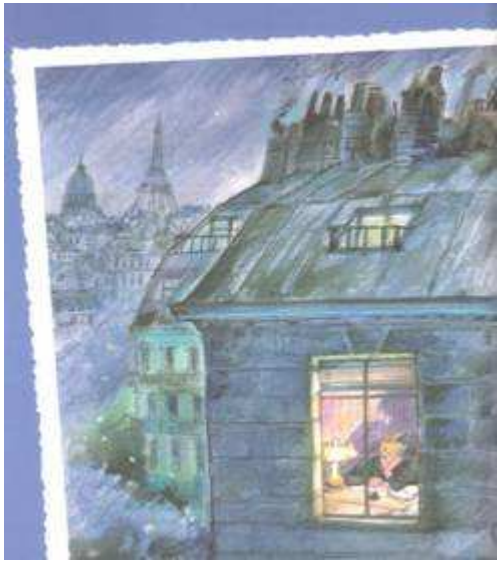
I.N.T.



sistemi per la definizione automatica dell’incidenza

I.N.T.

perché si decide di automatizzare un registro ?

per essere più efficienti

I.N.T.

confronto dei sistemi

- presentazione dei sistemi
- valutazione di qualità

I.N.T.

informazioni prodotte

- anagrafiche
- cliniche

I.N.T.

qualità da conservare

- completezza
- accuratezza

I.N.T.

gli algoritmi dei sistemi automatizzati si basano su sequenze di codici derivati dalle fasi precedenti di lavoro del registro

analizzano sequenze di questo genere:

ap sdo sdo m

1744 1744 V10.3, 1985 1991

- quali difficoltà incontrano gli algoritmi di risoluzione automatica dei casi ?

- a) informazioni discordanti
- b) informazioni insufficienti

I.N.T.

a - informazioni discordanti ?

soggetto	ap	sdo	m
1	1623	1744	1991
2	1533	1540	
3	1625	1991	1629

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b - informazioni non sufficienti ?

soggetto	ap	sdo	m
1	1629		
2		1540	
3	1624	1991	1970
4		1629	

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limitazioni introdotte da tutti i sistemi:

- generazione di dati per la sede alla terza cifra icd_9
- generazione della morfologia con dati approssimati secondo i gruppi di Berg o simili

I.N.T.

registri automatici

1. Danimarca, Arhus County
2. Ontario,Canada
3. Veneto
4. Friuli Venezia Giulia
5. Open Registry

I.N.T.

registri	software
danimarca	sir,sas
ontario	
veneto	sas
friuli venezia giulia	sas
open registry	oracle,c++

I.N.T.

gli algoritmi: regole per la gestione automatica dei casi

I.N.T.

registro della danimarca, contea di arhus: casi accettati in automatico

HDR=SDO
DC=M
PR=AP

Table 7.5. Match types and action in case resolution Denmark (Århus county 1990) (Ministry of Health, 1995)

Match type	Description	Action
A1	One entry in HDR/DC and at least one match in the PR	Accept case, code to matched diagnosis
A2	Several entries in HDR/DC, only match to one in the PR	Accept case, code to PR diagnosis
B	Several entries in HDR/DC, several in PR, at least two match	Accept case, code to most specific diagnosis
C	One or more entries in HDR/DC with one or more in PR, all discordant	Resolve manually
D	One or more entries in PR only	Accept case if PR record labelled 'primary', otherwise reject case
E1	One entry in HDR/DC only	Accept case
E2	Several entries in HDR/DC only	Resolve manually
F	No entry in either HDR/DC or PR (but present in national register)	Used for validation
G1	Multiple primaries in CR alone	"
G2	Multiple primaries in HDR/DC and PR	"
G3	Multiple primaries in both CR, HDR/DC and PR	"

automated data collection in cancer registration, IARC,tech rep n 32,1998,

I.N.T.

registro del veneto:
casi accettati in automatico

eur.j.of pub.health, 2005, tognazzo et al

I.N.T.

