



Il modello di risk adjustment



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Esito del ricovero

Caratteristiche della malattia

Caratteristiche del paziente

QUALITA' DELLA PRESTAZIONE

Componente casuale: numerosi determinanti,
ciascuno di poco peso, con effetti indipendenti ed
imprevedibili

Controllo del confondimento

Restrizione: diagnosi di ammissione

Stratificazione: sesso, età, gravità della malattia

Modellizzazione: regressione logistica (o lineare)

Per quali variabili controllare?

VARIABILI presenti al ricovero

o che si manifestano nel corso del ricovero come decorso della malattia

NON DIPENDENTI DALLA QUALITÀ DELLA CURA

1. Caratteristiche anagrafiche del paziente: età, sesso
2. Rischio intrinseco del paziente

Considerazioni di fattibilità

Applicare le procedure di aggiustamento usando
dati raccolti di routine in database amministrativi

Valutazione modelli LINEARI

R^2

percentuale di variazione della variabile di outcome
(es. mortalità) che è spiegata dal modello

$$R^2 = \frac{\text{variabilità spiegata dal modello}}{\text{variabilità totale}}$$

Varia fra 0 e 100% *more is better !!*

Valutazione modelli LINEARI

Quale valore per R^2 ?

“ With experience, analysts learn what values of statistical performance can be expected for “good” predictive models in specific contexts.”

Shwartz M, Ash, AS. Evaluating risk adjustment models empirically

(In lezzoni eds. Risk adjustment for measuring health care outcomes, Chicago, Health Administration Press)

Valutazione modelli LINEARI

Quale valore per R^2 ?

La scelta delle variabili da includere nel modello non deve basarsi esclusivamente su metodi empirici (R^2), ma deve essere principalmente guidata dal giudizio clinico

Valori tipici in letteratura: 10% - 30%

IQ	Label	R ²
8	IN-HOSP MORT ESOPHAGEAL RESECT	0.23559
9	IN-HOSP MORT PANCREATIC RESECT	0.24128
10	IN-HOSP MORT PEDIAT HEART SURG	0.15379
11	IN-HOSP MORT AAA REPAIR	0.29267
12	IN-HOSP MORT CABG	0.1356
13	IN-HOSP MORT CRANIOTOMY	0.20905
14	IN-HOSP MORT HIP REPLACEMENT	0.08582
15	IN-HOSP MORT AMI	0.2657
16	IN-HOSP MORT CHF	0.11793
17	IN-HOSP MORT STROKE	0.25982
18	IN-HOSP MORT GI HEMORRHAGE	0.15382
19	IN-HOSP MORT HIP FRACTURE	0.20556
20	IN-HOSP MORT PNEUMONIA	0.14405
21	CESAREAN SECTION DELIVERY	0.02535
22	VAGINAL BIRTH AFTER C-SECTION	0.06115
23	LAPAROSCOPIC CHOLECYSTECTOMY	0.12506
24	INCIDENTAL APPENDECTOMY	0.0218
25	BI-LATERAL CATHETERIZATION	0.13858
30	IN-HOSP MORT PTCA	0.14946
31	IN-HOSP MORT CAROTID ENDARTERECTMY	0.09657

Valutazione modelli LOGISTICI

C-statistic

confronta tutte le possibili coppie di pazienti (1 vivo 1 deceduto) e valuta la % di casi in cui la probabilità attesa di decesso (dal modello) è maggiore per il deceduto rispetto al vivo

