Objectives

- Describe the formation and purpose of the Paediatric Renal Nutrition Taskforce (PRNT)
- Review the evidence review process to form the Clinical Practice Recommendations
- Outline updates from the Clinical Practice Recommendations
The Pediatric Renal Nutrition Taskforce (PRNT) is an international team of pediatric renal dietitians and pediatric nephrologists, who develop clinical practice recommendations (CPRs) for the nutritional management of various aspects of renal disease management in children.
Members of the PRNT

Participants in the First Delphi Survey

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Goals of Recommendations

- KDOQI considered a durable foundation, but there is need to capture advances from newer research
- Update one topic at a time and periodically review
- Provide practical, useful guidance to clinicians
- Distribute to under-served areas of the world, and ultimately impact patient and families
- Consider international perspective

Formation of Taskforce

- Originally devised as European taskforce
  - Core working group – board members
  - 5 physicians and 5 dietitians chosen from multiple applicants
- North Americans (4) added after the first meeting and additional funding secured
- External advisory group included invited clinicians to help form guidelines on topics of expertise
- Inclusion of multi-national reviewers to strengthen international approach
The Paediatric Renal Nutrition Taskforce

The Paediatric Renal Nutrition Taskforce comprises Paediatric Renal Dietitians and Paediatric Nephrologists from 8 countries across Europe and North America who are dedicated to improving the nutritional care of children with kidney disease.

The taskforce is endorsed by ESPN and IPNA.

Why was the Paediatric Renal Nutrition Taskforce created?

The taskforce was set up in December 2017, prompted by the challenges and inconsistencies in the nutritional management of children with kidney disease globally. Many renal centres do not have trained dietitians and the importance of nutrition in patient care is not always addressed in medical education.

Evidence Review Process
PICO Questions

- **Population** – Children from birth to 18 years of age with kidney diseases
- **Intervention**
- **Comparator**
- **Outcomes**
- Group derived search terms in major medical databases

Grading and Follow Up

- Use of the AAP grading system
  - High (A), moderate (B), low (C), very low (D), X – unable to perform studies
- Delphi method
  - International leading experts sent e-questionnaire for level of agreement
    - Strongly agree to strongly disagree
    - 70% consensus required
- Research recommendations included
A new term needed – Suggested Dietary Intake (SDI)

"A number of different terms have been used in international recommendations to describe nutrient adequacy; these include Population Reference Intake (PRI), Recommended Dietary Allowance (RDA), Adequate Intake (AI) and others. Since these recommendations for dietary adequacy have different definitions and have used different methods in their derivation, some of the resulting recommendations differ widely... We have taken a pragmatic approach and quoted the range of the published values for our recommendations. We refer to this new reference using a novel term, Suggested Dietary Intake."
The dietary management of calcium and phosphate in children with CKD stages 2-5 and on dialysis

The dietary management of calcium and phosphate in children with CKD stages 2-5 and on dialysis – clinical practice recommendation from the Pediatric Renal Nutrition Taskforce

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PICO Questions

- **Population**: Children from birth to 18 years of age with CKD-5D.
- **Intervention**: Nutritional requirements for Ca and P in children at different stages of CKD
- **Comparator**: Nutritional requirements for Ca and P in age-matched healthy controls
- **Outcomes**: Growth, bone disease, fracture risk, Ca balance, bone mineralization on imaging or biopsies, development of hypo- or hypercalcemia, hypo- or hyper-phosphatemia or hyperparathyroidism, and development of vascular calcification.

Under review

Recommendation Statements

- **1. What are the main dietary sources of Ca and P for an infant, child and adolescent?**
  - **1.1** The main dietary sources of Ca for children are milk, milk products, breast milk and manufactured infant formulas. Statutory or voluntary fortification of foods with Ca can increase the contribution from other foods. (ungraded)
  - **1.2** The main natural dietary sources of P for children are milk (including milk products, breast milk and manufactured infant formulas), cereal (grains) and cereal products, and meat and meat products. Inorganic P added to some processed foods is readily absorbed and can significantly increase P intake. (ungraded)
Recommendation Statements

◦ 2. How are Ca and P intake assessed in healthy children and children with CKD2-5D?
◦ We suggest that in healthy children and those with CKD2-5D a diet history of a typical 24 hour period be used to rapidly identify the main dietary sources of Ca and P, including P additives in processed foods. An estimate of the total Ca and P intake should consider contributions from diet, nutritional supplements, dialysate and medications, including P binders. (grade C, weak recommendation)

Recommendation Statements

◦ 3. What are the Ca and P requirements in an infant, child and adolescent?
◦ 3.1 Requirements in healthy children We describe the Ca and P requirements for healthy children as background and justification for estimating the requirements for children with CKD2-5D; specific recommendations for healthy children are outside the scope of this document.
◦ 3.2 Requirements in children with CKD2-5D
◦ 3.2.1 We suggest that the diet of children with CKD2-5D should be regularly assessed for total Ca and P content. The contribution of P additives to total P intake cannot be quantified, but dietary sources of P additives should be identified where possible. Frequency of assessment is based on the child’s age, CKD stage and trends in serum Ca, P and PTH. (ungraded)
Recommendation Statements

