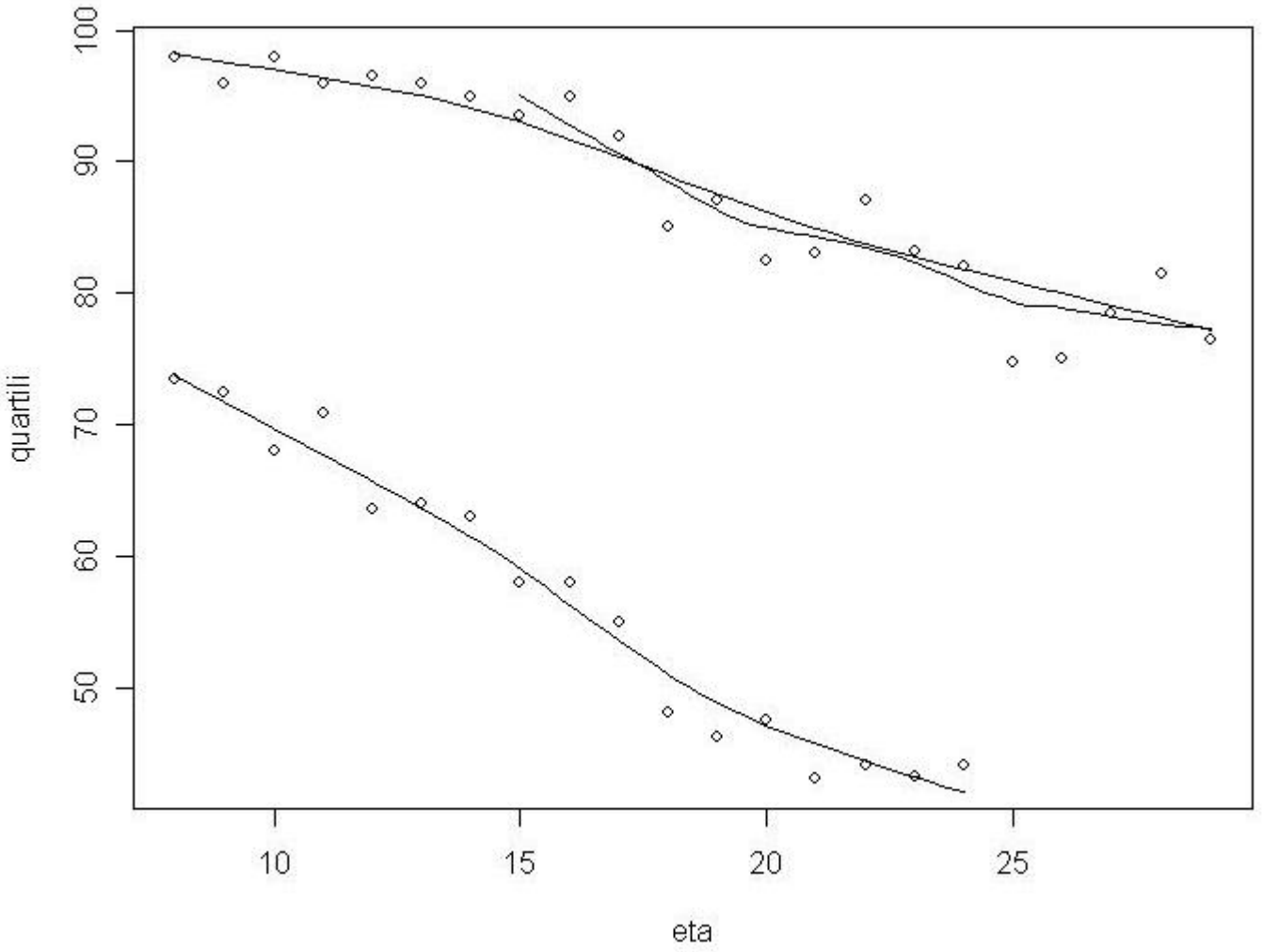
One of the main goals in CF is early identification of patients at risk. In our center we have the opportunity to follow CF patients since birth to adulthood and in the last years we have performed several studies trying to link specific clinical charateristics of our patients during early childhood to the severity of their disease in adulthood.

