

# HQIC Community of Practice Call

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The Impact of Healthcare Associated Renal Damage, and the Connection to Long Term Renal Disease: How Can Health Care Organizations Reduce Risk for Patients?

June 9, 2022

# Introduction

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Welcome!

**Shaterra Smith**

Social Science Research Analyst - Division of  
Quality Improvement Innovation Models Testing  
iQuality Improvement and Innovations Group  
Center for Clinical Standards and Quality  
CMS

# Agenda

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- Introduction
- Today's Topic
  - The Impact of Healthcare Associated Renal Damage, and the Connection to Long Term Renal Disease: How Can Health Care Organizations Reduce Risk for Patients?  
Presentations by Bruce W. Spurlock, M.D., President and CEO, Convergence Health Consulting  
Maryanne Whitney, Improvement Advisor, Cynosure Health, Convergence HQIC  
Deb DeWalt, Quality Improvement Director, IPRO ESRD Network Program  
Patrick O. Gee, PhD, JLC, Founder and Chief Executive Hope Dealer for iAdvocate, Inc.
- Open Discussion
- Closing Remarks

## As You Listen, Ponder...

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- What information can you leverage to help expand opportunities in your facilities and communities?
- What impactful actions can you take as a result of the information shared today?
- Where can you begin with your facility to continue to ensure safety, and a true patient-centered approach as you engage collaboratively with others?
- What activities do you have underway that will allow for you to expand and push forward in action over the next 30, 60 or 90 days?

# Meet Your Speakers

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**Bruce W. Spurlock, MD**  
President and CEO  
Cynosure Health  
Convergence Health Consulting



**Maryanne Whitney, RN, CNS, MSN**  
Improvement Advisor  
Cynosure Health  
Convergence HQIC



**Deb DeWalt, MSN, RN**  
Quality Improvement Director  
IPRO ESRD Network Program



**Patrick O. Gee, PhD**  
JLC Founder and CEHD  
iAdvocate, Inc.

# The Impact of Healthcare Associated Renal Damage, and the Connection to Long Term Renal Disease:

## How Can Health Care Organizations Reduce Risk for Patients?

A presentation from  
Convergence HQIC / IPRO HQIC / IPRO ESRD Program

June 9, 2022

HQIC Community of Practice Event

# Reducing the Risk of Contrast Induced Nephropathy

Bruce Spurlock, MD  
President and CEO  
Cynosure Health  
Convergence HQIC

[Bspurlock@Cynosurehealth.org](mailto:Bspurlock@Cynosurehealth.org)

