



Opinion

# Ideal Sodium Dialysate Concentration: A Brazilian Perspective

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**Abstract:** The current interpretation of the controversial and dynamic nature of the literature reports in this area leads me to lean towards the preference of a standard DNa<sup>+</sup> in the upper range (138 mEq/L) of the current international utilization and preference of clinical directors in Brazil. My opinion to individualize (plus and minus 2 mmol/L of DNa<sup>+</sup> prescription) would be based on clinically relevant signals of excessive interdialytic weight gain and uncontrolled hypertension (to decrease DNa<sup>+</sup> concentration), or intradialytic hypotension episodes (to increase DNa<sup>+</sup> concentration). In my experience, the individualization, based on this approach, would be applicable to a minority (less than 15%) of patients. As new data from randomized clinical trials emerge (particularly the robust RESOLVE trial), I would certainly need (and would be happy) to revise my point of view on this issue.

**Keywords:** hemodialysis; sodium; dialysate composition; volume

“You are being put in charge as the Medical Director of a newly built dialysis clinic in your country. In consideration of available resources and reimbursement policies, how would you prescribe the dialysate sodium concentration for your patients? What would your approach be and why?”

The motivation behind the question asked by the editors of this Special Issue clearly lies in the observation of the peculiar nature of cardiovascular disease in dialysis patients, which is illustrated by the frequent observation of clinical signs of fluid overload, and the almost universal prevalence of left ventricular remodeling [1]. Since a major etiological driver of this pathway under the current paradigm of hemodialysis appears to be the ubiquitous sodium and fluid retention, reducing sodium and fluid overload is a major target for intervention with the potential of moving the needle for this vulnerable population.

A clear modifiable source of sodium exposure in dialysis patients is the dialysate sodium (DNa<sup>+</sup>) concentration. A systematic review recently published summarized the 23 studies comparing low and high DNa<sup>+</sup> concentrations, which encompassed 8 observational studies, 8 quasi-interventional studies, 4 non-randomized clinical studies, and 3 randomized clinical trials [2]. Taken together, the studies suggested lower DNa<sup>+</sup> levels are generally associated with reductions in blood pressure and/or medication requirement, thirst, and interdialytic weight gain, although at the cost of some intradialytic hypotension. The Dialysis Outcome and Practice Patterns Study (DOPPS) reports warrant particular mention, describing an inverse association of DNa<sup>+</sup> with mortality, with the suggestion that the excess mortality was in those with lower serum sodium levels [3,4]. The current state of the art in this area highlights the necessity of conducting well-designed randomized trials, including trials that must assess outcomes in the sickest patients—those least likely to participate in conventional trials of individually randomized patients. The Randomised Evaluation of Sodium Dialysate Levels on Vascular Events (RESOLVE) trial (NCT02823821) may be the best suited to bring a final answer to the question about the ideal DNa<sup>+</sup> associated with the best results as a standardized prescription for most patients. This global study, with final results projected to the end of 2023, will assess the effect of randomizing dialysis sites to 140 mmol/L and 137 mmol/L, on major cardiovascular events and death in more than 50,000 dialysis patients.



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Practice patterns in Brazil have changed substantially over the last 1–15 years towards a prescription trend using lower sodium concentrations. According to a recent survey of Brazilian clinic directors (unpublished observation), the majority (71%) of dialysis units utilize a default dialysate sodium (DNa+) concentration for all patients (with 90% of clinics ranging between 136 and 138 mmol/L) which is most commonly set at 138 mmol/L. Interestingly, the majority of directors of Brazilian clinics reported that they would not be comfortable randomizing patients to DNa+ lower than 136 and higher than 140 mmol/L in a hypothetical cluster-randomized clinical trial.

In concert, the current interpretation of the controversial and dynamic nature of the literature reports in this area leads me to lean towards the preference of a standard DNa+ in the upper range (138 mEq/L) of the current international utilization and preference of clinical directors in my country. My decision to individualize (plus and minus 2 mmol/L of DNa+ prescription) would be based on clinically relevant signals of excessive interdialytic weight gain and uncontrolled hypertension (to decrease DNa+ concentration), or intradialytic hypotension episodes (to increase DNa+ concentration). In my experience, the individualization, based on this approach, would be applicable to a minority (less than 15%) of patients. As new data from randomized clinical trials emerge (particularly the robust RESOLVE trial), I would certainly need (and would be happy) to revise my recommendation.

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