

Frailty may indicate biological age in patients with urological cancers: A challenge evaluating biological age using frailty discriminant score (FDS)

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Background:

Although chronological age was key factor for frailty, it is not directly predicting biological age. We aimed to investigate biological age using quantitative frailty assessment tool: frailty discriminant score (FDS) and evaluated the relationship between the biological age and prognosis inpatients with urological cancers.

Methods:

This study included 2819 control individuals and 863 urological cancer patients who evaluated frailty using FDS between April 2013 and May 2019. A formula of biological age was retrospectively estimated using the non-linear regression curve between the FDS and chronological age in control individuals and the gap between the chronological and biological age was calculated using the formula. The association between the biological age and overall survival was evaluated using Kaplan-Meier curve and Cox regression analysis.

Results:

Median age of control and urological cancer groups was 55 and 71 years, respectively. The urological cancers included urothelial carcinoma (UC, n=361), renal cell carcinoma (RCC, n=141), and prostate cancer (PC, n=361). The formula for biological age in the control group was: Age = -0.4376*FDS^2 + 11.796*FDS + 58.79 (R^2 = 0.2847). The gap between the chronological and biological age was 13.4, 14.2, and 10.9 years in urothelial carcinoma, renal cell carcinoma, and prostate cancer, respectively. The age gap >30 years showed significantly poor overall survival.

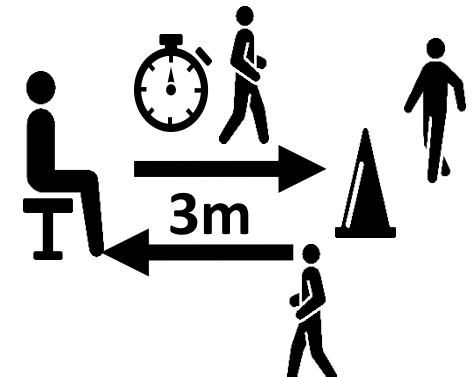
Conclusions:

Frailty might indicate biological age in urological cancer patients and it has potential to predict prognosis. Further study is needed to clarify the association of frailty, biological age, and prognosis .

Patients' background

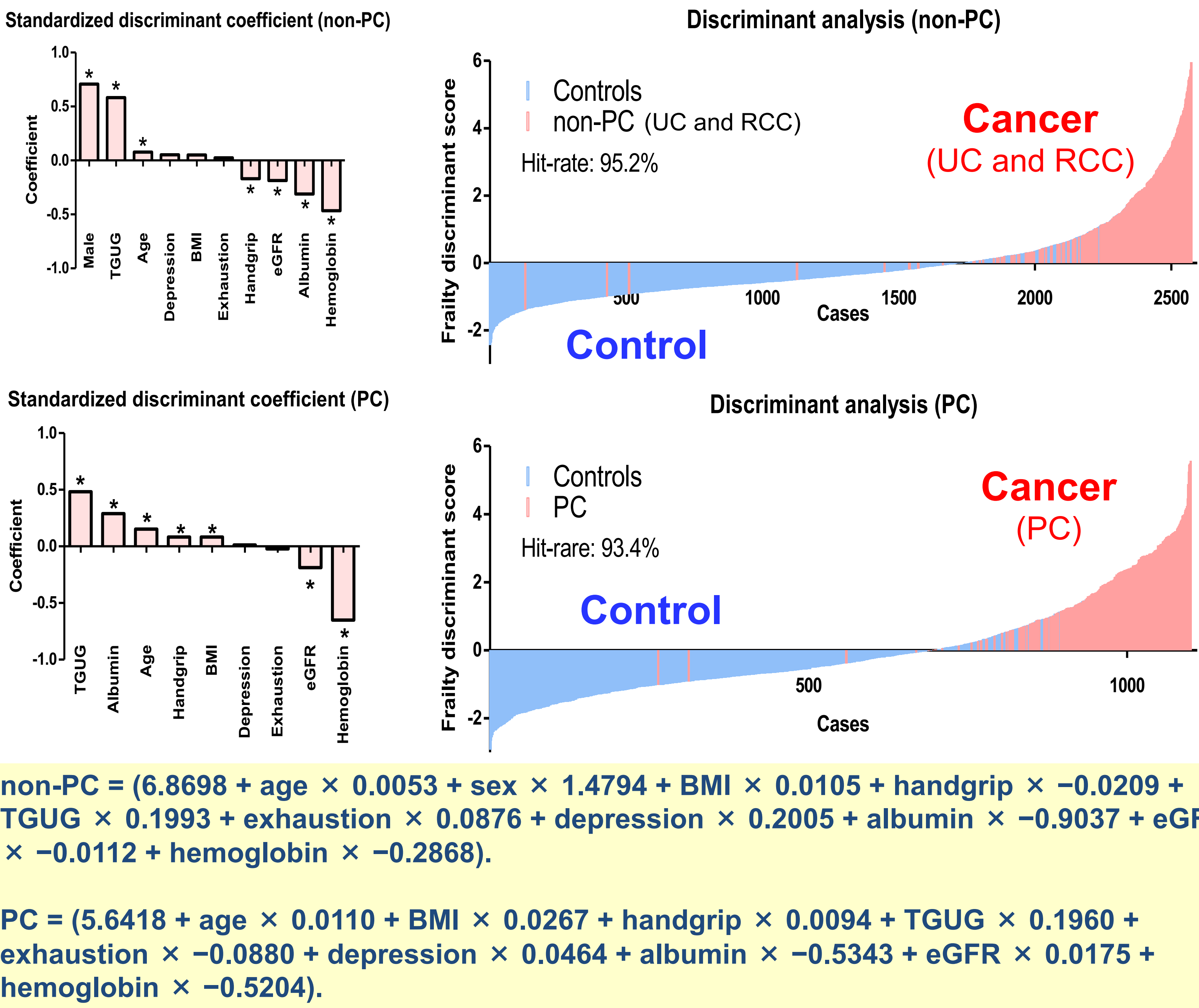
	Ctrl	Urological Cancers
n	2819	863
Age, years	53 ± 16	71 ± 9
Sex (male), n=	1108 (39%)	736 (85%)
Body mass index (BMI, kg/m ²)	23 ± 3.5	24 ± 7.0
Diabetes mellitus (DM), n=	221 (7.8%)	164 (19%)
Cardiovascular disease (CVD), n=	227 (8%)	129 (15%)
Handgrip strength (Kg)	29 ± 8.1	29 ± 9.3
TGUG (sec.)	5.5 ± 1.1	11 ± 6.6
Exhaustion (yes), n=	273 (10%)	146 (17%)
Depression (yes), n=	218 (7.7%)	118 (14%)
Serum Albumin (g/dL)	4.5 ± 0.3	3.9 ± 0.6
eGFR (mL/min/1.73m ²)	81 ± 16	69 ± 22
Hemoglobin (g/dL)	14 ± 1.5	12 ± 2.0
Type of urological cancers, n=		
Urothelial carcinoma (UC)		361 (42%)
Renal cell carcinoma (RCC)		142 (16%)
Prostate cancer (PC)		362 (42%)

