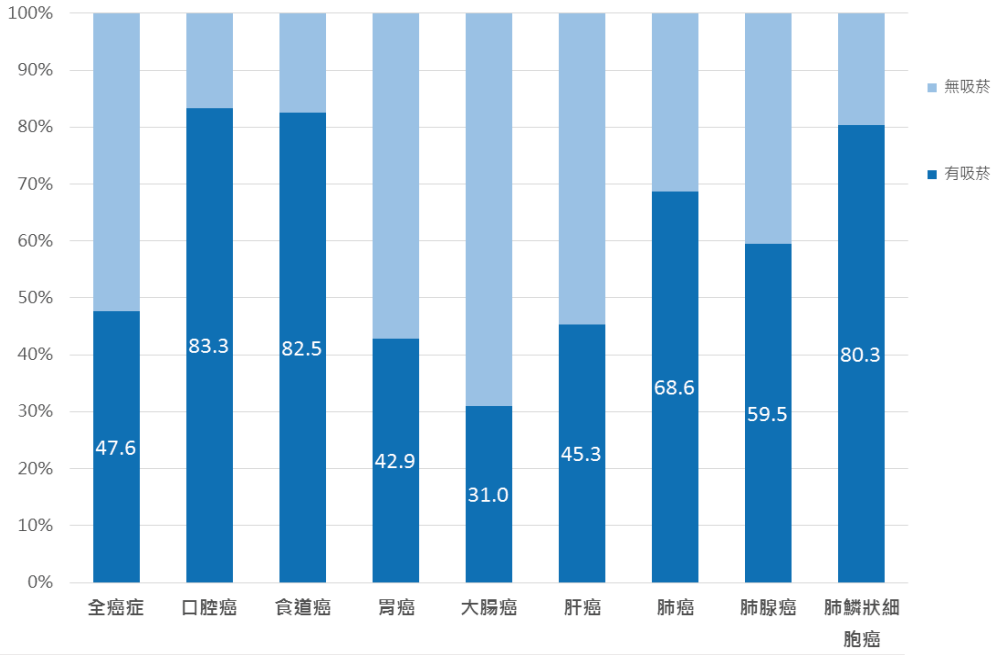


Comparison of Age-Standardized Incidence Rates of Lung Cancer among Two Major Histological Types and Gender, 1995-2013



Note: age-standardized rates based on the 2000 world standard population

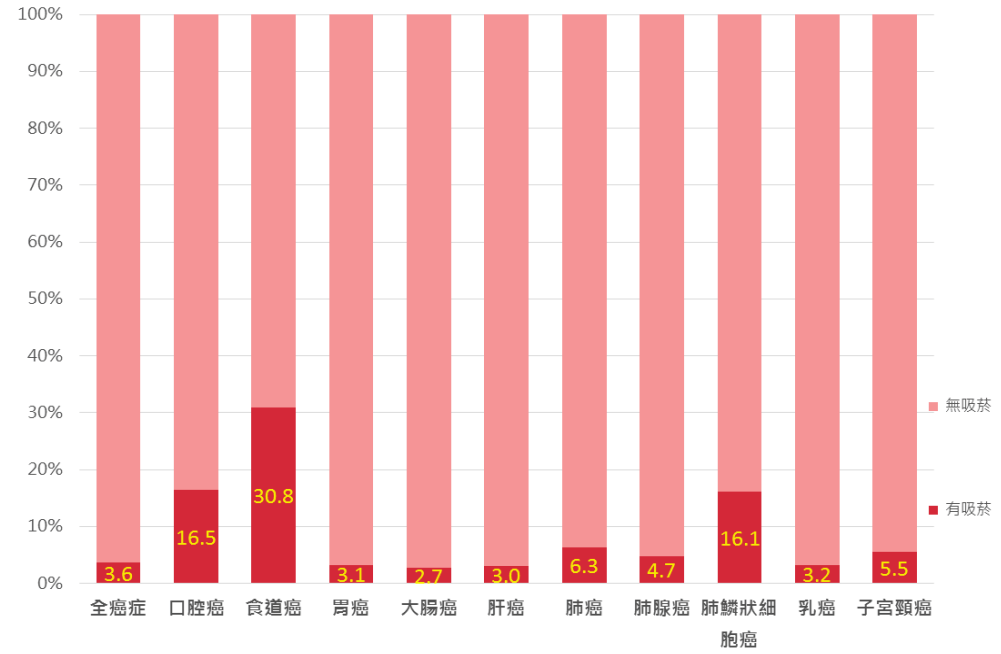
Smoking Habit for Major Cancers in Male in 2013



個案數*	40148	5044	1792	1752	6372	5569	5259	2846	1195

*個案數：僅分析有申報吸菸資料之個案

Smoking Habit for Major Cancers in Female in 2013



個案數*	39946	541	120	1211	5719	3084	4218	3581	180	10570	1370

*個案數：僅分析有申報吸菸資料之個案

UICC
global cancer control

IJC
International Journal of Cancer

The emerging epidemic of estrogen-related cancers in young women in a developing Asian country

Ching-Hung Lin[1]*, Yong-Chen Chen[2,3]*, Chun-Ju Chiang[2], Yen-Shen Lu[1,4], Kuan-Ting Kuo[5], Chiun-Sheng Huang[6], Wen-Fang Cheng[7], Mei-Shu Lai[2], San-Lin You[3,8] and Ann-Lii Cheng[1,4]

[1] Department of Oncology, National Taiwan University Hospital, Taipei, Taiwan
[2] Graduate Institute of Epidemiology, College of Public Health, National Taiwan University, Taipei, Taiwan
[3] Institute of Life Sciences, School of Public Health, National Defense Medical Center, Taipei, Taiwan
[4] Department of Internal Medicine, National Taiwan University Hospital, Taipei, Taiwan
[5] Department of Pathology, National Taiwan University Hospital, Taipei, Taiwan
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[7] Department of Obstetrics and Gynecology, National Taiwan University Hospital, Taipei, Taiwan
[8] Genomics Research Center, Academia Sinica, Taipei, Taiwan