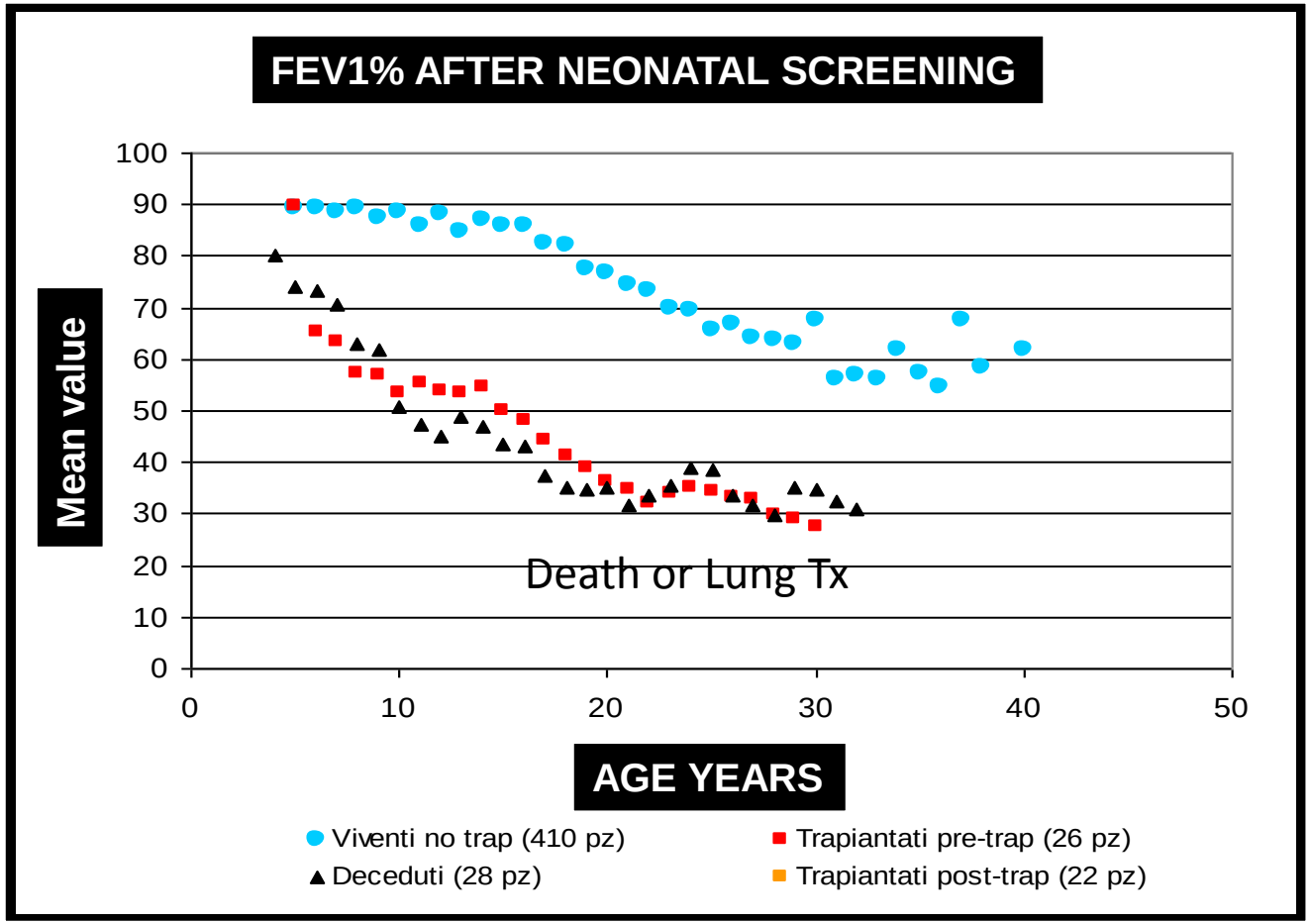
I will show today data linking chest CT performed in children 7 years old to their disease in the following 6-10 years.

Early CT abnormalities can identify patients at higher risk.

Furthermore, CT abnormalities in patients without chronic Pseudomonas colonization may predict the risk of colonization in the following 6 years.