TGUG: timed get-up and go test. TGUG is a simple test used to assess a person's mobility and requires both static and dynamic balance. It uses the time that a person takes to rise from a chair, walk three meters, turn around, walk back to the chair, and sit down.



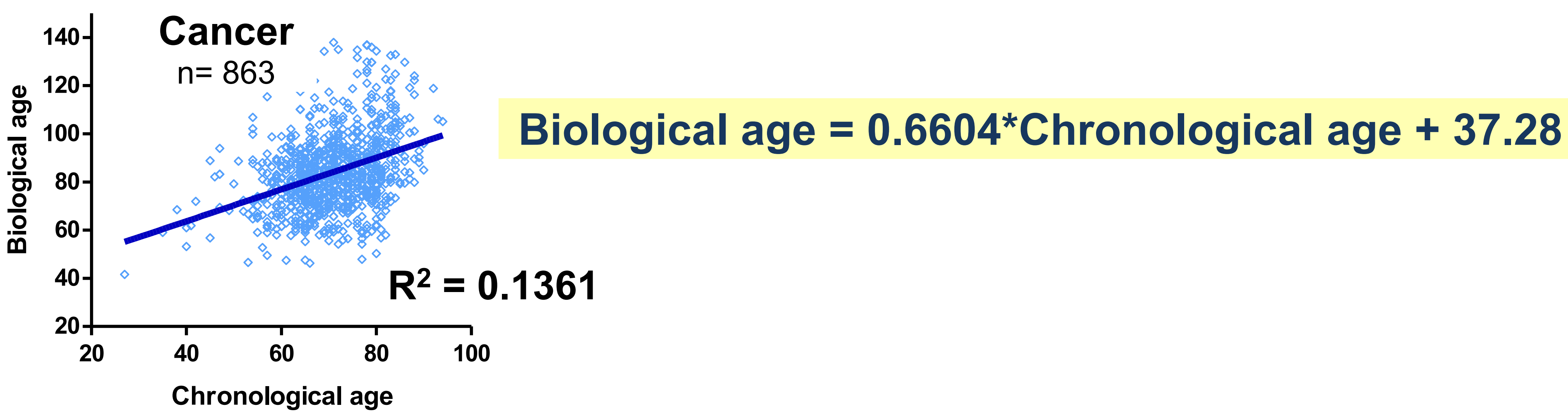
Conflict of Interest Disclosure: Osamu Soma
I have no potential conflict of interest to report

Frailty Discriminant Score (n=2885)

