

# Association of LDL Particle Size and Survival in Maintenance Hemodialysis Patients

Antigone Oreopoulos, MPH<sup>1</sup>; Mehdi Rambod, MD<sup>1</sup>; Wael Salameh, MD<sup>2</sup>; Richard E. Reitz, MD<sup>2</sup>; Michael P. Caulfield, PhD<sup>2</sup>;

Allen R. Nissenson, MD, FACP, FASN<sup>3</sup>; Csaba P. Kovesdy, MD<sup>4</sup>; and Kamyar Kalantar-Zadeh, MD, MPH PhD<sup>1\*</sup>

(1)Harold Simmons Center for Chronic Disease Research & Epidemiology, LABioMed at Harbor-UCLA, Torrance, CA; (2)Quest Diagnostics Nichols Institute, San Juan Capistrano, CA; (3)DaVita Inc., Lakewood, CO; (4) VAMC, Salem, VA

## INTRODUCTION

In hemodialysis (HD) patients (pts), traditional measures of lipoproteins are not associated with mortality. Direct determination of lipoprotein particle sizes and concentrations by novel "Ion Mobility Analysis" may provide more direct, accurate and reproducible measurement of size and concentration of lipoproteins.

We hypothesized that smaller LDL particle size is associated with higher death risk in HD pts.

## METHODOLOGY

- We measured LDL particle size in stored sera of a cohort of 235 HD pts.
- The cohort was followed for 3 yr, end-point was survival (1/2004-12/2006).
- LDL particle size measured using a recently developed method in which particles are separated by size in a gas-phase electrophoretic mobility analyzer, the so-called ion mobility (Caulfield et al. *Clin. Chem* 2008; 54:1307).

## RESULTS

Table 1. LDL Size Quartiles and Mortality Hazard Ratios

LDL size quartiles	1 <sup>st</sup> quartile (n=56)	2 <sup>nd</sup> quartile (n=59)	3 <sup>rd</sup> quartile (n=59)	4 <sup>th</sup> quartile (n=61)
LDL size (A)	<219.1	219.1 to 224.3	224.3 to 229.6	>=229.6
HR (Case-mix)	2.2 (1.1-4.6)	2.1 (1.1-4.4)	1 (reference)	1.6 (0.8-3.2)
HR (MICS)	2.4 (1.2-5.5)	2.4 (1.2-5.0)	1 (reference)	1.6 (0.8-3.5)

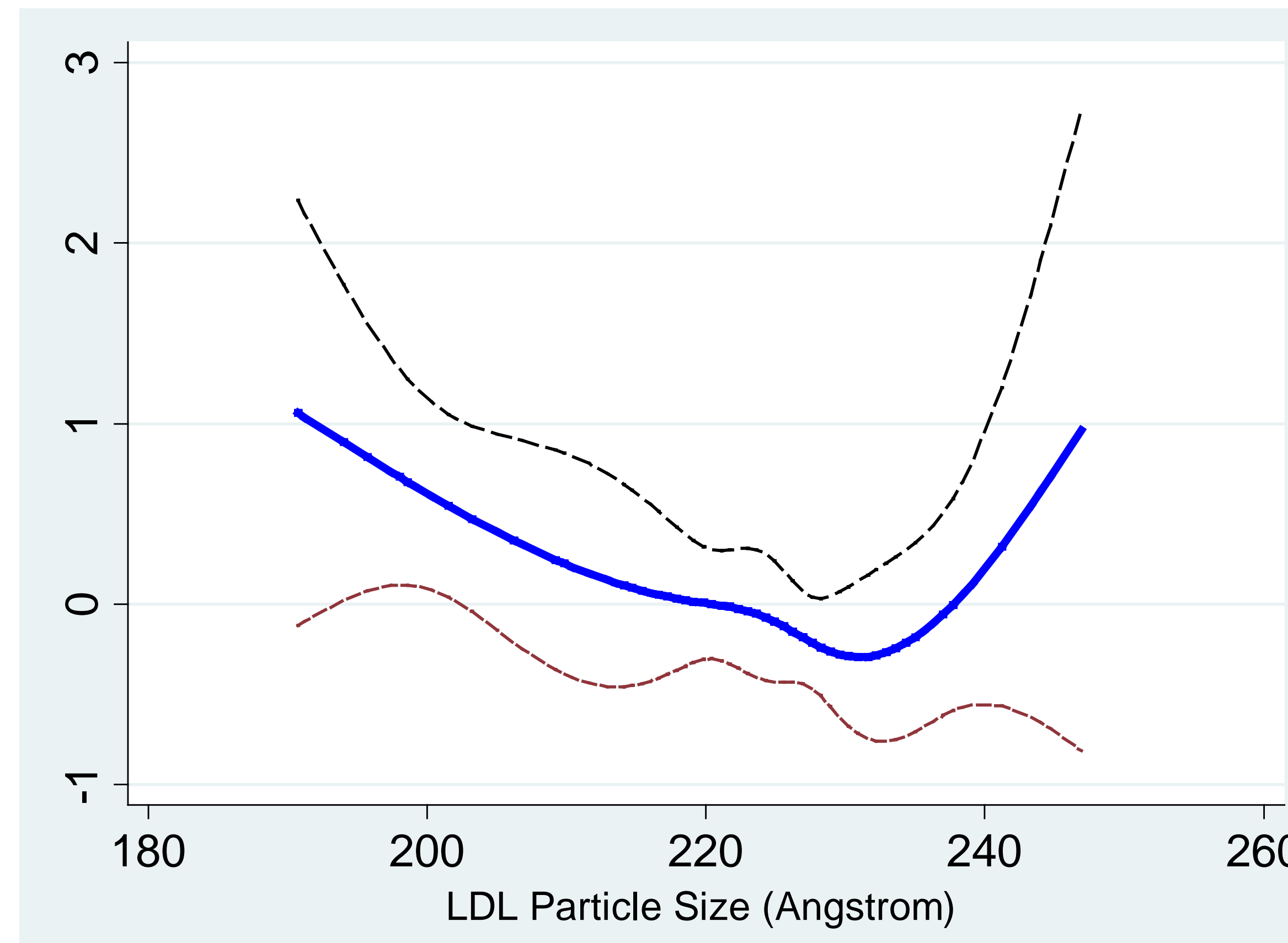


Figure 1. Cubic Spline Cox Model for LDL Size

## CONCLUSIONS

- LDL particle size was 222.5±10.8 angstrom (A) (min: 190.7, max: 246.9 A) (Table 1).
- Naïve LDL, HDL and triglyceride did not correlate with mortality (Table 1).
- However, the smallest LDL size quartile (using 3rd quartile as reference) was associated with 2.4 times higher death hazard ratio (HR) (95% CI: 1.2-5.5) after multivariate adjustment for age, gender, vintage, diabetes, Black race (case-mix), LDL, HDL, triglyceride and serum albumin (MICS) (Table 1).
- Cubic spline Cox models for LDL size was consistent with the quartile analyses (Figure 1).

## KEY LEARNINGS

- ✓ Hence, LDL particle size determination using the novel Ion Mobility methodology provides information related to risk of death not provided by standard lipid parameters in MHD patients.

We thank the patients who participated in this study and DaVita Clinical Research® (DCR) for support in preparing this poster. DCR is committed to advancing the knowledge and practice of kidney care.