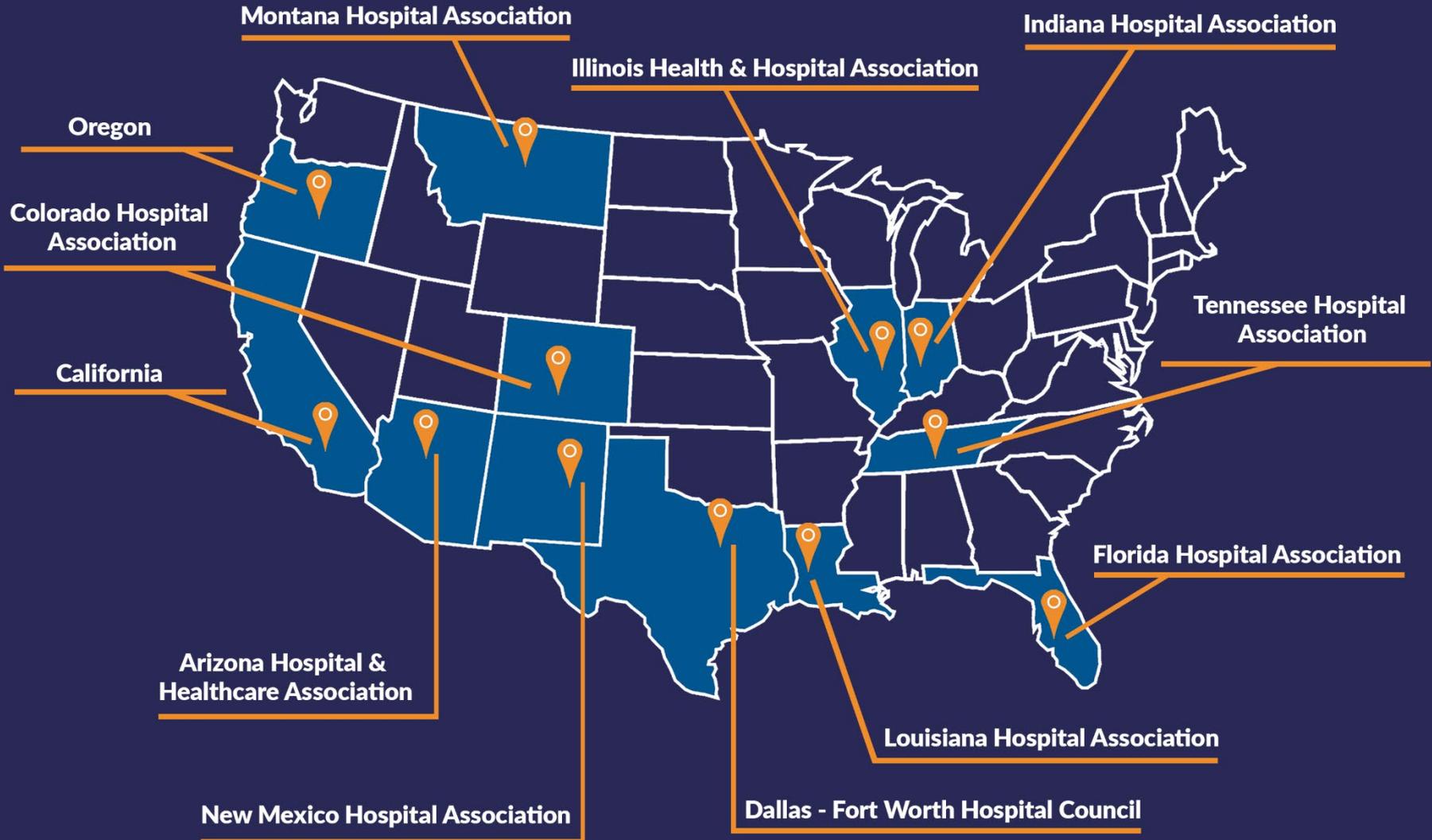


Maryanne Whitney, RN, CNS, MSN  
Improvement Advisor  
Cynosure Health  
Convergence HQIC

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# Cynosure HQIC



# Contrast Induced Nephropathy (CIN)

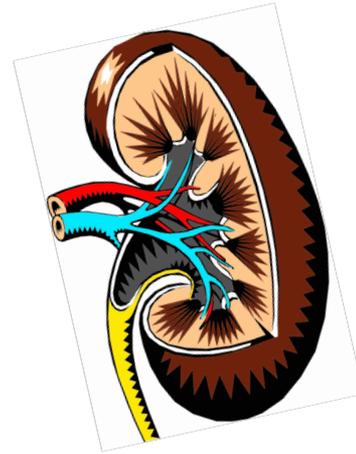
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- CIN is commonly defined as a decline in kidney function occurring in a narrow time window after administration of iodinated contrast agents
  - Radiological procedures utilizing intravenous iodinated contrast agents are being widely utilized for both therapeutic and diagnostic purposes. Thus, increasing the incidence of procedure-related, contrast-induced nephropathy (CIN).
  - CIN carries a risk of more permanent renal insufficiency, dialysis, and death.
  - It remains a common and serious complication among at-risk patients after exposure of contrast agents.
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# Pre-procedure Screening

Understand a patient's risk for CIN development

- Calculator (age, etc)
- Creatinine Clearance (Cr Cl)
- Glomerular Filtration Rate (GFR)



# Example Calculators

**RenalGuard** | CA-AKI | Cardiac Surgery | **Risk Calculators** | Media / Events | Company Info | Contact

CIN Risk Calculator | CIN Risk Calculator App | eGFR Calculator | GFR Calculator Request | CIN Cost Calculator

| Risk Factors                           | Values           | Risk Score |
|--|------------------|------------|
| Age (yrs)                              | 65               | 0          |
| Gender                                 | Male             | See GFR    |
| Race                                   | African-American | See GFR    |
| Hypertension**                         | No               | 0          |
| Intra-Aortic Balloon Pump              | No               | 0          |
| Congestive Heart Failure***            | No               | 0          |
| Hematocrit                             | 39+              | 0          |
| Diabetes                               | No               | 0          |
| Contrast Media Volume (cc)             | 0-100            | 1          |
| Serum Creatinine (mg/dL)               | 1.2              | See GFR    |
| Glomerular Filtration Rate Index (GFR) | 78               | 0          |