registro del veneto: casi accettati in automatico

- *pathology records, hospital discharge records and/or death certificate*: when the primary cancer registered is taken from pathology records and hospital discharge diagnoses or cause of death
  —give the same three-digit ICD-IX code indicated by the pathology diagnosis or
  —give only metastasis or an ill defined or unknown primary site or
  —give a 'compatible' primary site, close to that indicated by pathology (i.e., colon is compatible with rectum);

eur.j.of pub.health, 2005,
tognazzo et al

I.N.T.

registro del veneto: casi accettati in automatico

- *pathology records only*, reporting a single cancer with a well defined primary site;
- *hospital discharge records and death certificate*: the registered cancer is reported in the first source; the second is concordant or reports metastasis.

eur.j.of pub.health, 2005, tognazzo et al

I.N.T.

veneto: esempi

caso	ap	sdo	m	decisione
1	174	174	174	accettato
2	174	199		accettato
3	153	154		accettato (153)
4	153			accettato
5	-	153	199	accettato
6		199	153	rigettato

cortesia dott sandro tognazzo

I.N.T.

registro del friuli venezia giulia: casi accettati in automatico

cortesia dott margherita de dottori

3. applicazione dei criteri di **concordanza** (si fa utilizzo della codifica internazionale ICD-IX alla terza cifra). Nella fase iniziale vengono considerate le seguenti ipotesi:
   - tutte le diagnosi sono basate solo su fonte ospedaliera (H) o solo su fonte decesso (M) -> *rigettato*;
   - le diagnosi sono basate su più fonti o solo su fonte di anatomia patologica (AP) ed ho un singolo codice ICD-IX concordante tra le fonti -> *accettato*;
   - le diagnosi sono basate su più fonti o solo su fonte di anatomia patologica (AP) ed ho più di un singolo codice ICD-IX:
     - ✓ qualsiasi tumore non maligno (ICD-IX 210-239) basato su AP -> *accettato, non bloccante*;
     - ✓ qualsiasi tumore della pelle non melanotico (ICD-IX 173) basato su AP -> *accettato, non bloccante*;
     - ✓ fonte H + M: qualsiasi maligno primario (ICD-IX 140-195, 199-208) basato su H, in presenza di metastasi (ICD-IX 196-198), concordante con H -> *accettato*;

si accetta in automatico anche :

- ✓ maligni **mammella** femminile (ICD-IX 174) e **sede mal definita apparato respiratorio** (ICD-IX 165), entrambe basate su AP -> *accettato, con esclusione di diagnosi prevalenti discordanti*;
- ✓ **metastasi** apparato respiratorio (ICD-IX 197) o altre sedi (ICD-IX 198), in presenza di **sede sconosciuta** (ICD-IX 199), entrambe basate su AP -> *accettato, con esclusione di diagnosi prevalenti discordanti*;
- ✓ **maligni primari multipli**, di cui uno basato su AP, gli altri compatibili basati su H e/o M. Le diagnosi di sede mal definita e/o metastasi non portano a discordanza (ICD-IX 195-199) -> *accettato, con esclusione di diagnosi prevalenti discordanti;*

- un singolo codice ICD-IX concordante tra le fonti in seguito applicazione criteri non bloccanti -> *accettato, con esclusione di diagnosi prevalenti non discordanti.*

4. applicazione dei criteri di **revisione** il sistema identifica i soggetti che richiedono comunque la revisione dell'attribuzione automatica:
   - soggetti con diagnosi concordanti su tumori rari, pleura o peritoneo (ICD-IX 158, 163);
   - soggetti con diagnosi di linfoma o leucemia senza anatomia patologica da cui poter ricavare la morfologia (ICD-IX 200-208);
   - soggetti con diagnosi di metastasi (possibili prevalenti) (ICD-IX 196-198);
   - soggetti con diagnosi non concordanti su tumori della pelle (ICD-IX 172 e 173).