Int. J. Cancer: **130**, 2629–2637 (2012) © 2011 UICC

The incidence of breast and genital tract cancers is increasing among Taiwanese women, but the age specificity and histopathological features of these cancers have not been determined. We used a descriptive epidemiological method and data from the Taiwan Cancer Registry (1979–2007) to examine secular trends in the age-specific incidences of female breast cancer, three major female genital tract cancers and the histopathological subtypes of these cancers. Age-specific incidence rates in the United States (1978–2002) were used as an external reference, and the incidence rates of all malignancies and of malignant brain tumors were used as internal references. We found that age-adjusted incidence rates of female breast, uterine, and ovarian cancers increased in Taiwan from 1979 to 2007, whereas the incidence of cervical cancer decreased after 1998. The largest increase was observed for ductal and lobular carcinomas of the breast and endometrioid carcinomas of the uterus and ovary in women ≤55 years, all of these tumors show a high prevalence of hormone receptor expressions. In addition, hormone-receptor-positive rates of breast cancer were uniquely higher in younger, as opposed to older, Taiwanese women. These findings indicate that estrogen-related cancers rapidly emerge in young women in Taiwan and that incidence rates are catching up with that of women living in the United States.

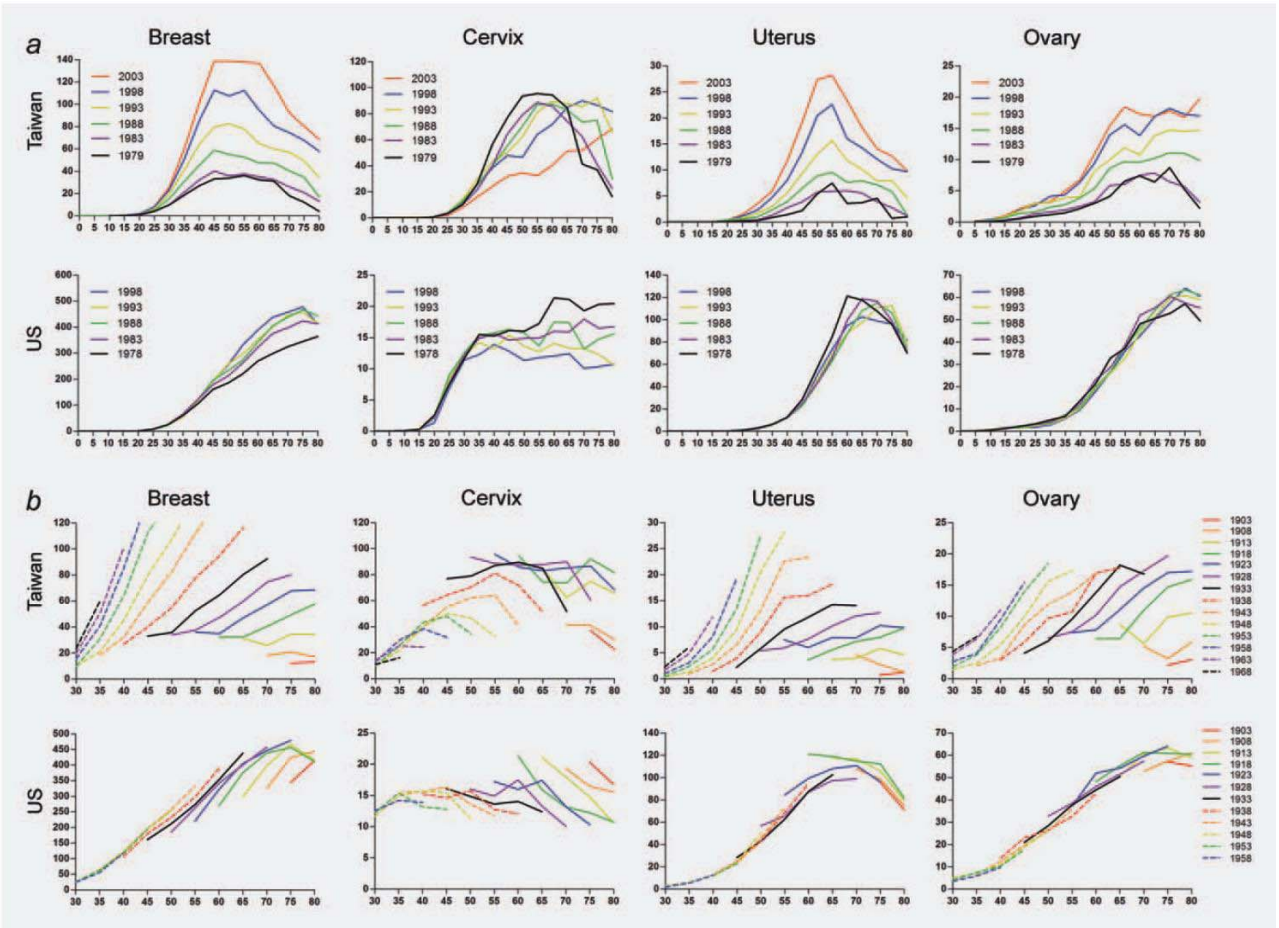


Figure 2. Age-specific incidence rates of breast, cervical, uterine and ovarian cancers by calendar year in Taiwan and US (*a*) and by birth cohort in Taiwan and the United States (*b*).