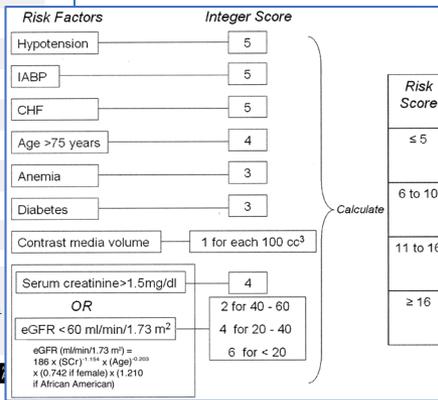
**Risk of Contrast-Induced Nephropathy: 7.5%**

**Risk of Need for Dialysis: 0.04%**

**One Year Mortality Risk: 2%**

Reset Calculator

\* All ethnic groups other than African-American.  
\*\* Hypertension: systolic blood pressure  $\geq 160$  mmHg for at least 1 hr, requiring isotropic support or intra-aortic balloon pump support within 24 hr, periprocedurally.  
\*\*\* Congestive Heart Failure: CHF class III/IV by New York Heart Association and/or history of pulmonary edema.  
Mehran R, Aurang EO, Nikolsky E, et al. A simple risk score for prediction of contrast-induced nephropathy after percutaneous coronary intervention: Development and initial validation. J Am Coll Cardiol. 2004;44(7):1393-1399. doi:10.1016/j.jacc.2004.06.065.



<https://renalguard.com/risk-calculators/>

**BMC2 PCI Risk Calculator for Death, Transfusion, and CIN**

**Age\***  
Age of patient at the time of care.

**Weight\***  
Indicate the patient's weight in kilograms.

**Height\***  
Indicate the patient's height in centimeters.

**Diabetes Mellitus\***  
Any occurrence between birth and arrival at this facility.  
 Yes  
 No

**Diabetes Therapy**  
Indicate the most aggressive therapy the patient presented with.  
 No Diabetes

**Chronic Lung Disease\***  
Any occurrence between birth and arrival at this facility.  
 Yes  
 No

**Heart Failure w/in 2 Weeks\***  
Indicate if there is physician documentation or report that the patient has been in a state of heart failure within the past 2 weeks.  
 Yes  
 No

**NYHA Class w/in 2 Weeks**  
The highest value between 2 weeks prior to current procedure and current procedure.  
 NA

**PCI Status\***  
Indicate the status of the PCI. The status is determined at the time the operator decides to perform a PCI.  
 - Select -

**PCI Indication\***  
Indicate the reason the PCI is being performed.  
 - Select -

**CAD Presentation\***  
Indicate the patient's coronary artery disease (CAD) presentation. Choose the worst status.  
 - Select -

<https://bmc2.org/quality-improvement/risk-calculators/bmc2-pci-risk-calculator-death-transfusion-and-cin>

# High Risk for CIN Development

**Preexisting renal dysfunction is the most significant risk factor for CIN, and up to 60% of the patients who develop CIN have a previous history of renal dysfunction**

- Diabetic patients
- Female gender
- Congestive heart failure
- Cardiovascular disease
- Dehydration
- Cirrhosis
- Anemia
- Elevated C reactive proteins

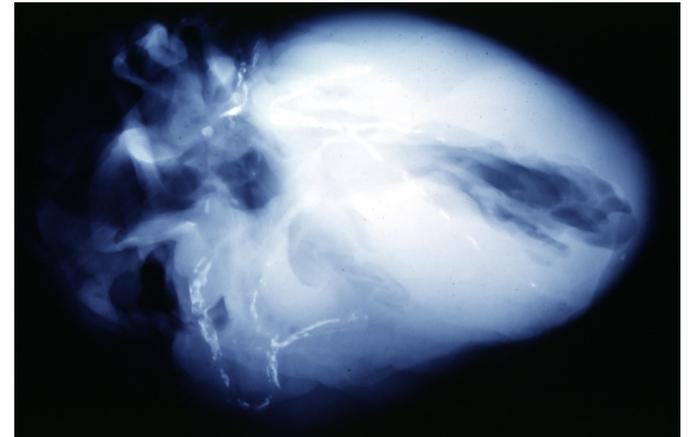
**There is a 5% increase in risk when there are two risk factors recognized which can increase to as much as 30% in patients with three risk factors.**