I.N.T.

registro dell'Ontario : casi accettati in automatico

Table 7.2. Ontario case summarization procedures

Step	% resolved*	Action
0. No discordance	39%	Select concordant site code
1. Site level	12 %	Selects specific site codes in preference to non-specific (e.g. 195–199) codes
2. Site branching	22%	Selects the most specific site code within 13 organ families
3. Source (4 digit site)	7%	Selects the site from the most reliable information source if equally specific site codes appear in one organ family
4. Non-specific site table	2%	If discordant site codes within the same organ family are present in records from the same information source, then the least specific or a non-specific code for that organ family is selected
5. Same histology table	19%	If morphology codes are from different morphological families (table 4.2) the case is defined as multiple primary cancer
6. Source (3 digit site)	12%	If sites differ at the 3-digit level of ICD and morphology codes are within the same morphological family, the site code from the most reliable source is selected
7. Restricted site–histology table	<1%	Selects the most probable site for some tumours which are site specific (eg retinoblastoma)
8. Indefinite site table	1.3%	Unresolved cases coded to site indefinite sites
9. 199 site table	0.8%	If still unresolved, then coded to unknown primary (ICD code 199)

* The sum of these percentages exceeds 100%, as some cases require multiple steps for successful resolution.

automated data collection in cancer registration,IARC,tech rep n 32,1998

registro dell’Ontario :
casi accettati in automatico

- la stessa fonte riporta

  153.1 154.1 -> 153.9

- ap sdo

  1730 1409 -> 1730 (nr)

- 2 primari diversi, stessa istol, stessa fonte -> 199

Iarc sc pub n. 95,

I.N.T.

open registry:
casi accettati in automatico

- Algorithm (a) (concordant code check). This algorithm checks whether the first three digits of the ICD-9 code agree in all source records. If they do, all records for the case are considered fully concordant and the computation stops; if not the algorithm passes the case records to algorithm (b).

population health metrics,2006,
tagliabue et al

I.N.T.

open registry: casi accettati in automatico

- Algorithm (b) (elimination of generic site codes). If the codes are split between site-specific and generic ones, the algorithm attempts to eliminate the generic code (e.g. 146 over 1499) using a hierarchic table developed in-house, linking specific and generic sites, and also using if necessary the information provided by the fourth digit. If after eliminations, all the remaining codes now agree the case is considered concordant and the computation stops; otherwise the algorithm passes the case records to algorithm (c).

population health metrics,2006,
tagliabue et al

I.N.T.

open registry:
casi accettati in automatico

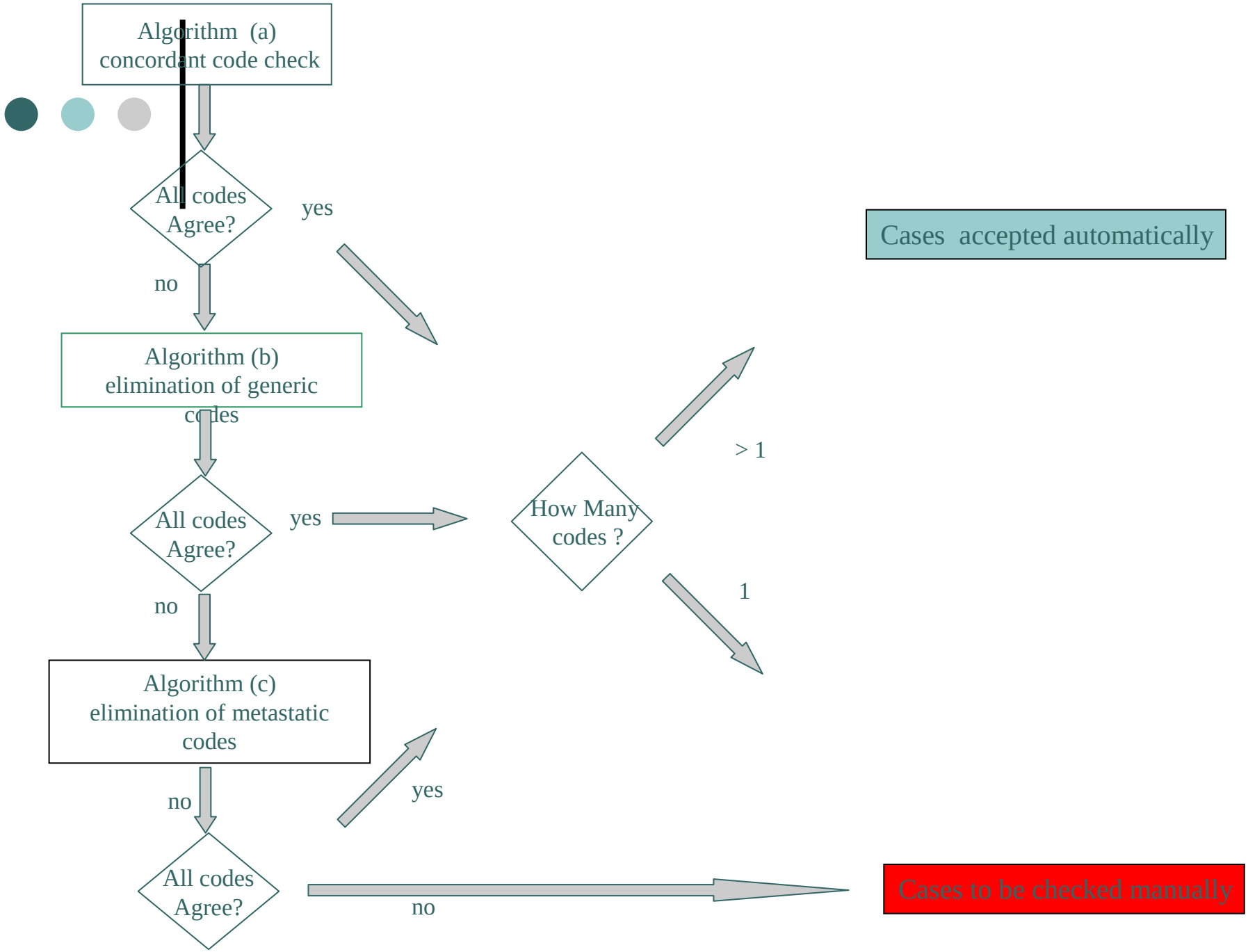
- Algorithm (c) (elimination of metastatic and ill-defined site codes). The algorithm eliminates metastatic site codes when compatible generic or specific codes are present (e.g. 1970 over 162). If the remaining codes are now the same the case is considered concordant; otherwise it is tagged as not concordant.