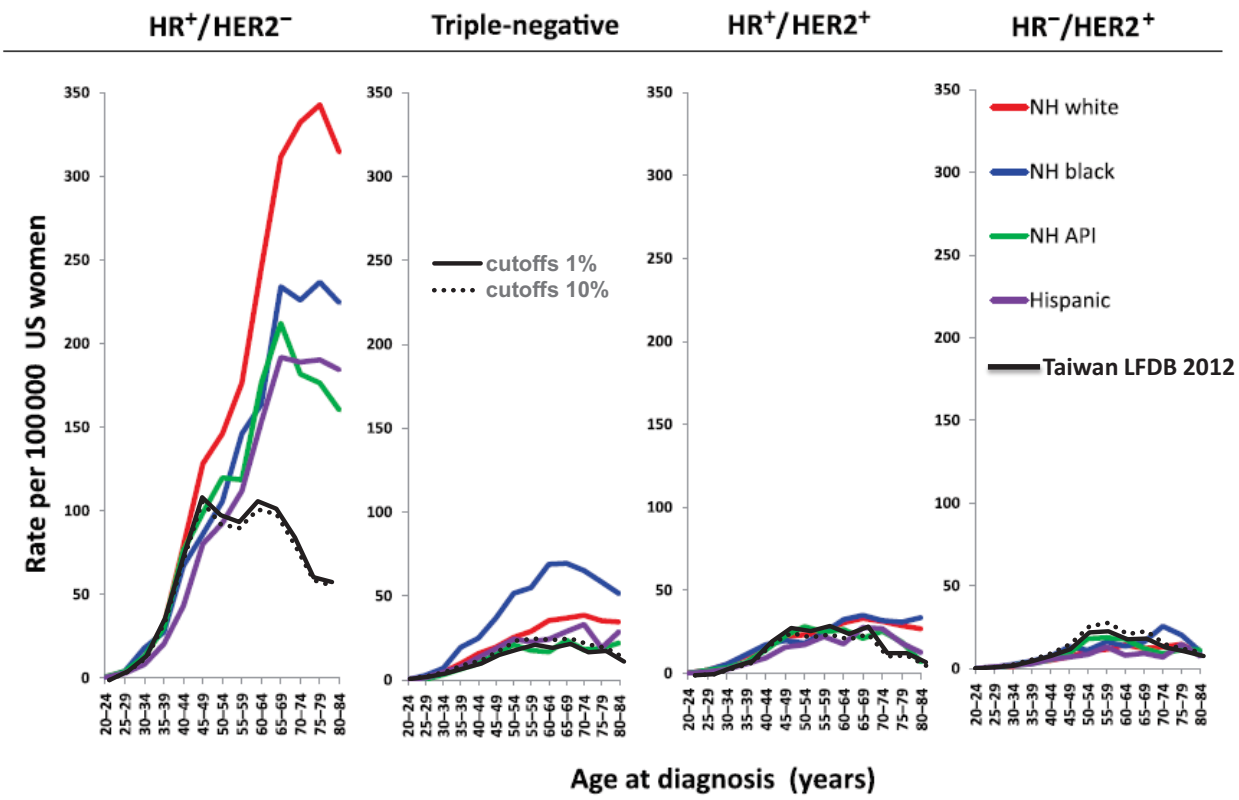


Figure 1. Age-specific incidence rates of breast cancer subtypes by race/ethnicity, Surveillance, Epidemiology, and End Resulsts 18, excluding Alaska, 2010. The 95% confidence intervals for incidence rates are presented in SupplementaryTable 3 (available online). API = Asian Pacific Islander; HER = human epidermal growth factor; HR = hormone receptor; NH = non-Hispanic.

Modified from Howlader N et al.; J Natl Cancer Inst. 2014;106:dju055.

The Oncologist®

Survival Following Surgery with or without Adjuvant Chemotherapy for Stage I–IIIA Non-Small Cell Lung Cancer: An East Asian Population-Based Study

ZHONG-ZHE LIN,[a,b,c] WEN-YI SHAU,[d] YU-YUN SHAO,[b] YEN-YUN YANG,[e] RAYMOND NIEN-CHEN KUO,[e,f] CHIH-HSIN YANG,[b,g] MEI-SHU LAI[e,f,h]

[a]Department of Oncology, National Taiwan University Hospital Yun-Lin Branch, City, Taiwan; [b]Department of Oncology, National Taiwan University Hospital, City, Taiwan; [c]Department of Internal Medicine, National Taiwan University College of Medicine, City, Taiwan; [d]Division of Health Technology Assessment, Center for Drug Evaluation (Taiwan), City, Taiwan; [e]Center for Comparative Effectiveness Research, Clinical Trial Center, National Taiwan University Hospital, City, Taiwan; [f]Taiwan Cancer Registry, City, Taiwan; [g]Graduate Institute of Oncology, National Taiwan University College of Medicine, City, Taiwan; [h]Institute of Preventive Medicine, College of Public Health, National Taiwan University, City, Taiwan

Key Words. Non-small cell lung cancer • Adjuvant chemotherapy • Asian ethnicity • Survival • Comparative effectiveness