Varia fra 0 e 1 (100%) *more is better !!*

Valutazione modelli LOGISTICI

C-statistic

Area sottesa alla curva ROC

Capacità del modello di DISCRIMINARE fra vivi e deceduti

Valori tipici in letteratura: 0.7 – 0.8

Inpatient Quality Indicator	n° cov
IQI #8 – Esophageal Resection Mortality	19
IQI #9 – Pancreatic Resection Mortality	21
IQI #10 – Pediatric Heart Surgery Mortality	27
IQI #11 – Abdominal Aortic Aneurysm (AAA) Repair Mortality	21
IQI #12 – Coronary Artery Bypass Graft (CABG) Mortality	27
IQI #13 – Craniotomy Mortality	35
IQI #14 – Hip Replacement Mortality	21
IQI #15 – Acute Myocardial Infarction (AMI) Mortality	47
IQI #16 – Congestive Heart Failure (CHF) Mortality	19
IQI #17 – Stroke Mortality	29
IQI #18 – Gastrointestinal (GI) Hemorrhage Mortality	37
IQI #19 – Hip Fracture Mortality	23
IQI #20 – Pneumonia Mortality	29
IQI #21 – Cesarean Section Delivery	4
IQI #22 – Vaginal Birth after Cesarean Section (VBAC), Uncomplicated	4
IQI #23 – Laparoscopic Cholecystectomy	25
IQI #24 – Incidental Appendectomy	45
IQI #25 – Bilateral Catheterization	41
IQI #30 – Percutaneous Transluminal Coronary Angioplasty (PTCA) Mortality	25
IQI #31 – Carotid Endarterectomy Mortality	17

Inpatient Quality Indicator

IQ15 Mortalita per infarto

Elenco codici APR-DRG per l'aggiustamento

- 004 Tracheostomy except for face,mouth & neck diagnoses
- 165 Coronary bypass w/o malfunctioning coronary bypass w cardiac cath
- 166 Coronary bypass w/o malfunctioning coronary bypass w/o cardiac cath
- 170 Permanent cardiac pacemaker implant w AMI,heart failure or shock
- 173 Other vascular procedures
- 174 Percutaneous cardiovascular procedures w AMI
- 190 Circulatory disorders w AMI

Tutti con i 4 livelli rischio decesso

Inpatient Quality Indicator

IQ16 Mortalita per CHF

Elenco codici APR-DRG per l'aggiustamento

- 194 Heart failure
(4 livelli rischio decesso)

Comorbidità Elixhauser

1.CHF	congestive heart failure
2.VALVE	valvular disease
3.PULMCIRC	pulmonary circulation disease
4.PERIVASC	peripheral vascular disorders
5.HTN_C	hypertension
6.PARĀ	paralysis
7.NEURO	other neurological disorders
8.CHRNLUNG	chronic pulmonary disease
9.DM	diabetes uncomplicated
10.DMCX	diabetes complicated
11.HYPOTHY	hypothyroidism
12.RENLFAIL	renal failure
13.LIVER	liver disease
14.ULCER	peptic ulcer
15.AIDS	AIDS
16.LYMPH	lymphoma
17.METS	metastatic cancer
18.TUMOR	solid tumor w/o metast
19.ARTH	rheumatoid arthritis
20.OBESE	obesity
21.WGHTLOSS	weight loss
22.BLDLOSS	blood loss anemia
23.ANEMDEF	deficiency anemia
24.ALCOHOL	alcohol abuse
25.DRUG	drug abuse
26.PSYCH	psychoses
27.DEPR	depression

Dall'elenco di 30 comorbidità originarie di Elixhauser ne sono state ESCLUSE 3 che in alcuni casi rappresentano **COMPLICANZE**

Cardiac arrhythmias

Coagulopathy

Fluid and electrolyte disorders

Patient Safety Indicator	n° cov
PSI #1 – Complications of Anesthesia	33
PSI #2 – Death in Low Mortality DRGs	57
PSI #3 – Decubitus Ulcer	215
PSI #4 – Failure to Rescue	186
PSI #5 – Foreign Body Left During Procedure	20
PSI #6 – Iatrogenic Pneumothorax	99
PSI #7 – Selected Infections Due to Medical Care	160
PSI #8 – Postoperative Hip Fracture	25
PSI #9 – Postoperative Hemorrhage or Hematoma	71
PSI #10 – Postoperative Physiologic and Metabolic Derangements	19
PSI #11 – Postoperative Respiratory Failure	71
PSI #12 – Postoperative Pulmonary Embolism or Deep Vein Thrombosis	131
PSI #13 – Postoperative Sepsis	55
PSI #14 – Postoperative Wound Dehiscence	29
PSI #15 – Accidental Puncture or Laceration	166
PSI #17 – Birth Trauma—Injury to Neonate	1
PSI #18 – Obstetric Trauma —Vaginal Delivery with Instrument	5
PSI #19 – Obstetric Trauma —Vaginal Delivery without Instrument	7
PSI #20 – Obstetric Trauma—Cesarean Delivery	5

Patient Safety Indicator

Variabili di aggiustamento

Failure to rescue

Sesso

20 classi di età + interaz

25 comorbidità

140 DRG modificati

TOTALE: 186 covariate

Le scelte del progetto

Abbiamo utilizzato i parametri di
aggiustamento forniti dall'AHRQ

Scelta corretta?