population health metrics,2006,
tagliabue et al

Open registry

- For cases without a previous cancer diagnosis, one of three categories is assigned by Open Registry: multiple concordant incident (**MCI**), unique incident (**UI**), or non concordant multiple incident (**NMI**).

The program is set up to **automatically accept** records assigned as **MCI** and also those with a single instance (i.e. status UI) of code 173 (skin non melanoma) on a pathology report. Records assigned **NMI or UI** with code other than 173 on the pathology report, are **tagged for manual review.**


Algorithm (a)
concordant code check
All codes
Agree?
yes
no
Cases accepted automatically
Algorithm (b)
elimination of generic
codes
All codes
Agree?
yes
How Many
codes ?
> 1
1
no
Algorithm (c)
elimination of metastatic
codes
no
yes
All codes
Agree?
no
Cases to be checked manually

I.N.T.

open registry: esempi

caso	ap	sdo	m	decisione
1	153	153, 197	1599	**accettato**
2	165	162 ,165	-	**no suff inf, rigettato**
3	162	162, 197	165	**accettato**
4	162	162, 174	199	**info disc, rigettato**

qualità del registro:

- database completo
- diagnosi accurate
- efficienza

I.N.T.

completezza

completezza

danimarca

metodo: confronto con registrazione manuale
numero di casi analizzati: 2740
casi persi: 10 %

automated data collection in cancer registration,IARC,tech rep n 32,1998

I.N.T.

completezza

ontario

metodo : capture-recapture
casi persi : 4.75 %

j clin epidemiology 1988, robles et al

I.N.T.

completezza

Open Registry

metodo : confronto con rilevazione manuale numero di casi analizzati: 5096

J biomed Inform, 2008,Contiero et al

I.N.T.

completezza

Open Registry

1.3%

Table 3
Comparison of cases found by the automated and manual systems

Manual system	Automated system		
	Not present	Found	Totals
Not present	Not valuable	504	504
Found	69	4523	4592
Totals	69	5027	5096

Automated system data are in columns; manual system data are in rows.