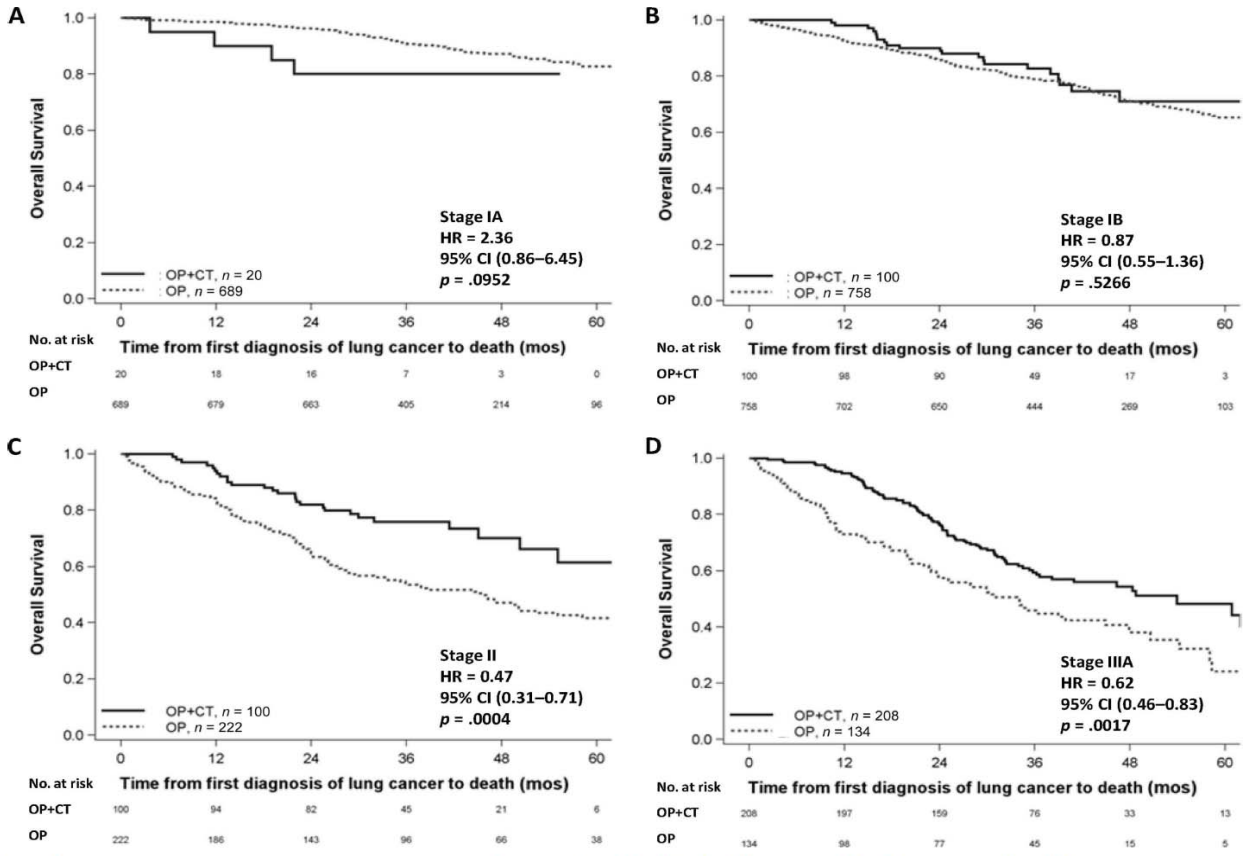


Figure 1. Overall survival of patients with resectable stage IA **(A)**, IB **(B)**, II **(C)**, and III **(D)** non-small cell lung cancer receiving primary surgery with or without adjuvant chemotherapy.

Abbreviations: CI, confidence interval; HR, hazard ratio; OP, surgery alone; OP+CT, surgery followed by adjuvant chemotherapy.

OPEN ACCESS Freely available online

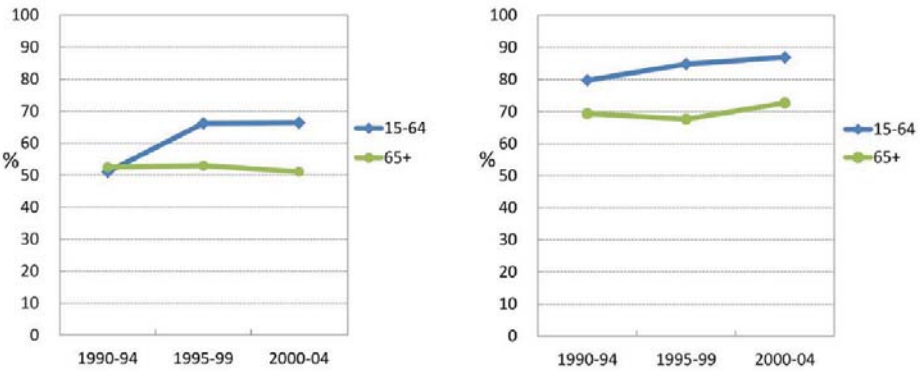
PLOS ONE

Improving but Inferior Survival in Patients with Chronic Lymphocytic Leukemia in Taiwan: A Population-Based Study, 1990–2004

Shang-Ju Wu[1,2], Chun-Ju Chiang[3,4], Chien-Ting Lin[1], Hwei-Fang Tien[1]*, Mei-Shu Lai[3,4]*

1 Division of Hematology, Department of Internal Medicine, National Taiwan University Hospital, Taipei, Taiwan, **2** Graduate Institute of Clinical Medicine, College of Medicine, National Taiwan University, Taipei, Taiwan, **3** Graduate Institute of Epidemiology and Preventive Medicine, College of Public Health, National Taiwan University, Taipei, Taiwan, **4** Taiwan Cancer Registry, Taipei, Taiwan

PLoS One. 2013; 8(4): e62930.



Taiwan (RS %)				
		Period		
		1990-94	1995-99	2000-04
Age	15-64	51.1	66.2	66.4
	65+	52.5	53.0	51.2

US (RS %)				
		Period		
		1990-94	1995-99	2000-04
Age	15-64	79.8	84.9	86.9
	65+	69.4	67.7	72.7

Figure 3. The 5-year relative survival estimates (%) of patients with CLL in different time periods among Taiwanese and the US patients.

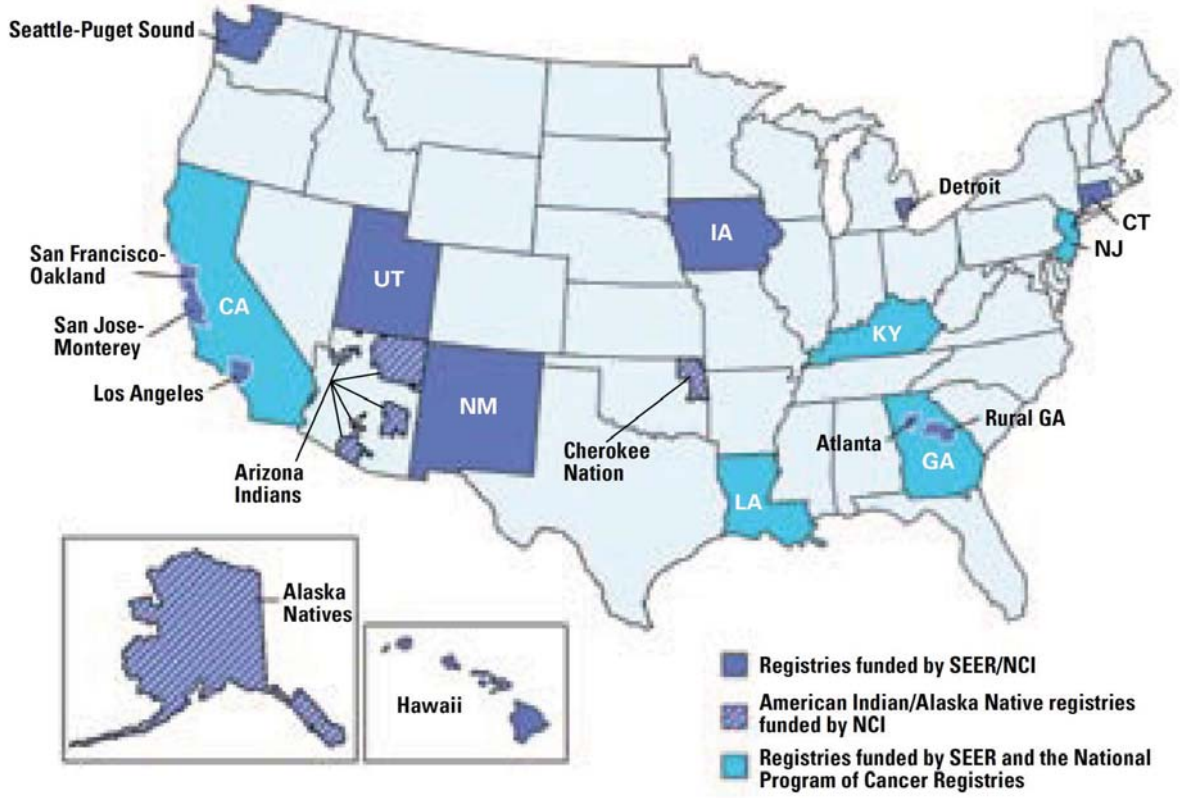
TOPIC V:

International Collaboration

Surveillance Epidemiology and End Results (SEER) Program

http://seer.cancer.gov

The SEER Program, funded by NCI since 1973 as a result of the National Cancer Act of 1971, collects these data on every case of cancer reported from 20 U.S. geographic areas. These areas (shown below) cover about 28% of the U.S. population and are representative of the demographics of the entire U.S. population.



National Program of Cancer Registries (NPCR)

http://www.cdc.gov/cancer/npcr/index.htm

CDC Centers for Disease Control and Prevention
CDC 24/7: Saving Lives, Protecting People™

SEARCH

CDC A-Z INDEX

National Program of Cancer Registries (NPCR)

NPCR
- Cancer Registries' Value for You +
- Cancer Data and Statistics Tools +
- About the Program +
- State-Specific Cancer Data Access Requirements for Research
- Comparative Effectiveness Research Data Collection Enhancement Project
- Meaningful Use of Electronic +

CDC > Cancer Home

National Program of Cancer Registries (NPCR)

NPCR NATIONAL PROGRAM OF CANCER REGISTRIES

Data collected by local cancer registries enable public health professionals to understand and address the cancer burden more effectively. CDC provides support for states and territories to maintain registries that provide high-quality data.

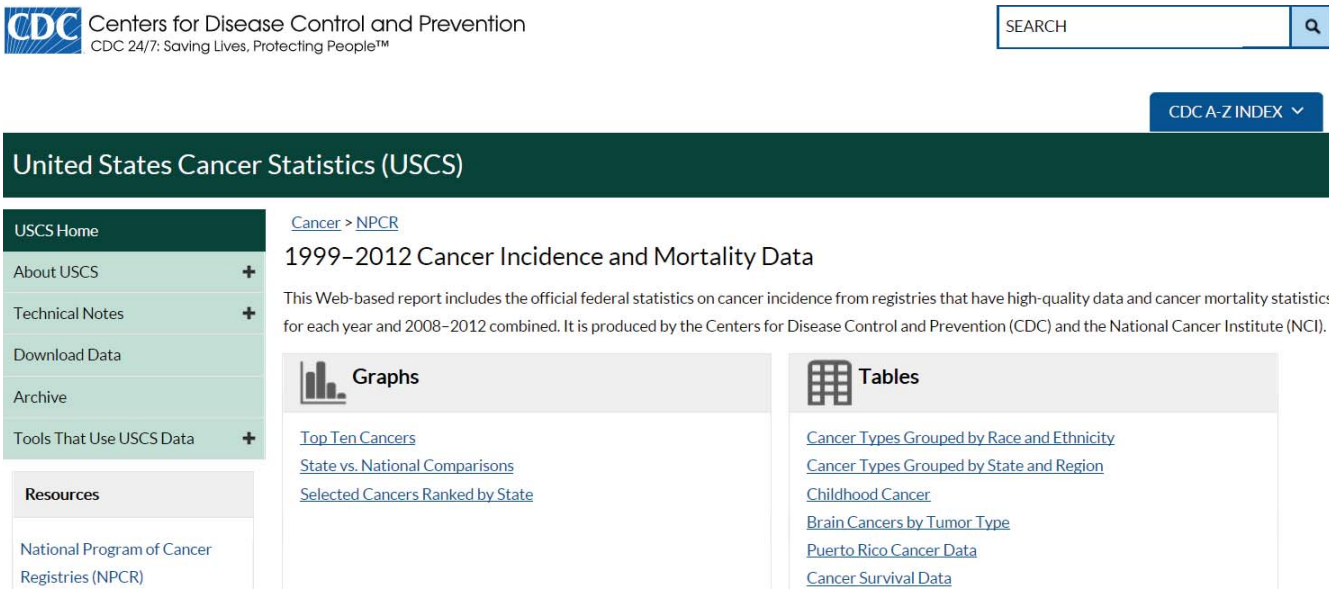
Contact Your Local Registry

Find contact information for registries in all 50 states, the District of Columbia,

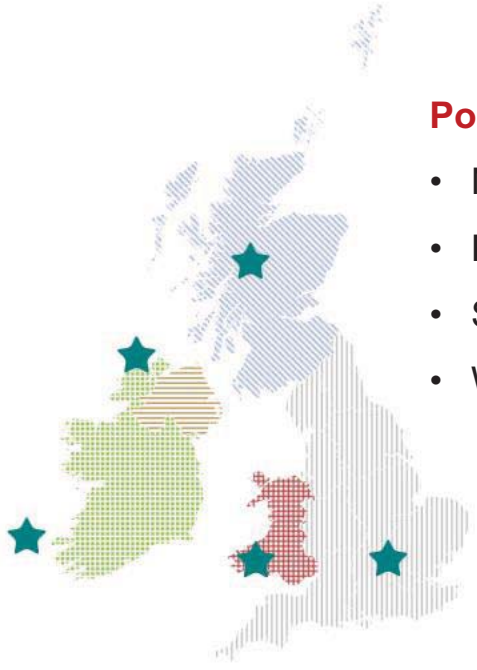
CDC's Latest Research

- Evaluating early case capture of pediatric cancers in 7 central cancer registries

Today, through NPCR, CDC supports central cancer registries in 45 states, the District of Columbia, Puerto Rico, and the U.S. Pacific Island Jurisdictions. These data represent 96% of the U.S. population.



