The mission of the NKC is to improve the health of newborns with or at risk for kidney disease through multidisciplinary collaborative research, advocacy, and education.

Kidney Health in the Preemie Population

What do the kidneys do?

The kidneys do a lot of jobs in the body, including helping with growth, and removal of waste products and water as urine from the body.

Why should I be worried about my baby's kidneys?

Just like many organs, the kidneys can be underdeveloped if a baby is born prematurely. This can cause the kidneys to not be able to perform its jobs, leading to issues later in life.

These issues include:

- Bone problems
- Failure to grow
- High blood pressure
- Electrolyte problems
- Buildup of waste products

How does this put my child at risk?

Babies who are born prematurely are at an increased risk for Chronic Kidney Disease (CKD) later in life, even if their kidney function is normal before hospital discharge.

What do we need to do?

Kidney disease can progress without any outward signs. We recommend that your child be screened for any signs of CKD. This includes taking a blood pressure, a urine sample to check for protein, and a blood sample to measure the function of the kidney. Unfortunately, it is hard to know how well the kidney is working without a blood sample. We try and take as little blood as possible with minimal pain to your baby.

We may ask you to have your pediatrician measure blood pressure and look at your child's urine or blood from time to time. If anything is not normal, our kidney team at Children's of Alabama can help manage that!

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Chronic Kidney Disease
in the Preemie Population

Name ____________________________ Age __________

Kidney function

	Now	Last	Target
BUN	_____	_____	_____
Cr	_____	_____	_____
GFR	_____	_____	_____

Kidney function is measured by a patient's blood creatinine and a patient's height. Creatinine is a normal waste product found in the body and urine. The higher the creatinine in the body, the less that is being eliminated in the urine, meaning your kidneys aren't working properly.

Blood pressure

You _____________ Target _____________

High blood pressure can cause permanent damage to your heart and kidneys and could cause stroke and brain damage.

Protein in the urine

Normal urine does not have protein in it, as kidneys hold protein in. Damaged kidneys can spill protein into the urine. We will check your urine for protein. If the urine is not normal, we will contact you about further work up.

The Pediatric and Infant Center for Acute Nephrology (PICAN) will follow your child if there are signs that kidney disease is present.

It is important that your child avoid certain medications that may be harmful to the kidney. Please see list on back of this sheet.

Common NSAIDS (Nonsteroidal Anti-Inflammatory Drugs)

Generic Name	**Brand Name**
Aspirin (Acetylsalicylic acid)	Bufferin, Ecotrin, Bayer, Stanback Analgesic
Celecoxib	Celebrex

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Dexdetroprofen	Keral
Diclofenac	Voltaren, Cataflam, Arthrotec, Cambria
Diflunisal	Dolobid
Etodolac	Lodine
Etoricoxib	Algix
Fenoprofen	Nalfon, Fenopron
Firocoxib	Equioxx, Previcox
Flurbiprofen	Ansaid, Urbifen, Fluriwood, Froben
Ibuprofen	Advil, Genpril, Midol IB, Motrin, Nuprin, Vicoprofen, Medipren, Wal-profen,
Indomethacin	Indocin, Indo-Lemmon, Indomethagan
Ketoprofen	Orudis, Actron, Orovail, Ketoflam
Ketorolac	Toradol, Sprix
Meclofenamate	Meclomen
Mefenamic Acid	Ponstel
Meloxicam	Mobic, Recoxa, Melox, Movalis
Nabumetone	Relafen
Naproxen	Aleve, Naprosyn, Anaprox, Naprelan, Prevacid, NapraPac, Midol Extended Relief
Oxaprozin	Daypro, Dayrin, Duraprox
Piroxicam	Feldene, Fexicam
Salsalate	Disalcid, Salflex
Sulindac	Clinoril
Tenoxicam	Mobiflex
Tolmetin	Tolectin
Valdecoxib	Bextra

*This list does not include every medication that is an NSAID. Some medications combine NSAIDs with other ingredients.

*Please be sure your healthcare provider understands your child's AKI and knows his/her kidney function before prescribing antibiotics or ordering contrast for an x-ray, CT scan or MRI.

Chronic Kidney Disease in the Preemie Population: An Information sheet for Pediatricians

Name ______________________________ Age ____________

Research shows that ELGANs are at increased risk for chronic kidney disease (CKD). Your patient was screened for CKD at the most recent Newborn Follow Up clinic visit and was found to have the following:

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Blood pressure: _______________ Normal for age/ht _____________

Kidney function: Cr_______ GFR_______ Normal for age/ht Cr____ GFR____

Proteinuria __________________ Normal for age ______<30mg/g__

Please measure BP and check urine for your patient at every visit and q_____________.

Please contact 205 638 9781 and ask for a PICAN provider to follow up if any of these are concerning to you.

Neonatal KIDNEY Collaborative

The mission of the NKC is to improve the health of newborns with or at risk for kidney disease through multidisciplinary collaborative research, advocacy, and education.

What is the prevalence of 2 year kidney outcomes in extremely low for gestational age neonates (ELGANs) born <28 weeks gestation?

CJASN
Clinical Journal of the American Society of Nephrology

Investigator

Recombinant Erythropoietin for Protection of Infant Renal Disease (REPAIReD) study

Study Cohort from

PENUT Trial
Preterm Epo Neuroprotection

< 28 Weeks Extremely low for gestational age neonates (ELGANs)

N – 832 survived to 2 yrs
N – 565 had at least one outcome measured

Kidney Outcomes at 2 years corrected gestational age

eGFR <90mL/min/1.73m²	Albuminuria < 30 mg/g	Systolic BP >90th %tile	Diastolic BP >90th %tile
61 (17%)	**155 (36%)**	**65 (22%)**	**128 (44%)**

eGFR < 90mL/min was associated with

- **Gestational age** OR = 0.94 (95%CI 0.89-0.99)
- **Prenatal steroids** OR = 1.23 (95%CI 1.08-1.39)
- **Birth weight z-score** OR = 0.91 (95%CI 0.85-0.98)

↑ SBP was associated with

- **Indomethacin use** OR = 1.18 (95%CI 1.04-1.33)
- **Black Race** OR = 1.19 (95%CI 1.01-1.39)

↑ DBP was associated with

- **Male Sex** OR = 1.29 (95%CI 1.13-1.49)
- **Severe AKI** OR = 1.24 (95%CI 1.04-1.48)
- Indomethacin use OR = 1.16 (95%CI 1.01-1.33)

Conclusion: Approximately 17% of ELGANs have CKD, 35% have albuminuria, 22% have an elevated systolic BP, and 44% have an elevated diastolic BP at 2 years of age. GA, birthweight z-score, and prenatal steroids were associated with low eGFR. Male sex, Black race, indomethacin use, and severe AKI were associated with elevated BP.

Sangeeta Hingorani, Robert Schmicker, Kaashif A. Ahmad, et al. *Prevalence and Risk Factors for Kidney Disease and Elevated Blood Pressure in 2-Year-Old Children Born Extremely Premature.* CJASN doi: 10.2215/CJN.15011121. Visual Abstract by Aakash Shingada, MD

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