J biomed Inform, 2008,Contiero et al

I.N.T.

completezza

Open Registry

analisi per sede

Table 4
Completeness of cancer registration according to site

Site code	Anatomical location	Total number of cases	Number and percentage of cases not registered
142	Major salivary glands	6	1 (17%)
150–154	Digestive organs	903	5 (0.5%)
155–157	Liver and bile ducts	307	6 (1.9%)
160–162	Respiratory organs	619	7 (1.1%)
172	Melanoma	86	2 (2.3%)
173	Skin (non-melanoma)	623	15 (2.4%)
174	Breast	600	5 (0.8%)
182–183	Uterus and ovary	173	3 (1.7%)
184	Other female genital organs	23	1 (4.3%)
185	Prostate	385	6 (1.5%)
188–189	Urinary tract	377	6 (1.6%)
191	Brain	56	2 (3.6%)
200–208	Lymphatic and hematopoietic tissue	373	10 (2.7%)
Total		5096	69 (1.3%)

Only sites with incomplete registration are reported.

I.N.T.

completezza

Open Registry

Table 5
Reasons for non-registration by Open Registry

Reason for non-registration	Number of cases	Total (%)
No source data	11	0.2
Failed linkage	9	0.16
Benign instead of malignant code	9	0.16
Incidence record dated 1998 although diagnosed in 1997	40	0.8
Total	69	1.3

completezza

tutti i registri manuali

casi persi : 2.2% – 41 %

int j epidemiol, 1988; int j epidemiol, 1993; eur j cancer, 1994; j epidemiol com health, 1995; eur j cancer prev, 2001 ;eur j canc prev, 2003; med care, 2004 ; j clin epid, 2006.

I.N.T.

accuratezza

accuratezza

danimarca

metodo :confronto
con registro manuale

numero di casi
analizzati: 2740

I.N.T.

Table 7.6. Agreement between the constructed main groups for morphology and site between the Cancer Registry and the Registry based on Hospital Discharge Registry (HDR), National Death Index (DC) and the Pathology Registry (PR).(Ministry of Health, 1995, Storm *et al.*, 1996)

	Match type	No. of persons	Agreement topography (3-digit ICD)	Agreement morphology (in 75 morphology families)	Agreement topography + morphology
A1	One entry in HDR/DC and at least one match in the PR	1351	1335 98.8%	1179 87.3%	1169 86.5%
A2	Several entries in HDR/DC, only match to one in the PR	341	289 84.8%	288 84.5%	252 73.9%
B	Several entries in HDR/DC, several in PR, at least two match	64	54 84.4%	55 85.9%	48 75.0%
C	One or more entries in HDR/DC with one or more in PR, all discordant	111	54 48.6%	84 75.7%	40 36.0%
D	One or more entries in PR only	157	153 97.5%	144 91.7%	143 91.1%
E1	One entry in HDR/DC only	229	212 92.6%	– –	– –
E2	Several entries in HDR/DC only	72	– –	– –	– –

* The topography from HDR/DC and the morphology from PR was selected for this comparison. Match types C and E2 were not used to create registration records

accuratezza

veneto

metodo :
revisione manuale

numero di casi
analizzati: 1539

I.N.T.

Table 2 Outcome of manual revision of cases

Level of discordance with site and morphology codes automatically assigned	Number of subjects				Total
	Confirmed as incident cases 1990–1994	Redefined as prevalent cases	Resident outside the registered area	False positive	
None	1206 (78.4%)[a]	24 (1.6%)	–	–	1230 (79.9%)
Low	113 (7.3%)[b]	16 (1.0%)	1 (0.1%)	–	130 (8.4%)
Medium	86 (5.6%)	2 (0.1%)	–	–	88 (5.7%)
High	51 (3.3%)	1 (0.1%)	–	–	52 (3.4%)
Maximum	–	–	–	39 (2.5%)	39 (2.5%)
Total	1456 (94.6%)	43 (2.8%)	1 (0.1%)	39 (2.5%)	1539 (100%)

a: Fourteen subjects had also a second primary cancer not registered
b: One subject had also a second primary cancer not registered

I.N.T.