UK Cancer Registries



Population-based Cancer Registries in UK:

- Northern Ireland Cancer Registry
- Public Health England
- Scottish Cancer Registry
- Welsh Cancer Intelligence and Surveillance Unit

Population Coverage = 100%

UK Cancer Statistics

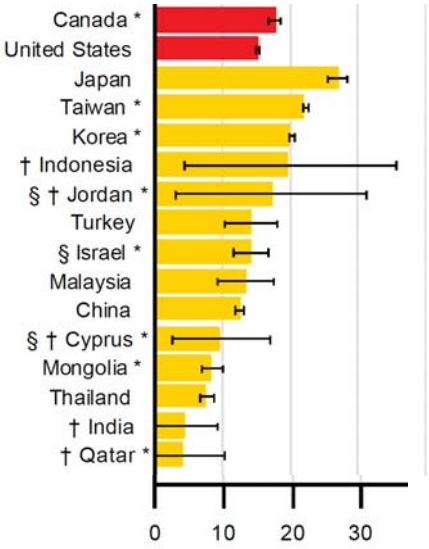
http://publications.cancerresearchuk.org/publicationformat

International Collaboration

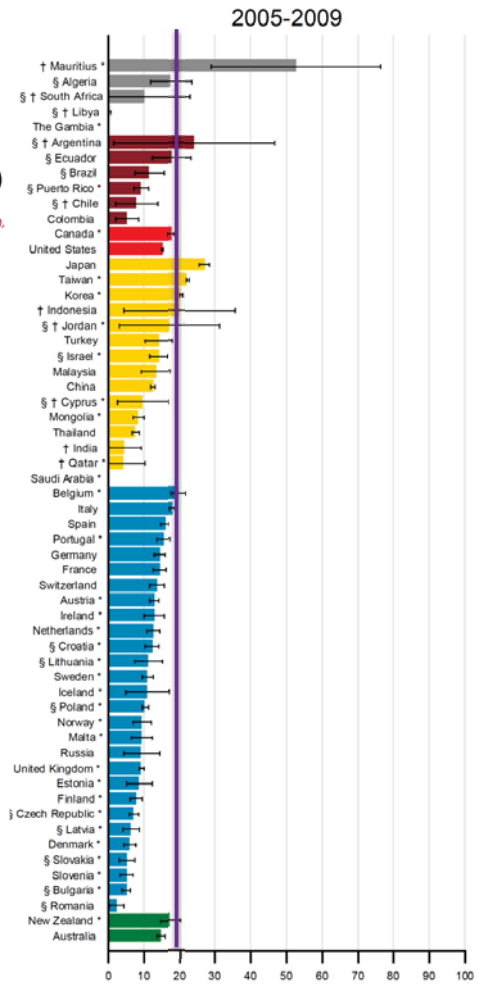
Global surveillance of cancer survival 1995–2009: analysis of individual data for 25 676 887 patients from 279 population-based registries in 67 countries (CONCORD-2)

*Claudia Allemani, Hannah K Weir, Helena Carreira, Rhea Harewood, Devon Spika, Xiao-Si Wang, Finian Bannon, Jane V Ahn, Christopher J Johnson, Audrey Bonaventure, Rafael Marcos-Gragera, Charles Stiller, Gulnar Azevedo e Silva, Wan-Qing Chen, Olufemi J Ogunbiyi, Bernard Rachet, Matthew J Soeberg, Hui You, Tomohiro Matsuda, Magdalena Bielska-Lasota, Hans Storm, Thomas C Tucker, Michel P Coleman, and the CONCORD Working Group**