# Prevention Strategies for High-Risk Patients

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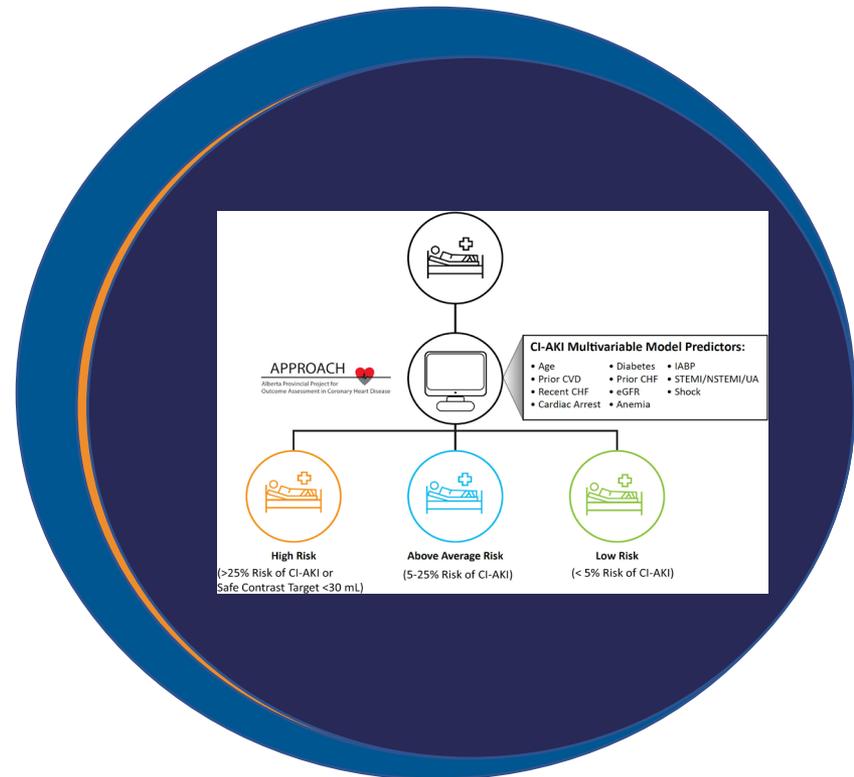
## Consider

- Dose and type of contrast agent modifications
- Specific contrast agent
- Concurrent nephrotoxic agents
- Devices for renal protection



# Prevention of CIN for patients who are at higher risk after screening

- Avoid volume depletion and NSAIDs
- Consider dose and type of contrast modifications
- Hydration: Fluid administration
  - Isotonic Saline
  - Bicarbonate
  - Acetylcysteine
  - Oral salt loading
- Vitamin C



# Unproven considerations

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- Remote ischemic preconditioning
- Prophylactic hemofiltration or hemodialysis
- Withholding Angiotensin Converting Enzyme (ACE) inhibitors and/or Angiotensin Reabsorption Blocking agents (ARBs)
- Statins
- Diuretics

# Additional tools

## Procedure

1. Schedule outpatients for early arrival to allow time for adequate hydration pre-procedure
  - a. If Isotonic or normal saline is ordered for hydration, it should be started at least 3 hrs prior to procedure
    - i. For GFR >60 ml/min
      - Initial rates should be at least 100-150 cc/hr with ideally 300-500 ml infused prior to procedure. Adjustments to rate post procedure to be made as clinically indicated.
    - ii. For GFR 30-60 ml/min (moderate renal dysfunction):
      - Inpatients: start IV hydration at 9pm the night before procedure
      - Outpatients: schedule arrival to allow for at least 3 hrs of IV hydration prior to procedure
      - EF >50% recommend NSS @ 100-150 cc/hr
      - EF 40-50% recommend NSS @ 80 cc/hr
      - EF <40% recommend NSS @ 60 cc/hr
    - iii. For GFR <30 ml/min (severe renal dysfunction)
      - Consider postponement of procedure
      - At minimum, use the least amount of contrast as possible
    - iv. For GFR <15 ml/min
      - Patients on dialysis so need to coordinate dialysis treatment in regard to timing of procedure