MATHEMATICAL MODELLING OF FEV 1




FEV1% AFTER NEONATAL SCREENING
Mean value
100
90
80
70
60
50
40
30
20
10
0
0
10
20
30
40
50
Death or Lung Tx
AGE YEARS
Viventi no trap (410 pz)
Trapiantati pre-trap (26 pz)
Deceduti (28 pz)
Trapiantati post-trap (22 pz)

Methods (1)

- **Single centre** retrospective data analysis
- **Inclusion criteria**:
  - Cystic Fibrosis
  - Age at CT: 4-11 years
  - stable clinical conditions at CT
  - 6 years long follow up in Verona CF Centre
  - Informed consent

- CF-CT **Brody score** (bronchiectasis, mucus pluggings, air wall thickening, bullae and cysts)

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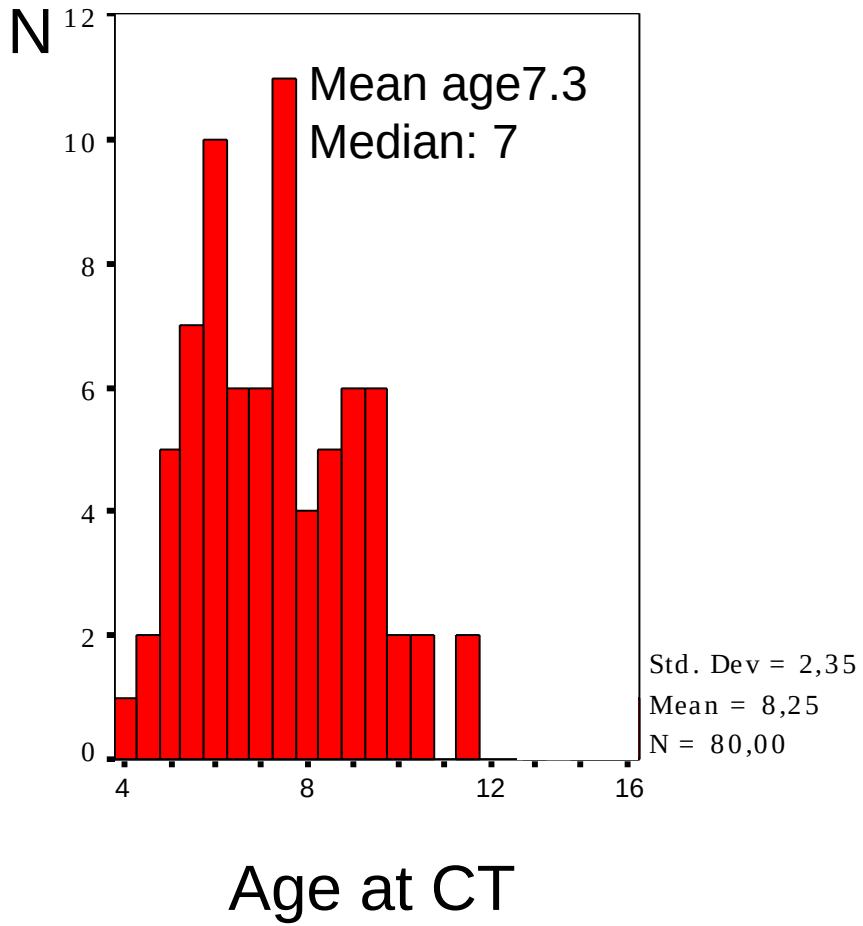
Brody AS, Klein JS, et al, *J Pediatr* 2004;145(1):32-8.
De Jong et al. Thorax 2006; 61: 80-85.

Methods (2)

- 2 observers independently analyzed all CT scans (*M. Loeve Rotterdam-S.Volpi Verona*)
- Good interobservers agreement (ICC>0,95)
- CF-CT scores expressed as percent of maximum value
- RTE was defined as respiratory symptoms requiring intravenous antibiotic treatment

Results (1): age distribution

- 92 eligible children and adolescents
- **73 patients included**
- 40 females



Results (2)