Database italiano: 6.000.000 di ricoveri

Database SID AHRQ: 31.000.000 di ricoveri

Covariate anagrafiche: sesso eta

Effetto sovrapponibile fra USA e Italia

APR-DRG:

Risente della codifica.

Effetto sovrapponibile fra USA e Italia?

Assistenza AHRQ

Contatti con l'AHRQ QI Hotline

(Jeff Geppert)

Abbiamo ricevuto continui chiarimenti riguardo il metodo
ed i risultati del procedimento di aggiustamento.

Metodi non completamente descritti nei manuali.

Solo da Dicembre 2004 sono forniti direttamente gli
indicatori attesi

Prospettive di lavoro

1. Stimare i parametri del modello di aggiustamento sul database italiano

Database italiano: 6.000.000 di ricoveri

Database SID AHRQ: 31.000.000 di ricoveri

Prospettive di lavoro

2. Rivedere il metodo di aggiustamento

Interpolazione modello di regressione logistica anche per IQI?

Alternativa ad APR-DRG?

Database italiano: 6.000.000 di ricoveri

Database SID AHRQ: 31.000.000 di ricoveri

... qualche anteprima

**Prossima versione pacchetto indicatori
rilasciata da AHRQ
(Estate 2005)**

Rilascio di licenza limitata per l'utilizzo pubblico di APR-DRG

Pubblicazione di documentazione tecnica più dettagliata
riguardante I metodi di aggiustamento

Jeff Geppert, AHRQ QI Hotline

**Dalla parte del paziente:
come scegliere la struttura
in cui farsi curare**

Il caso Bill Clinton

The New York Times

The New York Times **National**

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Clinton Is Given Bypass Surgery for 4 Arteries

Published: September 7, 2004

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Dr. Smith said the surgical team had taken blood vessels from the left and right chest, known as mammary vessels, and another from the left leg, to create detours around the clogged arteries. The arteries were the left anterior descending, the first diagonal, the obtuse marginal and the posterior descending, he said.

Dr. Smith acknowledged that there were a few "anxious moments," which



Frances Roberts for The New York Times

Doctors from Columbia-Presbyterian Center of New York-Presbyterian Hospital spoke on Monday about former President Bill Clinton's surgery.

"Columbia-Presbyterian, a major teaching center for the Columbia University College of Physicians and Surgeons, was listed in a report by the New York State Health Department last week as having the highest death rate for coronary bypass surgery of any hospital in the state during 2001, the latest year for which data are available. The death rate, 3.93 percent, was nearly double the average for the 34 other hospitals that perform coronary bypass surgery in the state"

"On Sunday, a spokesman for the hospital said that no one was available to comment on the report. Yesterday, Myrna Manners, a spokeswoman, said the rates had declined substantially since 2001. She listed the rates as 1.9 percent for 2002; 0.8 for 2003, and 0.6 for the first six months of this year. Unlike the 2001 figure, however, the later rates did not have the same statistical validity because they were not yet adjusted for risk in comparison with those of other hospitals."

If the case of former President Bill Clinton is any example, being a big shot can sure help get a doctor, but it doesn't guarantee first choice

Dr. O. Wayne Isom cardiac surgeon and surgeon in chief at **Weill-Cornell Medical Center in New York** said he was at his East Hampton home at 7 a.m. Friday when he got a call from a primary-care practitioner at Westchester Medical Center asking him to accept a patient transfer for emergency coronary surgery.

"I said, 'I'm on vacation,' " Isom recalled in a telephone interview.

"And he said, 'Well, it's an important person.'

"And I said, 'Well, they're all important.' And I had a tee time at 9 o'clock.

"He said, 'Well, they want you.'