- 3.2.2 We suggest that the total Ca intake from diet and medications, including P binders, should be within the SDI, and be no more than twice the SDI, unless in exceptional circumstances. (grade C, weak recommendation)

- 3.2.3 In special circumstances, such as for infants with CKD or those with mineral depleted bone, a higher Ca intake may be considered with careful monitoring. (grade C, weak recommendation)

- 3.2.4 We suggest that the dietary P intake of children with CKD should be within the SDI for age, without compromising adequate nutrition. (grade C, weak recommendation)

4. Managing the Ca and P requirements in children with CKD2-5D

- 4.1 We suggest that intake of Ca and P is adjusted to maintain serum Ca and P levels within the age appropriate normal range, without compromising nutrition. Changes in management should be based on trends of serial results rather than a single result, with integration of serum Ca, P, PTH, alkaline phosphatase and 25-vitamin D levels. (grade C, weak recommendation)

- 4.2 We suggest that children with CKD who have hyperphosphatemia or hyperparathyroidism may require further dietary restriction of P, potentially to the lower limit of the SDI, without compromising adequate nutrition. Advice to limit the P contribution from phosphate additives should be given. Use of P binders for further control of serum P and PTH levels is often required, in addition to dietary restriction. Be aware of the high phosphate content of phosphate additives. (grade C, weak recommendation)
Under review
Recommendation Statements

- 4.3 We suggest that children with persistent hypocalcaemia or a high PTH may require a Ca intake above 200% of the SDI for calcium for short periods and under close medical supervision. Calcium can be provided through Ca supplementation, together with vitamin D (usually both native and active forms), as well as other sources of Ca such as a high Ca dialysate. (grade C, weak recommendation)

- 4.4 We suggest that children with persistent hypophosphatemia should have their dietary P intake increased. P supplements may be necessary in some patients, particularly those on intensified dialysis or with renal wasting of P. (grade C, weak recommendation)

5. Management of the CKD patient with hypercalcemia

- 5.1 Acute, severe hypercalcemia can be life-threatening and requires rapid medical intervention. (grade X, strong)

- 5.2 In a child with persistent mild to moderate hypercalcemia, we suggest a stepwise approach with reducing or stopping Ca supplements, Ca-based P-binders, and native and active vitamin D and using lower calcium dialysate. Transient reduction of dietary Ca, without compromising adequate nutrition, may be necessary. Regular reassessment is required, especially when Ca intake is reduced below the SDI. (grade C, weak recommendation)
Energy and protein requirements for children with CKD stages 2-5 and on dialysis

PICO Questions

- **Population:** Children from birth to 18 years of age with CKD2-5D
- **Intervention:** Nutritional requirements for energy and protein in children at different stages of CKD
- **Comparator:** Nutritional requirements for energy and protein in age-matched healthy children
- **Outcomes:** Energy and protein requirements to support normal growth and development in children with CKD2-5D
## Likely highlights from the new recommendations

<table>
<thead>
<tr>
<th>Foundation from Healthy Children</th>
<th>Factors Influencing Children with CKD</th>
<th>Nutritional Prescription</th>
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<tbody>
<tr>
<td>Using all national databases as a range termed the SDI – healthy populations have similar needs to CKD</td>
<td>Adjust energy intake toward higher end for underweight children, adjust as needed for overweight; protein should be within SDI, lower for high urea levels, higher for dialysis losses</td>
<td>Preference is for breastmilk, then whey-based formula, concentrate kcal as needed to meet nutrition goals with gradual increases; solid food as per healthy children balancing with individual diet restrictions, promoting variety and oral stimulation; prompt intervention and supplementation if centiles declining</td>
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</tbody>
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## Assessment of the nutritional status in children with kidney diseases
PICO Questions

- **Population:** Children from birth to 18 years of age with kidney diseases
- **Intervention:** Assessment of nutritional requirements
- **Comparator:** Assessment in healthy age- and gender-matched pediatric populations or no comparator
- **Outcomes** – Valid assessment of underweight, overweight, obesity, malnutrition and related calorie and protein needs, adequacy of nutritional intake

Likely highlights from the new recommendations

**Anthropometrics**
Use standard measures (ht, wt, BMI, HC), age-based guidance; use WHO or region-specific growth charts; trends important; z-scores complementary; frequency guidelines; z-scores complementary; mid-parental height; prematurity guidelines; secondary measure guidelines

**Dietary Intake**
Frequency of dietary evaluation based on severity of illness/other factors; evaluate appetite; 3 day+ food record first choice, then dietary recalls

**Biochemical**
nPCR for adolescents on HD, caution with albumin; other labs potentially part of the total picture
Upcoming Recommendation Documents

- Delivery of the nutritional prescription
- Potassium management
- Obesity and metabolic syndrome
- Kidney transplant

Thanks!

Any questions?

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