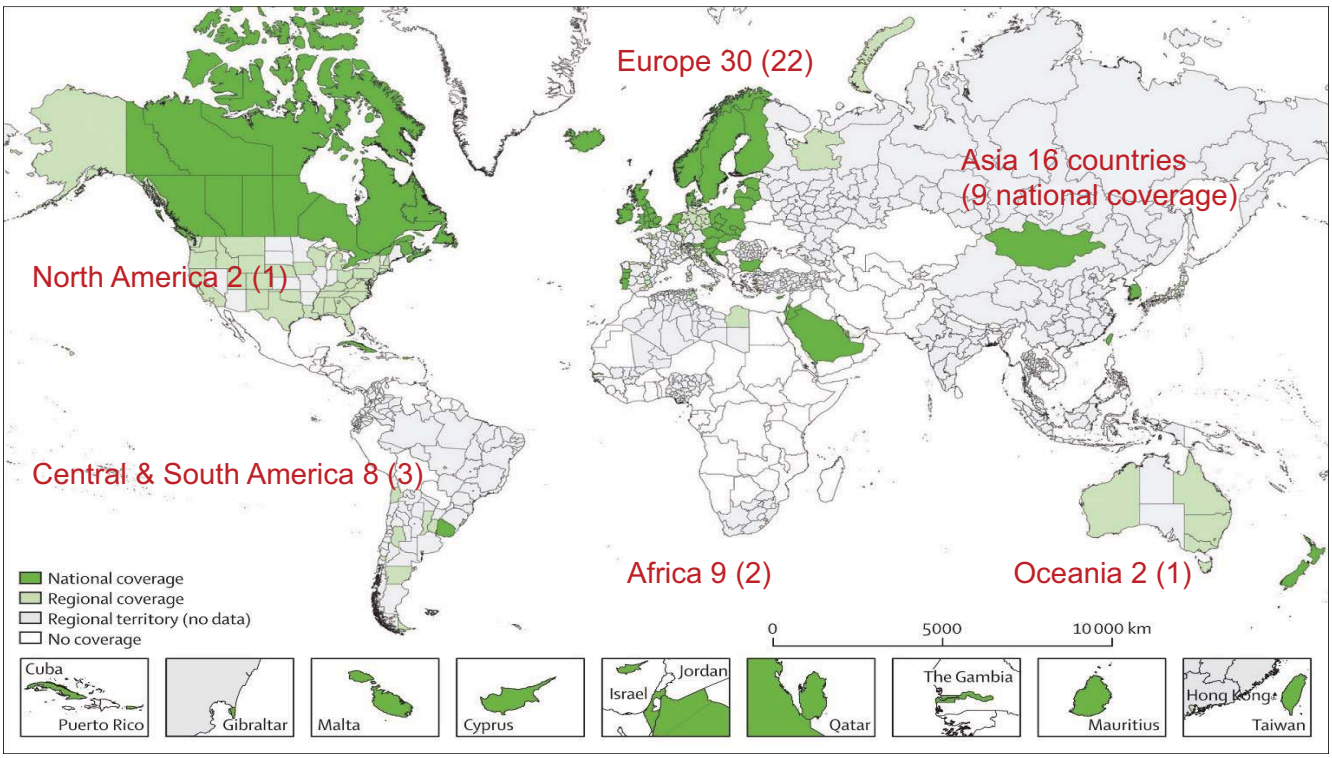
Lancet 2015; 385: 977-1010



5-year Survival for Liver cancer:
- Japan 27% NO.1
- Taiwan 22% NO.2



71



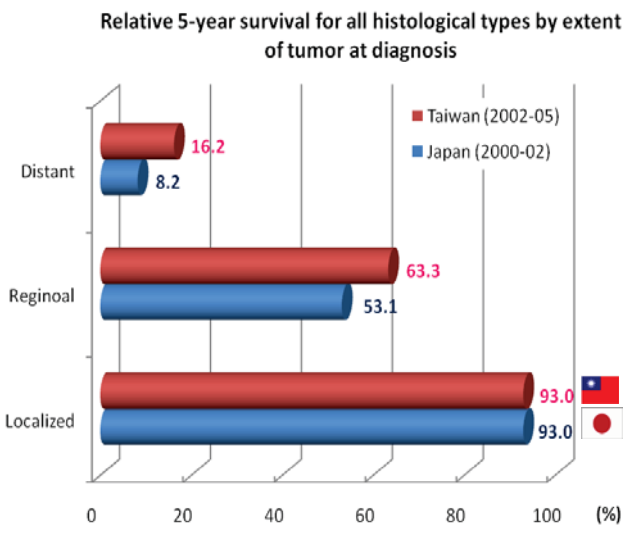
- **Ovarian Cancer: NO.1 (5-year survival = 46%)**
  Cervical Cancer: NO.2 (5-year survival = 74%) followed by South Korea (77%)
- **Stomach Cancer: NO.3 (5-year survival = 36%) followed by South Korea (58%) & Japan (54%)**
- **Breast/Colorectal Cancer: similar with developed countries**
- **Prostate Cancer: fall behind 5-20% than developed countries**
- **Lung Cancer: (5-year survival = 14%) fall behind 15% than Japan (NO.1)**

72

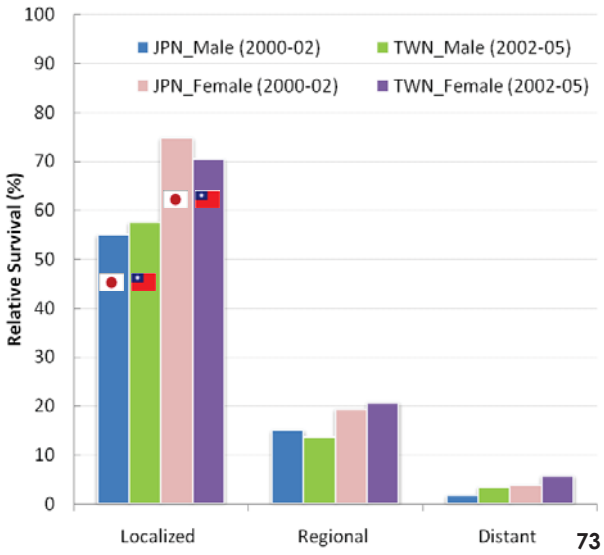
Collaborative study of descriptive cancer epidemiology in Japan and Taiwan, 2012-2013

Comparison of cervical and female lung cancer survivals between Japan and Taiwan

Cervical Cancer



Lung Cancer



TOPIC VI:

Data Linkage with Health Information Database

ORIGINAL ARTICLE

Treatment of patients with dual hepatitis C and B by peginterferon α and ribavirin reduced risk of hepatocellular carcinoma and mortality

Chun-Jen Liu,[1,2] Yu-Tseng Chu,[3,4] Wen-Yi Shau,[2] Raymond N Kuo,[3,4] Pei-Jer Chen,[1,2] Mei-Shu Lai[3,4,5]

What is already known on this subject?

- Hepatitis C virus (HCV)–hepatitis B virus (HBV) dually-infected patients have a significantly higher (two to threefold) risk of developing hepatocellular carcinoma (HCC) than those with either infection alone.
- In the previous controlled trial, the sustained virological response following the completion of combination therapy with peginterferon and ribavirin was similar in HCV–HBV dually-infected patients and in HCV mono-infected patients.
- Among patients with chronic hepatitis C only, peginterferon plus ribavirin therapy not only cured HCV infection in the short term but significantly decreased the risk of HCC and liver-related mortality.

What are the new findings?

- The first evidence shows that combination therapy decreased the risk of developing HCC and improved survival in HCV–HBV dually-infected patients.
- The presence of HBV co-infection was still a risk factor for HCC development in patients with chronic HCV infection even after pegylated interferon and ribavirin therapy.
- Treatment was associated with an increase in the incidence of thyroid dysfunction and mood disorders; however, the risk of mood disorders decreased gradually after ceasing anti-HCV therapy.