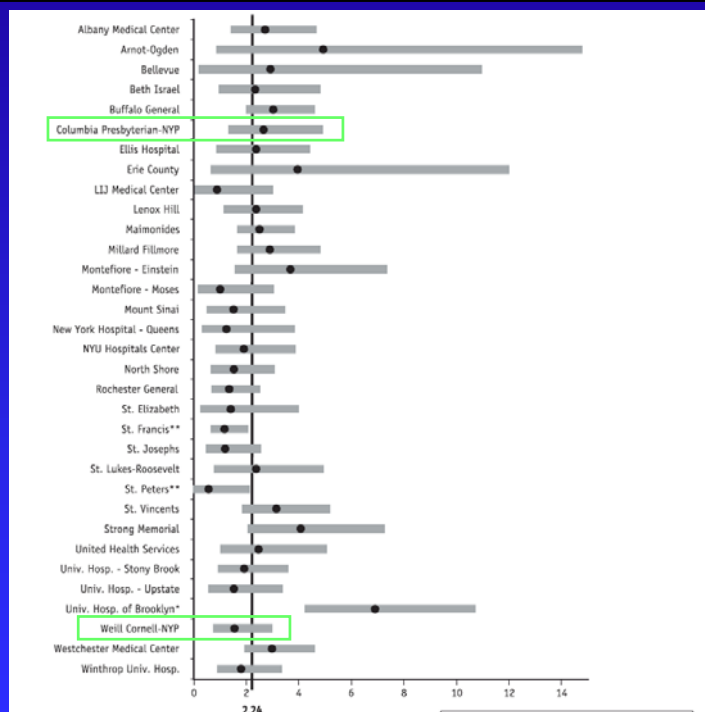
"And I said, 'Who is it?'

"And he said, 'I can't tell you. It's an important person.'

"I said, 'If you can't tell me, then I'm going to play golf.' "

At that, the doctor asked Isom, a cardiac surgeon and surgeon in chief at Weill-Cornell Medical Center in New York, whom he would recommend at his sister institution, Columbia-New York Hospital, in Upper Manhattan.

"And I said, 'I'd select **Craig Smith**,' " the chairman of the division of cardiac surgery.



2000 – 2002 HOSPITAL AND SURGEON OUTCOMES

	Cases	No of Deaths	OMR	EMR	RAMR	95% CI for RAMR
Weill Cornell-NYP						
Altorki N	84	5	5.95	2.65	5.08	(1.64,11.86)
Brodman R	265	3	1.13	1.97	1.30	(0.26, 3.79)
Girardi L	811	9	1.11	2.12	1.18 **	(0.54, 2.24)
Isom O	149	3	2.01	1.32	3.45	(0.69,10.08)
#Ko W	150	3	2.00	1.80	2.50	(0.50, 7.32)
Krieger K	573	8	1.40	2.02	1.56	(0.67, 3.08)
Lamberti JJ	2	0	0.00	1.00	0.00	(0.00,100.0)
##Tortolani A	168	1	0.60	2.31	0.58	(0.01, 3.24)
All Others	110	3	2.73	2.64	2.33	(0.47, 6.81)
TOTAL	2312	35	1.51	2.06	1.66	(1.15, 2.31)

2000 – 2002 HOSPITAL AND SURGEON OUTCOMES

	Cases	No of Deaths	OMR	EMR	RAMR	95% CI for RAMR
Columbia Presbyterian-NYP						
Edwards N	231	1	0.43	2.29	0.43	(0.01, 2.38)
Esrig B	4	0	0.00	5.18	0.00	(0.00,39.96)
Mosca R S	1	0	0.00	2.21	0.00	(0.00,100.0)
Naka Y	263	9	3.42	2.34	3.30	(1.50, 6.26)
Oz M	569	11	1.93	1.93	2.26	(1.13, 4.05)
Quaagebeur J	1	0	0.00	1.13	0.00	(0.00,100.0)
Rose E	58	4	6.90	1.34	11.60 *	(3.12,29.70)
Scott R	1	0	0.00	0.30	0.00	(0.00,100.0)
Smith C	451	12	2.66	1.44	4.18	(2.16, 7.31)
All Others	66	4	6.06	1.98	6.92	(1.86,17.72)
TOTAL	1645	41	2.49	1.90	2.96	(2.13, 4.02)

Isom, who described himself as a political independent, **said he made his 9 a.m. tee off.**

"Realistically, if they had told me it was him, I probably would have said, 'Sure, I'd be glad to do it.' I'm not a big fan of his but, as they say, everybody looks the same on the inside," Isom said