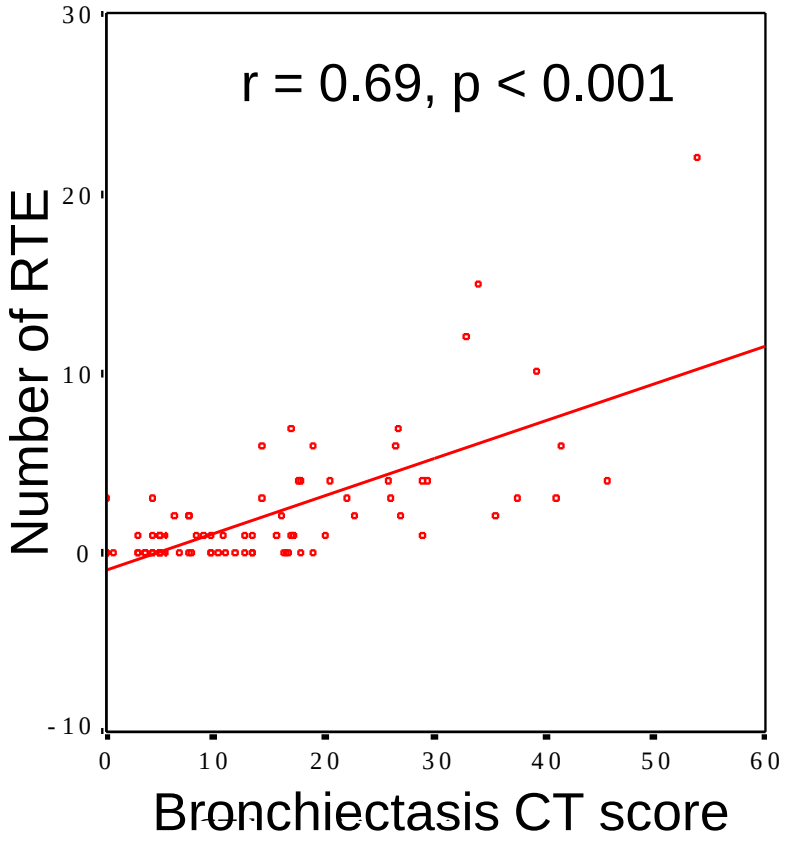
	Mean	+/-SD	Median	Range
Total CF-CT score %	12.8	10.6	9.7	0-42.4
Bronchiectasis CT score %	14.9	12	12.7	0-53.8

	Mean	+/-SD	Median	Range
FEV1% pred at baseline	83.3	16.8	82.7	42-117

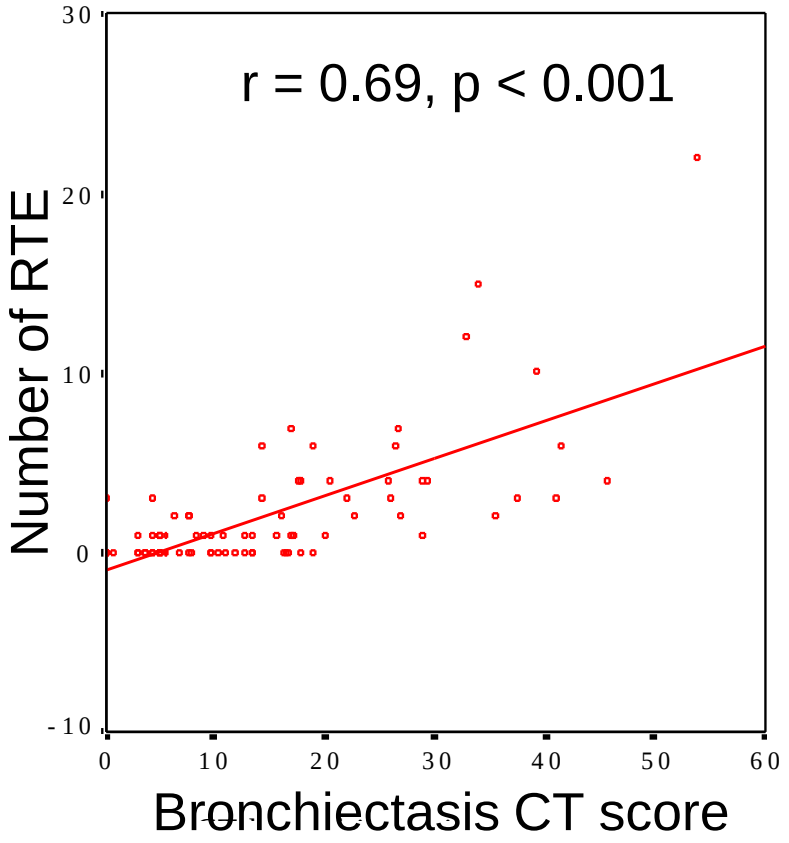
Results : CT scores ad FEV1

- Baseline FEV1 showed a low although significant correlation with bronchiectasis CF-CT score:
  ($r = 0.441$, $p<0.001$)

Results (5): CT score and RTE



Results (5): CT score and RTE



Baseline FEV1% predicted showed a lower although significant correlation with number of RTE (r = 0.49, p<0.001).