Table 3 Distribution of prevalent cases by diagnostic evidence

Diagnostic evidence	Prevalent cases		Total cases
	N	%	
Pathology only, Pathology and other(s) source(s):	13	1.1%	1163
Female breast (174)	4	2.4%	166
Prostate (185)	–	–	65
Larynx (161)	–	–	28
Rectum, skin melanoma, uterus, bladder (154,172,179,180,182,188)	1	0.5%	204
Stomach, colon, lung, kidney (151,153,162,189)	5	1.5%	341
Other sites	3	0.8%	359
Hospital discharge and death certificate:	30	8.0%	376
Female breast (174)	14	51.9%	27
Prostate (185)	4	26.7%	15
Larynx (161)	3	100.0%	3
Rectum, skin melanoma, uterus, bladder (154,172,179,180,182,188)	5	20.0%	25
Stomach, colon, lung, kidney (151,153,162,189)	4	2.8%	145
Other sites	–	–	161
Total	43	2.8%	1539

I.N.T.

Table 4 Variables significantly correlated with discordance levels proportions ($\alpha = 0.01$)

Explanatory variable	Modality	No. of cases by discordance level					Regression coefficient (a) (Standard error)
		None or low	Medium	High	Maximum	Total	
Number of concordant sources							
	1	459	74	44	30	607	
		76%	12%	7%	5%	100%	
	2	740	14	7	9	770	
		96%	2%	1%	1%	100%	
	3	161	—	1	—	162	
		99%	—	1%	—	100%	

I.N.T.

Table 4 Variables significantly correlated with discordance levels proportions ($\alpha = 0.01$)

Explanatory variable	Modality	No. of cases by discordance level					Regression coefficient (a) (Standard error)
		None or low	Medium	High	Maximum	Total	
Base of diagnosis							
	1. Clinical, diagnosed during terminal hospitalization	168	3	7	5	183	
		92%	2%	4%	3%	100%	
	2. Clinical, diagnosed before terminal hospitalization	188	1	2	2	193	
		97%	1%	1%	1%	100%	
	3. Cytological	59	30	22	8	119	
		50%	25%	18%	7%	100%	
	4. Histological	945	54	21	24	1.044	
		91%	5%	2%	2%	100%	

I.N.T.

Table 4 Variables significantly correlated with discordance levels proportions ($\alpha = 0.01$)

Explanatory variable	Modality	No. of cases by discordance level					Regression coefficient (a) (Standard error)
		None or low	Medium	High	Maximum	Total	
Presence of compatible primary sites							
	0 (No)	1.060	24	40	31	1.155	
		92%	2%	3%	3%	100%	
	1 (Yes)	300	64	12	8	384	
		78%	17%	3%	2%	100%	

I.N.T.

Table 4 Variables significantly correlated with discordance levels proportions ($\alpha = 0.01$)

Explanatory variable	Modality	No. of cases by discordance level					Regression coefficient (a) (Standard error)
		None or low	Medium	High	Maximum	Total	
Primary site uncertain (PSU) (ICD-IX 159,165,195,199)							
	0 (No)	1.351	65	27	37	1.480	
		91%	4%	2%	3%	100%	
	1 (Yes)	9	23	25	2	59	
		15%	39%	42%	3%	100%	

I.N.T.

Table 4 Variables significantly correlated with discordance levels proportions ($\alpha = 0.01$)

Explanatory variable	Modality	No. of cases by discordance level					Regression coefficient (a) (Standard error)
		None or low	Medium	High	Maximum	Total	
Primary site female breast							
	0 (No)	1.171	86	52	37	1.346	
		87%	6%	4%	3%	100%	
	1 (Yes)	189	2	–	2	193	
		98%	1%	–	1%	100%	

I.N.T.

Table 5. Point estimates and 95% Confidence intervals for the proportions of discordant and prevalent cases