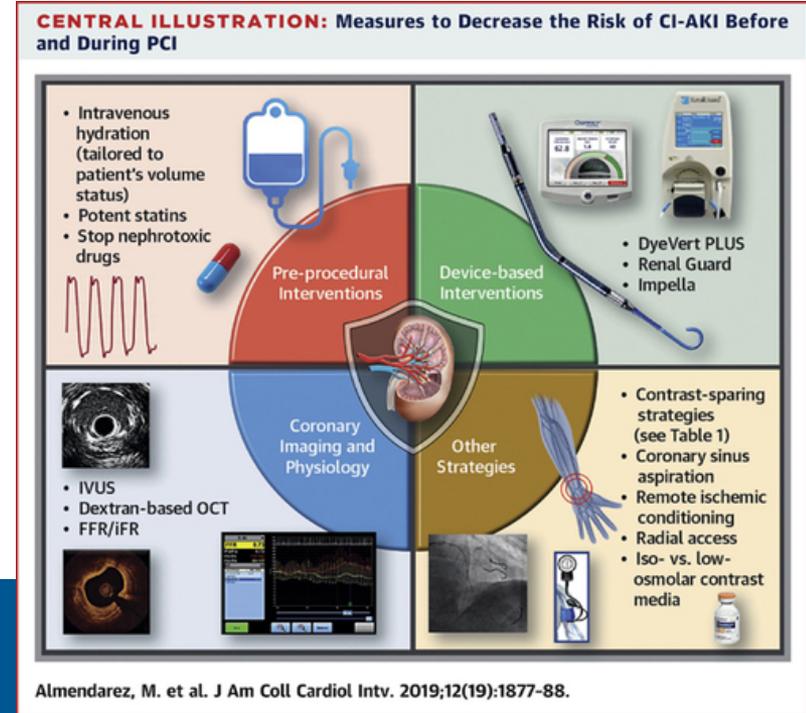


Figure 2. The hydration protocol at Chester County Hospital.

# Resources for Contrast Induced Nephropathy Prevention



## Risk Identification Tools:

- <https://renalguard.com/risk-calculators/>
- [https://bmc2.org/quality-improvement/risk-calculators/bmc2-pci-risk-calculator-death-transfusion-and-cinhttps://qxmd.com/calculate/calculator\\_47/contrast-nephropathy-post-pci](https://bmc2.org/quality-improvement/risk-calculators/bmc2-pci-risk-calculator-death-transfusion-and-cinhttps://qxmd.com/calculate/calculator_47/contrast-nephropathy-post-pci)

## Resources

- [https://www.uptodate.com/contents/prevention-of-contrast-induced-acute-kidney-injury-associated-with-computed-tomography?topicRef=7221&source=see\\_link#H4118157279](https://www.uptodate.com/contents/prevention-of-contrast-induced-acute-kidney-injury-associated-with-computed-tomography?topicRef=7221&source=see_link#H4118157279)
- <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8174394/>
- <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5954945/>
- <https://onlinelibrary.wiley.com/doi/full/10.1002/clc.23023>
- <https://www.bmj.com/content/351/bmj.h4395.short>
- [https://www.uptodate.com/contents/prevention-of-contrast-associated-acute-kidney-injury-related-to-angiography?topicRef=112897&source=see\\_link#H4022880283](https://www.uptodate.com/contents/prevention-of-contrast-associated-acute-kidney-injury-related-to-angiography?topicRef=112897&source=see_link#H4022880283)

# Improving Patient Outcomes and Optimizing the Transition from CKD to ESRD



Deb DeWalt, MSN, RN  
Quality Improvement Director  
IPRO ESRD Network Program

[Deborah.Dewalt@ipro.us](mailto:Deborah.Dewalt@ipro.us)

