

APPLICAZIONE DEL PROPENSITY SCORE NEL CONFRONTO  
TRA DUE TRATTAMENTI FARMACOLOGICI IN UNO STUDIO  
OSSERVAZIONALE SU PAZIENTI CON DOLORE DA CANCRO

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## OBSERVATIONAL STUDIES: CLASSICAL STATISTICAL TECHNIQUES FOR BIAS AND CONFOUNDING MINIMIZATION

- Restriction
- Matching
- Multivariate analysis
- Stratification

## OBSERVATIONAL STUDIES: ALTERNATIVE STATISTICAL TECHNIQUES FOR BIAS AND CONFOUNDING MINIMIZATION

- Miettinen multivariable confounder score/risk disease scores
- Propensity score

## WHAT'S NEW?

- “Traditional” techniques →  
adjust for prognostic, predictive and  
selection-related variables
- Risk disease and propensity scores →  
consider only the variables that  
conditioned the primary choice

# THE PROPENSITY SCORE

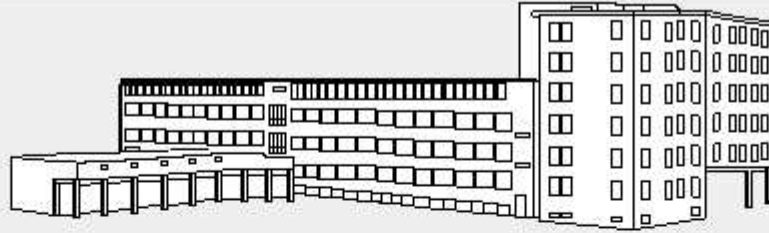
- Introduced by Rosenbaum and Rubin in 1983
- It is the conditional probability of exposure to a treatment given the observed covariates available

# HOW TO USE IT

- Matching
- Stratification
- As a variable in a regression model
- Covariance adjustment
- Inverse probability weighting

# THE PROPENSITY SCORE: PROS & CONS

- + minimize bias and confounding when observational data are used to estimate the effect of treatments
- + capability to inspect data before and after the final adjustment
- - can not remove hidden (unmeasured) bias
- - gives similar results to traditional regression modeling
- - requires a large sample size



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**PROGETTO**  
**"IL DOLORE NEL PAZIENTE CON CANCRO"**  
**Reclutati più di 1600 casi.**  
**Accettato abstract per Budapest 2007.**

Nel contesto di un'iniziativa di più ampio respiro ([Storia del Progetto](#)), è in corso una ricerca clinica che ha il fine di documentare sul campo, con dati empirici, la tipologia, la qualità e gli effetti di diverse strategie analgesiche per il trattamento del dolore oncologico ([Protocollo del Progetto](#)). Si tratta di uno studio di Outcome, multicentrico ed osservazionale a cui hanno aderito, ad oggi, circa 160 centri ([Elenco Centri Partecipanti](#)) di cui 130 hanno completato una fase pilota nel 2005.

La fase di reclutamento è ufficialmente iniziata il **27 Febbraio 2006** ([Vai al Sistema di Raccolta Dati](#)). Ad oggi 113 centri hanno già reclutato più di 1600 casi ([Statistiche in Tempo Reale](#)).

Ricordiamo che la fase di reclutamento terminerà il **1 Marzo 2007** e successivamente ogni centro dovrà completare il follow-up dei casi inclusi. Lo studio, quindi, terminerà formalmente nel **Giugno 2007**.

**DOCUMENTI**

[Protocollo in Italiano](#)

[Storia del progetto](#)

 [Project overview](#)

 [Summary of the protocol](#)

[Proposta per AIFA](#)

[Report Preliminare](#)

[Diapositive AIOM](#)

 [Abstract Budapest](#)

# OBJECTIVES OF THE STUDY

- To describe the characteristics of a large sample of cancer patients in terms of case mix, pattern of care and relevant efficacy and safety outcomes
- To assess the quality of analgesic treatments in terms of congruence between patients' reported intensity of pain and the potency of the prescribed analgesic drug: Pain Management Index
- To evaluate the effectiveness of treatment regimens on pain intensity and patient-reported quality of life
- To evaluate the effect of treatment regimens on patient-reported satisfaction
- To evaluate the safety profile

# MAIN STUDY CHARACTERISTICS

- Multicenter, open-label, prospective, and nonrandomized study
- Each center was allowed to admit up to 25 patients with diagnostic evidence of advanced/metastatic solid tumor;
- Persistent pain, any degree of intensity related to cancer, requiring or already on analgesic treatment;
- 2 months for recruitment, 3 months follow-up (1 visit/week for the 1<sup>st</sup> month)
- Data collection with e-CRF via web