Subpopulation	No of cases		Proportion of cases with discordance level		
	Universe	Sample	Medium	High	Maximum
Site ill-defined or uncertain (ICD IX 159,165,195,199) automatically accepted	451	59	39%	42.4%	3.4%
			(24.9–55.2%)	(27.8–58.4%)	(0.7–15.0%)
One source, cytological base	416	44	25%	11.4%	13.6%
			(12.5–43.7%)	(4.0–28.3%)	(5.2–31.1%)
One source, histological base and presence of compatible primary diagnosis	1203	160	22.5%	6.3%	3.1%
			(15.4–31.7%)	(2.9–12.9%)	(1.1–8.7%)
One source, female breast or bladder cancer automatically accepted	802	96	–	–	3.1%
			(0–4.5%)	(0–4.5%)	(0.8–11.1%)
One source, histological base; two sources, clinical base with two concordant diagnoses	4128	508	1.8%	2.2%	4.1%
			(0.8–3.9%)	(1.0–4.5%)	(2.4–7.0%)
Two sources, histological base with less than three concordant diagnoses	8550	275	2.5%	0.4%	0.7%
			(1.0–6.2%)	(0.05–2.9%)	(0.1–3.5%)
Two sources with more than three concordant diagnoses; three sources	9919	397	0.5%	–	–
			(0.1–2.4%)	(0–1.1%)	(0–1.1%)
Stratified sample estimates:					
Point estimates			3.5%	1.7%	1.5%
Confidence intervals			2.7–4.3%	1.3–2.1%	1.1–2.2%

I.N.T.

accuratezza

Open Registry

metodo:
confronto con la registrazione manuale

n di casi analizzati: 2959

I.N.T.

accuratezza

Open Registry

Table 1: Identifying and demographic data discrepancies in automatically accepted cases in comparison to manually generated cases.

Type of discrepancy	No.	%
Surname		
Surname spelling	45	1.50
Double surname ambiguity	4	0.14
First name		
Spelling of first name	32	1.10
Double first name ambiguity	49	1.70
Sex		
Male/female attribution	2	0.07
Date of birth		
Year	6	0.20
Month	7	0.24
Day	24	0.81
Residence code	84	2.8

I.N.T.

1.6 %

Table 2: ICD-9 site code discrepancies between automatically accepted cases in comparison to manually generated cases.

Type of discrepancy	No.	%
Primary neoplasm coded:		
With different primary site code	28	57
As metastases or unspecified neoplasm	17	35
As neoplasm of uncertain behaviour	1	2
Ill-defined neoplasm coded as:		
Primary neoplasm	1	2
Metastases	0	0
Uncertain behaviour coded as		
Primary neoplasm	2	4
TOTAL	49	100

I.N.T.

accuratezza

ontario

Table 7.8. ICD-9 consistency (3-digit) between manual and computer-assisted diagnoses

	Automated diagnoses	Agreement with manual diagnoses		Disagreement with manual diagnoses	
	N	N	(%)	*N*	(%)
Århus county	1508	1488	(98.7)	20	(1.3)
Ontario [a]	1194	1092	(91.5)	102	(8.5)
Veneto [b]	368	360	(97.8)	8	(2.2)

[a] Based on the reabstraction study (Holowaty *et al.*, 1996).
[b] Weighted estimates based on a stratified random sample of 1988–91 cases.

I.N.T.

accuratezza

ontario

Table A.3.3. Weighted estimates of accuracy

Data element	*N*	Complete agreement		Major disagreement	
		p	95% CI	*p*	95% CI
Demographic and identifier					
Surname	1189	97.0	(95.4–97.9)	1.4	(1.0–2.7)
First name	1187	89.3	(86.9–91.0)	3.0	(2.2–4 7)
Middle name	384	66.1	(60.3–70.9)	8.4	(6.1–13.0)
Sex	1194	100	(99.0–100)	0.0	(0.0–1.0)
Year of birth	1194	99.1	(97.9–99.4)	0.9	(0.6–2.1)
Month of birth	1170	99.7	(98.6–99.8)	0.3	(0.2–1.4)
Day of birth	1170	98.9	(97.6–99.3)	1.1	(0.7–2.4)
Age at diagnosis	1171	95.4	(93.5–96 5)	1.6	(1.0–3.0)
OHIP [a]	912	99.0	(97.6–99 4)	1.0	(0.6–2.4)
Diagnostic					
Reportability	1194	94.1	(92.1–95.4)	5.9	(4.6–7.9)
Sequence No.	1118	95.8	(94.0–96.9)	4.2	(3.1–6.0)
Behaviour	1194	96.0	(94.2–97.0)	4.0	(3.0–5.8)
Primary site	1138	76.2	(73.1–78.9)	6.7	(5.2–8.8)
Morphology	1039	85.5	(82.7–87.8)	8.1	(6.4–10.4)
Diagnosis confirmed	1050	98.8	(97.5–99.2)	0.4	(0.2–1.4)
Year of diagnosis	1171	96.7	(95.1–97.6)	3.3	(2.4–4.9)
Month of diagnosis	1170	91.4	(89.2–93.1)	8.6	(6.9–10.8)
Day of diagnosis	1152	84.6	(81.9–86.8)	15.4	(13.2–18.1)
Laterality	220	98.0	(93.0–98.8)	–	–