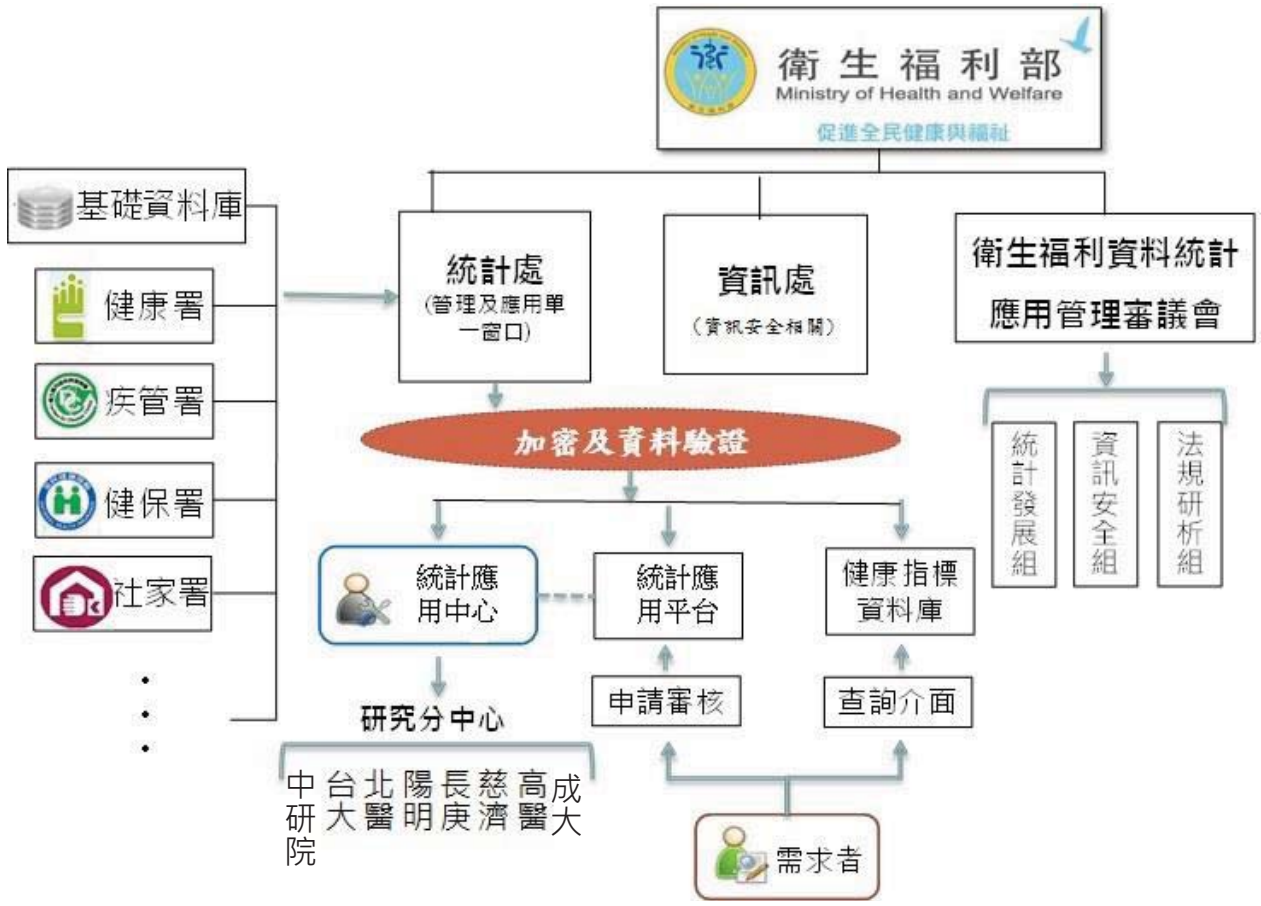
Gut 2014;63:506–514.

Health and Welfare Statistics Application Center (HWSAC), MOHW

衛生福利資料科學中心

http://www.mohw.gov.tw/CHT/DOS/DM1.aspx?f_list_no=812

- 「衛生福利資料科學中心」之建置目標便為將個別健康資料予以加值以產生具應用價值之集體資訊，以促進公共衛生決策品質、相關學術研究及醫療保健服務業等相關產業研發創新之參據，用以增進全民福祉。整合之資料除了**公共衛生與醫療保健**資料之外，亦含與**健康相關之資料（如社會、經濟與地理資訊**等）；而加值應用服務範圍應至少包括公共衛生決策、相關學術研究、醫療保健服務業與相關產業研發創新。
- 且為因應資訊公開及個人資料合理利用，並建立使用者付費之成本觀念，使資料之使用、對外提供及收費有所規範，特參考「政府資訊公開法」、「個人資料保護法」及其施行細則，依據本中心實際作業需要，訂定相關執行規則。



資料庫種類--個人健康狀況(以公務檔案為主)

出生/死亡	身心/功能障礙
1. 出生通報檔 2. 死因統計檔 3. 多重死因統計檔 4. 延遲申報死因檔 5. 延遲申報多重死因檔	1. 健保重大傷病檔※# 2. 身心障礙資料庫※*
疾病/傷害	**其他**
1. 健保申報明細及醫令檔# 2. 癌症登記檔(LF,SF,TCDB) 3. 癌症登記年報檔 4. 癌篩資料庫-乳癌、子宮頸癌、口腔癌、大腸癌 5. 罕見疾病通報資料庫 6. 交通事故傷害檔(BASn,PSNn) 7. 遺傳疾病資料庫*	1. 醫事機構現況檔 2. 醫院醫療服務量檔 3. 醫事機構基本資料檔 4. 專科醫師證書主檔 5. 醫療院所評鑑等級檔 6. 醫事人員基本資料檔

註：*尚在進行驗證之檔案；※需資料提供單位授權同意方可申請使用；#限於本部協作中心使用

資料庫種類--影響健康之因素(以統計調查為主)

健康行為		
1. 國民健康訪問調查	3.吸菸調查檔	5.健康行為危險因子監測調查*
2. 青少年健康行為調查	4.三高調查檔	

個人家庭	
1. 健保承保檔	4.人工生殖資料庫
2. 台灣出生世代調查	5.200萬人抽樣檔及個人屬性抽樣檔
3. 家庭與生育率研究調查	

族群	
1. 低收入戶及中低收入戶名冊檔※*	7.少年身心狀況調查*
2. 原住民檔(出生,死亡,戶籍)※	8.老人狀況調查*
3. 中老年身心社會生活狀況調查檔	9.低收入戶生活狀況調查*
4. 老人福利機構需求概況調查*	10.身心障礙者生活需求調查表*
5. 居家服務補助使用者狀況調查檔*	11.婦女生活狀況調查*
6. 居家服務補助使用者滿意度調查*	12.單親家庭狀況調查*

註：*尚在進行驗證之檔案; ※需資料提供單位授權同意方可申請使用

統計應用範圍

- Evidence-Based Health Policy 研究

政策與決策	• 使相關政策擬定與計畫評價有客觀數據依據 • 進行健康資訊與衛生決策相關學術研究
醫務管理	• 品質、資源配置、成效分析，與相關學術研究
流行病學	• 找出各種疾病盛行率、發生率、危險因子，與相關學術研究
臨床醫學/護理	• 疾病臨床表現、關聯性和最佳檢查方法、治療及照護模式(包括藥物、器材及手術)，作為臨床決策之參考或相關學術研究

Thanks for your attention and welcome discussion

- **National Cancer Registry Center**
- **College of Public Health, NTU**
- **National Taiwan University**
- **Health Promotion Administration, MOHW**