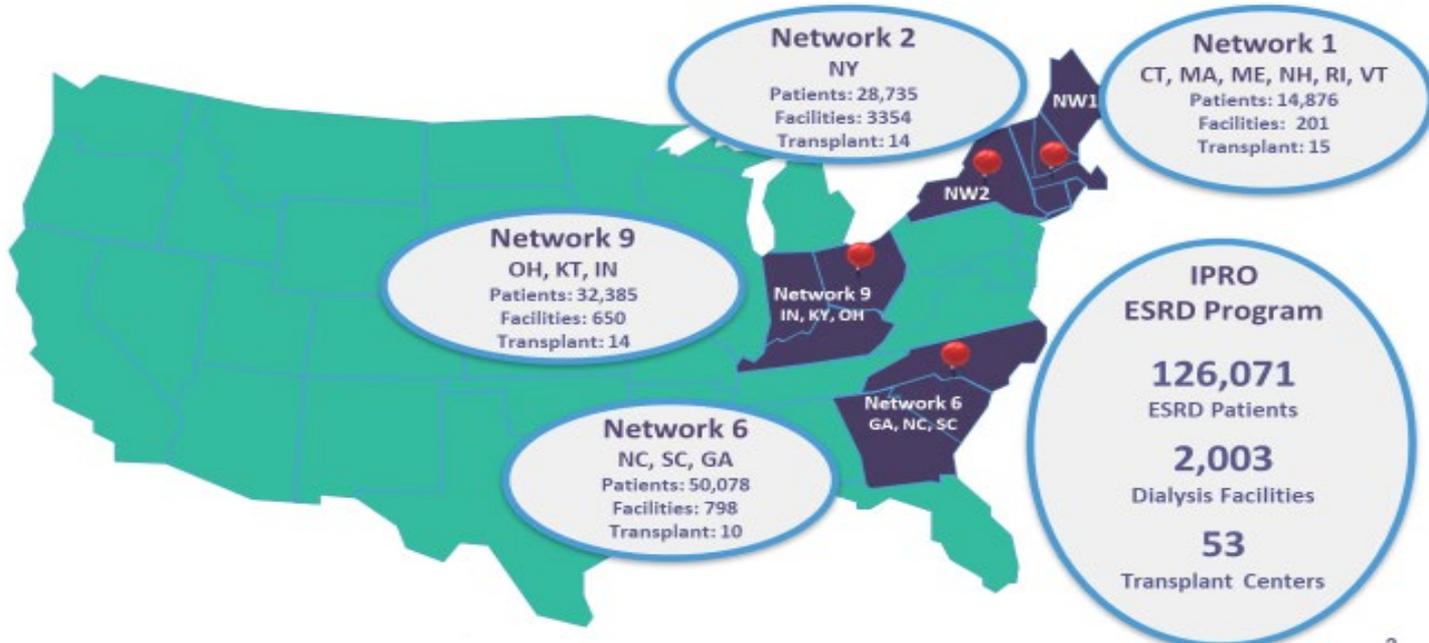


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■ Superior Health Quality Alliance

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# IPRO ESRD Network 2021 Service Areas

(2021 Network Annual Reports)

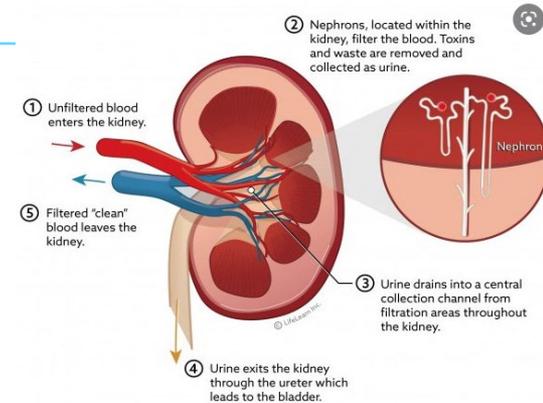


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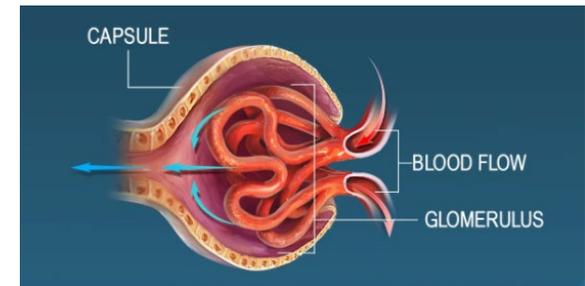
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# Healthy Kidneys: What Do They Do?

- Cleans the blood of waste products
- Removes extra fluid from the body
- Helps the body make red blood cells
- Keeps the bodies electrolytes in balance
- Controls blood pressure
- Helps maintain healthy bones-CA/Phosphorus balance
- Helps maintain a healthy heart



A healthy kidney and the blood filtration process



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# Chronic Kidney Disease (CKD)

*CKD means that there has been irreversible loss of kidney function and glomeruli.*