N is not weighted.
OHIP = Ontario Health Insurance Plan No.
[a] Excluding cases diagnosed in 1991

I.N.T.

efficienza dei sistemi automatizzati

I.N.T.

efficienza

danimarca, ontario, veneto

Table 7.7. Estimates of the proportions of cases potentially acceptable to the registration system without manual verification (for accuracy of site codes but not morphology codes)

	Definition	Proportion of cases accepted
Århus county	A1+A2 (Table 7.5)	0.69
Ontario *	Full concordance + step 1 (Table 7.2)	0.51
Veneto	Full concordance + specific site with micro-scopic confirmation	0.61

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efficienza

Open Registry

59 % dei casi di tumore maligno accettati in automatico

J biomed Inform, 2008 Contiero et al

I.N.T.

efficienza

Open Registry

analisi per sede

Table 3: Percentages total cases accepted automatically for each site (%).

Site	ICD-9 code	Percentage accepted automatically (%)
Oropharyngeal sites	140–149	25
Digestive tract	150–154	66
	155–157	66
	158,159	22
Respiratory tract	160–161	71
	162	77
	163	50
Bone and soft tissue	170,171	50
Melanoma	172	50
Skin (non-melanoma)	173	77
Breast	174	83
Female genital tract	179–184	40
Prostate	185	77
Male genital tract	186,187	71
Urinary tract	188,189	62
Eye	190	38
Central nervous system	191,192	59
Thyroid gland	193	83
Other Endocrine glands	194	37
Hematological	200–202	43
	203	71
	204–208	50
Other, met. and ill-defined sites	195–199	13

A high percentage indicates that very few cases had to be checked manually.

I.N.T.

efficienza

open registry

Table 4: Problems in cases flagged for checking (selected cancer sites).

Type of Problem	No. of cases with specific problems/total flagged cases for cancer site *								
ICD-9 code	140–149	158,159	170,171	172	179–184	194	195–199	200–202	204–208
Cases notified by one source code only	3/63	6/14	2/13	22/45	32/139	3/7	9/73	20/83	21/43
Discordant Codes									
Within a single organ system	25/63	8/14	2/13	0/45	40/139	0/7	16/73	72/83	21/43
Within more than one organ system but not multiple primaries	33/63	0/14	9/13	22/45	65/139	4/7	48/73	3/83	0/43
Multiple primary cancers	33/63	0/14	1/13	1/45	13/139	0/7	0/73	3/83	1/43
Extranodal/nodal site discrepancy	0/63	0/14	0/13	0/45	0/139	0/7	0/73	17/83	0/43

*A case may have more than one problem

I.N.T.

quanto costa un registro automatizzato ?

Br J Cancer, 1996. Simonato et al
J biomed Inform, 2008. Contiero et al

open registry:30 E /caso (solo tumori maligni)

veneto:19 US /caso (tumori benigni e maligni insieme)

Br J Cancer, 1996. Simonato et al
J biomed Inform, 2008. Contiero et al

I.N.T.

confronto tra
automatico e manuale:

40 % di risorse
risparmiate

J biomed Inform, 2008. Contiero et al

I.N.T.

licenze o free system?

danimarca

ontario

veneto

friuli venezia giulia

open registry

I.N.T.

caratteristica	automatici (%)	manuali (%)
completezza	98.7 ; open reg 95.3 ; ontario 90 ; danimarca	59-97.8
accuratezza	98.6 ; danimarca 93.3; ontario 93.3; veneto 98.4 : open reg	80-94.6
efficienza	69 ; danimarca 51; ontario 55-61; veneto 59 : open reg	-
risparmio risorse	40 : open reg	-

I.N.T.

conclusioni

i sistemi che sono stati presentati rispondono alle aspettative per:

1. qualità ?
2. efficienza ?
3. costi ?

I.N.T.