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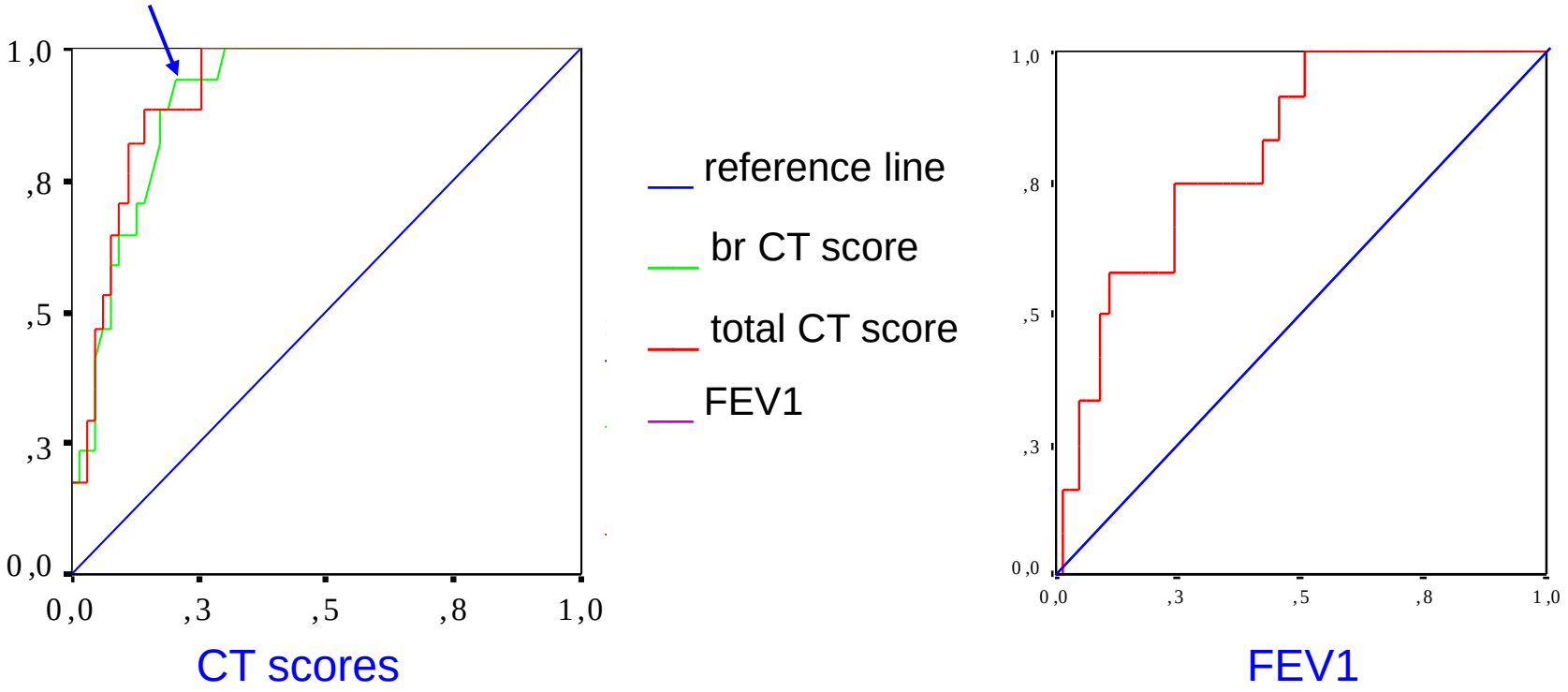
ROC curves



Bronchiectasis CF-CT score ≥16.9% identified patients who experienced ≥3 RTE in the following 6 years with sensitivity 94.1% and specificity 79.4%.