# INFORMATION COLLECTED

- Patient: age, sex, performance status, disability, bone metastasis, current chemotherapy, knowledge of prognosis, tumor primary site...
- Pain: site, characteristics, intensity (4 questions NRS from BPI), breakthrough pain, incident pain, pain relief
- Therapy: around-the-clock, rescue, adjuvant, frequency and severity of side effects

# RECRUITMENT

VALID RECRUITING CENTRES n=110 with 1842 pts

SECOND LEVEL OF EXCLUSION (41 pts)

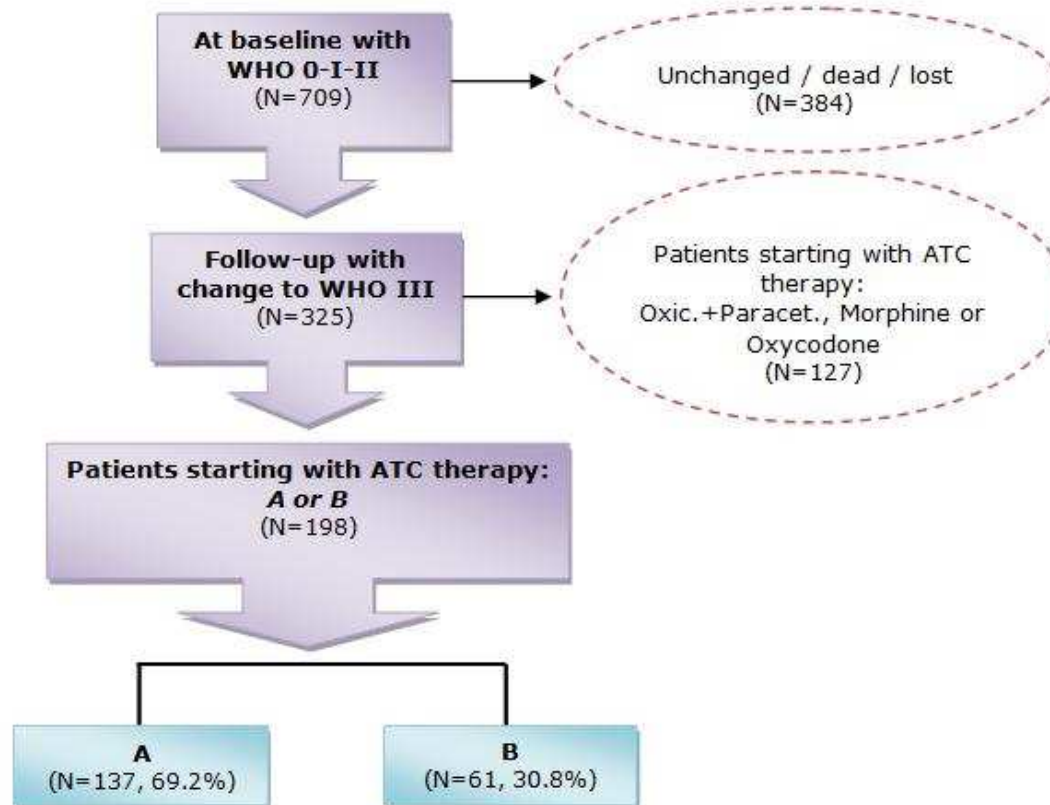
- no informed consent
- not eligible
- other causes

VALID CASES RECRUITED n=1801 pts

BASELINE  
SAMPLE (visit 1)

LONGITUDINAL SAMPLE  
(0-28 days)

# STUDY POPULATION FOR PROPENSITY SCORE APPLICATION



# DIFFERENCES BETWEEN A AND B

- Pain intensity at baseline is more or less the same (slightly worse for B)
- B patients have a more complex situation with worst performance status, breakthrough pain, incident pain
- Oncology units prescribe B in 64% of cases, palliative units in 36%

# PROPENSITY SCORE BUILDING: VARIABLES IN THE MULTIVARIATE MODEL

## Demographic

Sex.....	[male, female]
Age.....	[<51, 52-74, >74]

## Clinical

Breakthrough pain.....	[No, Yes]
Bone metastasis.....	[No, Yes]
Neuropathic pain.....	[No, Yes]
B-ADL.....	[<50, ≥50]
KPS.....	[<50, ≥50]
Time recruitment.....	[New, Old]
Recruitment centre.....	[Oncology+Other, Palliative care+Pain centre+Hospice]
Patient knowledge.....	[No, Yes]
Disease duration.....	[months]
Incident pain.....	[No, Yes]
Distress.....	[No, Yes]