## Risk Factors:

- Diabetes
- High blood pressure
- Heart disease
- Family history of kidney failure

| STAGES OF CHRONIC KIDNEY DISEASE                                      | GFR*         | % OF KIDNEY FUNCTION |
|---|--------------|----------------------|
| <b>Stage 1</b> Kidney damage with <b>normal</b> kidney function       | 90 or higher | 90-100%              |
| <b>Stage 2</b> Kidney damage with <b>mild loss</b> of kidney function | 89 to 60     | 89-60%               |
| <b>Stage 3a</b> <b>Mild to moderate</b> loss of kidney function       | 59 to 45     | 59-45%               |
| <b>Stage 3b</b> <b>Moderate to severe</b> loss of kidney function     | 44 to 30     | 44-30%               |
| <b>Stage 4</b> <b>Severe</b> loss of kidney function                  | 29 to 15     | 29-15%               |
| <b>Stage 5</b> Kidney <b>failure</b>                                  | Less than 15 | Less than 15%        |

\* Your GFR number tells you how much kidney function you have. As kidney disease gets worse, the GFR number goes down.

# The Facts

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80% of Dialysis Patients “Land” into treatment with no Nephrology Care:

- 50% have hypertension (HTN)
- 40% have diabetes (DM)
- 5% are congenital anomalies
- 5% from other

Many of these conditions were undiagnosed or poorly followed prior to their first dialysis treatments.



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# The Benefits of Early Diagnosis of CKD and *Nephrology Care*

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## **Nephrologists are able to:**

Manage co-morbid conditions and the correlating treatments that slow progression to ESRD:

- Hypertension control
- Diabetic management or referral to endocrinologist that sub specialize in CKD/ESRD patients
- Anemia
- Educate on fluid and diet restrictions
- Symptom Control
  - Pruritis
  - Nausea / Vomiting
  - Edema



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# Patients and Caregivers that are Transferred to a Nephrologist Care are More Likely to:

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Have participated in some early education series which include:

- Discussion of therapies available to treat ESRD
  - Transplantation
    - Living Donor
    - Deceased Donor
  - Home Modalities
    - Peritoneal
    - Home Hemodialysis
- Dietary Consult
  - Transition from CKD to ESRD diet restrictions
  - Symptom control of no taste, nausea control and itching
- Social Work Consult
  - Financial support options
  - Early screening and referral for treatment for depression
  - Promotion of quality of life



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# New Trends in ESRD Prevention

## Machine Learning (ML)/Artificial Intelligence (AI) - the hope for the future

- At-risk patients often do not receive routine primary care when early detection is key.
- Machine learning models/AI has proven effective in predicting the potential for patients to develop CKD as well as in predicting the progression to ESRD from CKD in Type 2 Diabetes or after instances of sepsis.
- *“From a policymaker’s point of view, these ML-based models could be efficiently used in resource management and initiating public health initiatives such as closely monitoring and early detection of CKD”*
- New Diabetic Oral Hypoglycemics are now available that slow the progression of CKD to ESRD

# Prevention - the Key to the Future

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*“The ESRD incidence rate is projected to rise between 11-18% between 2015 and 2030, and the prevalence is projected to rise from 971,000 to 1,259,000 patients over the same period.”* J

*AmSocNephrol 30: ccc–ccc, 2019. doi: <https://doi.org/10.1681/ASN.2018050531>*

- Early prediction and referral for appropriate care critical for improved outcomes
- Use of Machine learning models will help with detection and resource allocation
- Adjustment of diet, lifestyle, and medication therapy can prevent ESRD
- Preventing kidney harm when providing care is an important part of the solution



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# How Can the Lived Experiences of the Patients We Serve Help Us to Prevent Harm?



Patrick O. Gee, Ph.D., JLC  
Founder and CEHD  
iAdvocate, Inc.  
[Geepatrick50@yahoo.com](mailto:Geepatrick50@yahoo.com)

## Discussion

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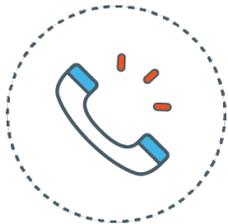
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# Final Thoughts

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# Join Us for the Next Community of Practice Call!

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Join us for the next  
Community of Practice Call on July 14, 2022  
from 1:00 – 2:00 PM ET

We invite you to register at the following link:

[https://zoom.us/webinar/register/WN\\_ASI\\_I3p\\_TEyX\\_VY\\_YYFFeA](https://zoom.us/webinar/register/WN_ASI_I3p_TEyX_VY_YYFFeA)

*You will receive a confirmation email with login details.*

# Thank You!

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*Your opinion is valuable to us. Please take 4 minutes to complete the post event assessment here: [post assessment 6.9.22](#)*

*We will use the information you provide to improve future events.*