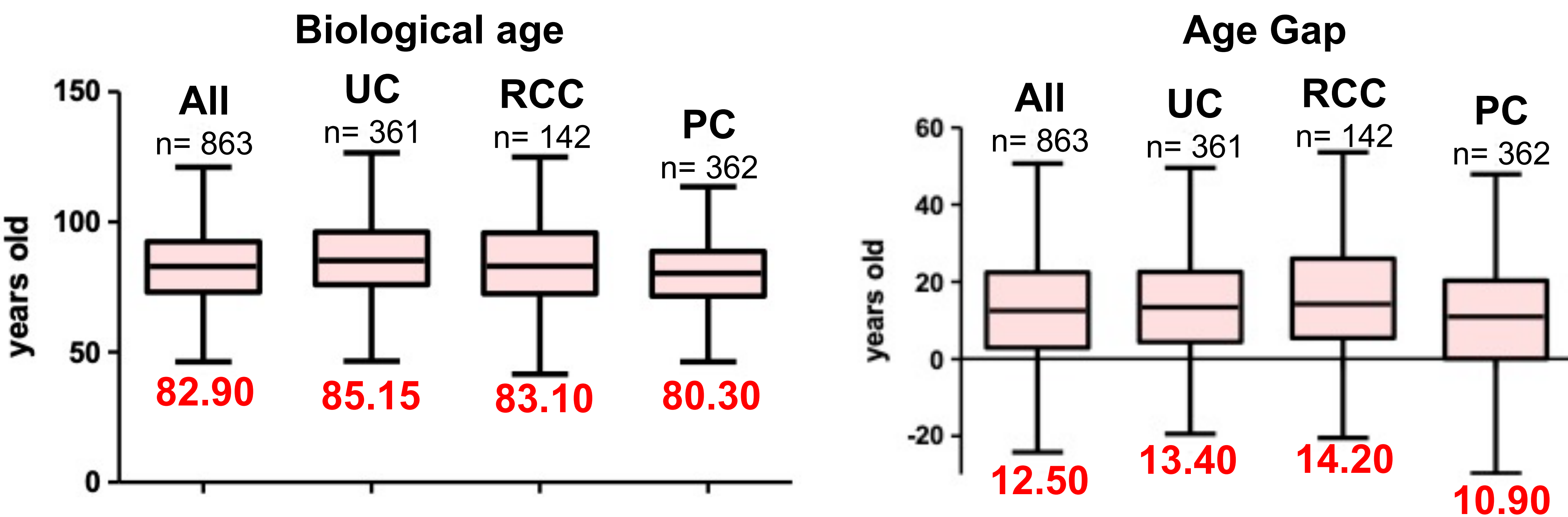


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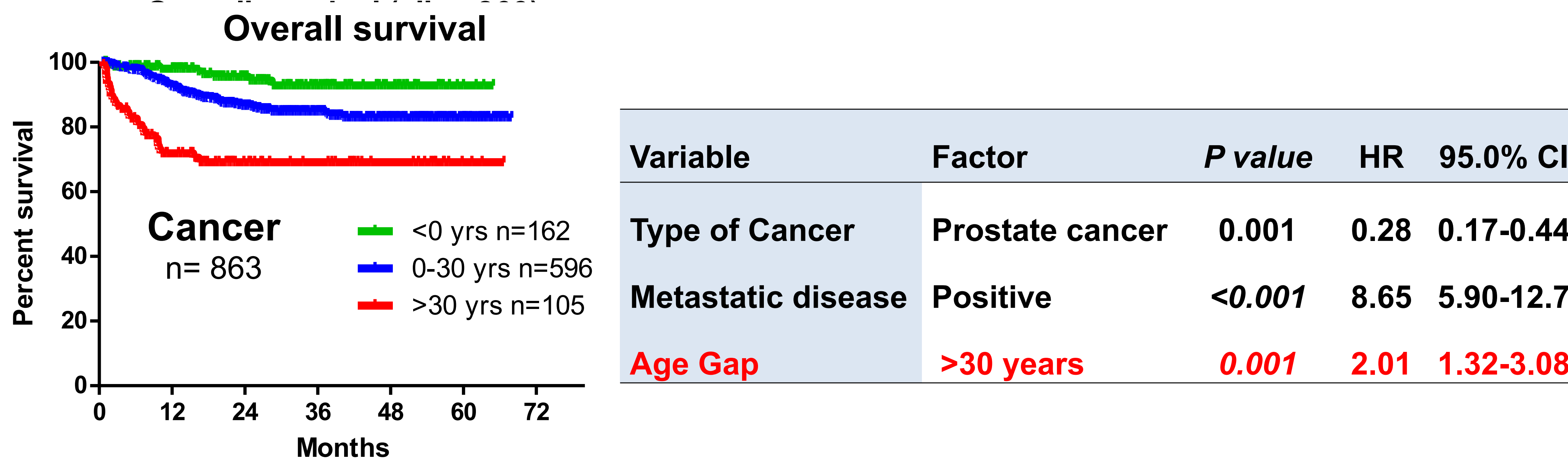
The formula for biological age



Biological age and Age Gap between urological cancers



Association between Age Gap and OS



Scatter plot and approximate curve