## Therapy

Rescue (FANS, ATC II, ATCIII) .....	[No, Yes]
Medicalization .....	[No, Yes]
Concomitant therapies (surgery, chemio, radio, hormone) .....	[No, Yes]
Adjuvant (antidepressant, biphosphonates, anticonvulsivant, corticosteroides).....	[No, Yes]
Drug before change.....	[ATC 0/I, ATC II]

# CARATTERISTICHE DEI MODELLI

Modello	#
Modello saturo senza Worst pain basale (in continuo)	1
Modello saturo con Worst pain basale (in continuo)	2
Modello insaturo* senza Worst pain basale (in continuo)	3
Modello insaturo* con Worst pain basale (in continuo)	4

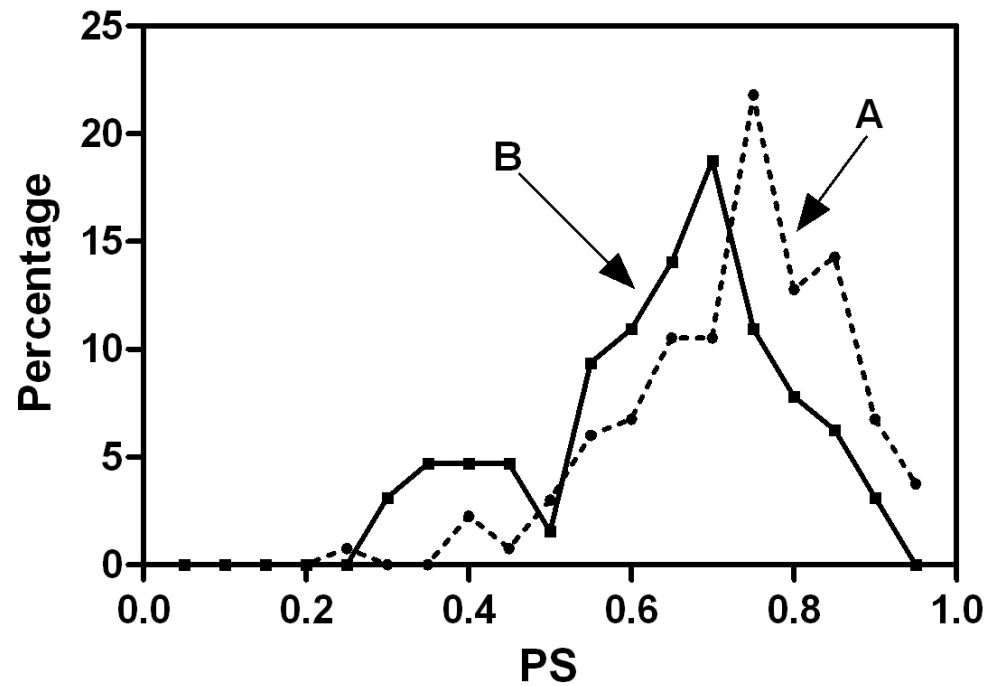
Modello	R <sup>2</sup>	Test H <sub>0</sub> =0 Likelihood	% concordante	C	H-L adattamento
<b>1</b>	<b>0.2296</b>	<b>0.3613</b>	<b>72.6</b>	<b>0.727</b>	<b>0.2389</b>
<b>2</b>	<b>0.2304</b>	<b>0.4016</b>	<b>72.5</b>	<b>0.726</b>	<b>0.2928</b>
3	0.0947	0.0357	63.9	0.655	0.8138
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# PROPENSITY SCORE: DISTRIBUTION BY TREATMENT



# PROPENSITY SCORE APPLICATION

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Pain relief (evento=score increment  $\geq 20\%$ )

Unadjusted analysis			1.86	1.01	3.44	0.0479
Adjusted analysis with all individual factors in the model			2.52	1.24	5.11	0.0107
Adjusted analysis with PS as continuous in the model			2.32	1.19	4.50	0.0130
Adjusted analysis by PS strata	0-50	21	8.00	0.75	85.31	0.0679
	0.51 - 0.60	30	0.98	0.18	5.39	0.9772
	0.61 - 0.70	49	5.06	1.39	18.41	0.0116
	0.71 - 0.80	58	1.71	0.47	6.14	0.4148
	0.81+	39	1.36	0.24	7.75	0.7340
	Whole sample	.	2.41	1.24	4.71	0.0093
	OR homogeneity	.	.	.	.	0.3854
Analysis with matching			1.81	0.93	3.53	0.0799

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# CONCLUSIONS

- This one of the first applications of the propensity score in this context
- This is a work in progress: propensity score for 4 treatments?