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logistic regression model:

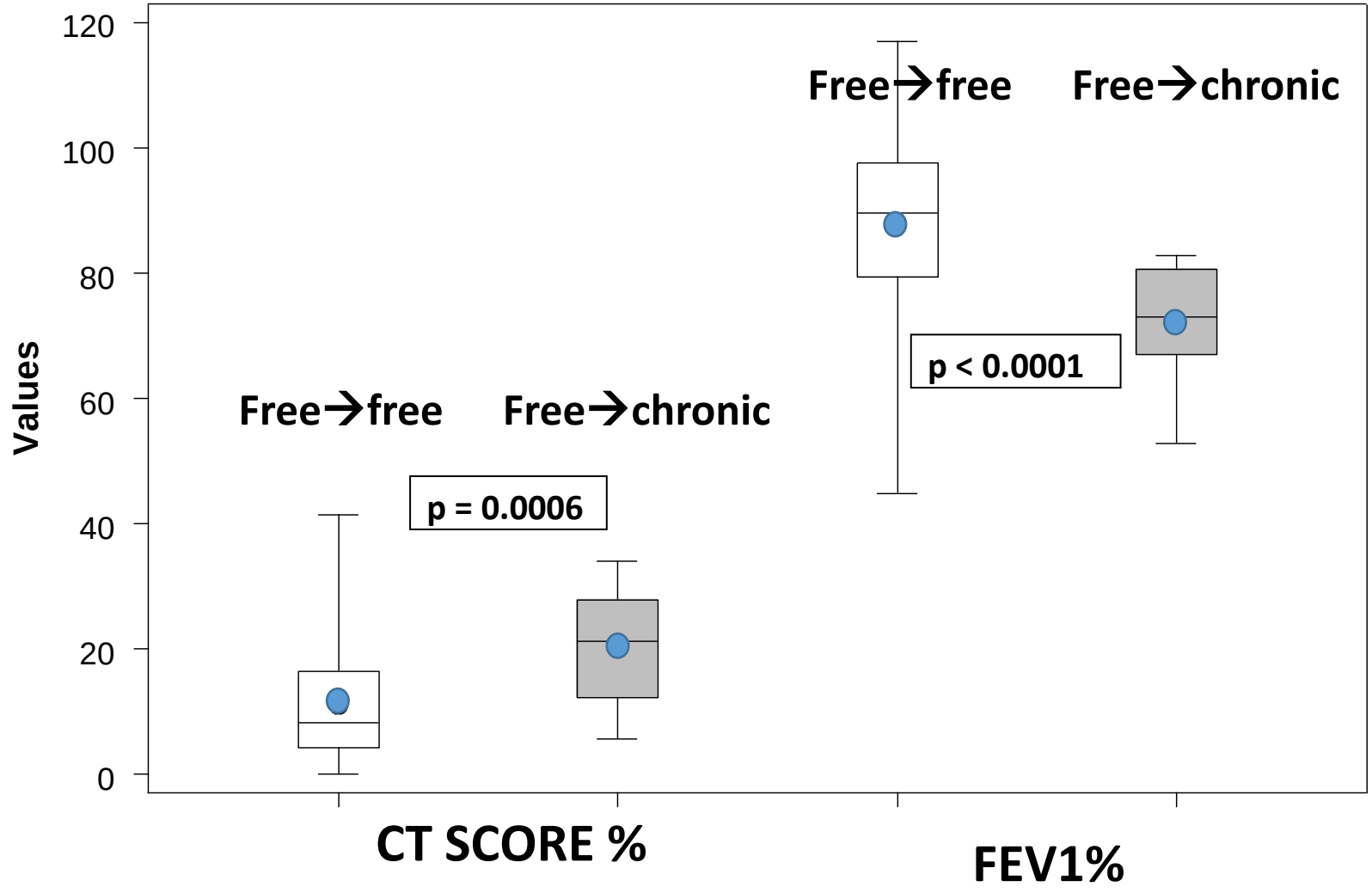
Bronchiectasis score p=0.0004

FEV1 not significant

Our statistician says

'For every one unit increase in CT score, the odds ratio of having more than 3 RTE increases by 15%.

PsA status initial		PsA status 6 years later		
		free	intermittent	chronic
free	50	30	12	8
intermittent	18	9	5	4
chronic	5	1	1	3
		40	18	15


120
100
80
60
40
20
0
Values
Free→free
Free→chronic
p = 0.0006
Free→free
Free→chronic
p < 0.0001
CT SCORE %
FEV1%

Further follow-up 6-10 YEARS

CF-CTscore =>16.9	**4/29 patients lung Tx**
CF-CTscore <16.9	**0/51**

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Conclusions

In 7-year-old CF children:

chest CT identifies with higher sensitivity and specificity patients at risk of RTE, compared to FEV1.

Chest CT and spirometry identify patients at higher risk of chronic PsA infection