

Acute Disease Quality Initiative XXII: Quality Improvement Goals for Acute Kidney Injury

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For the ADQI Consensus Group



ADQI 22 Consensus Group

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ADQI 22 Consensus Group



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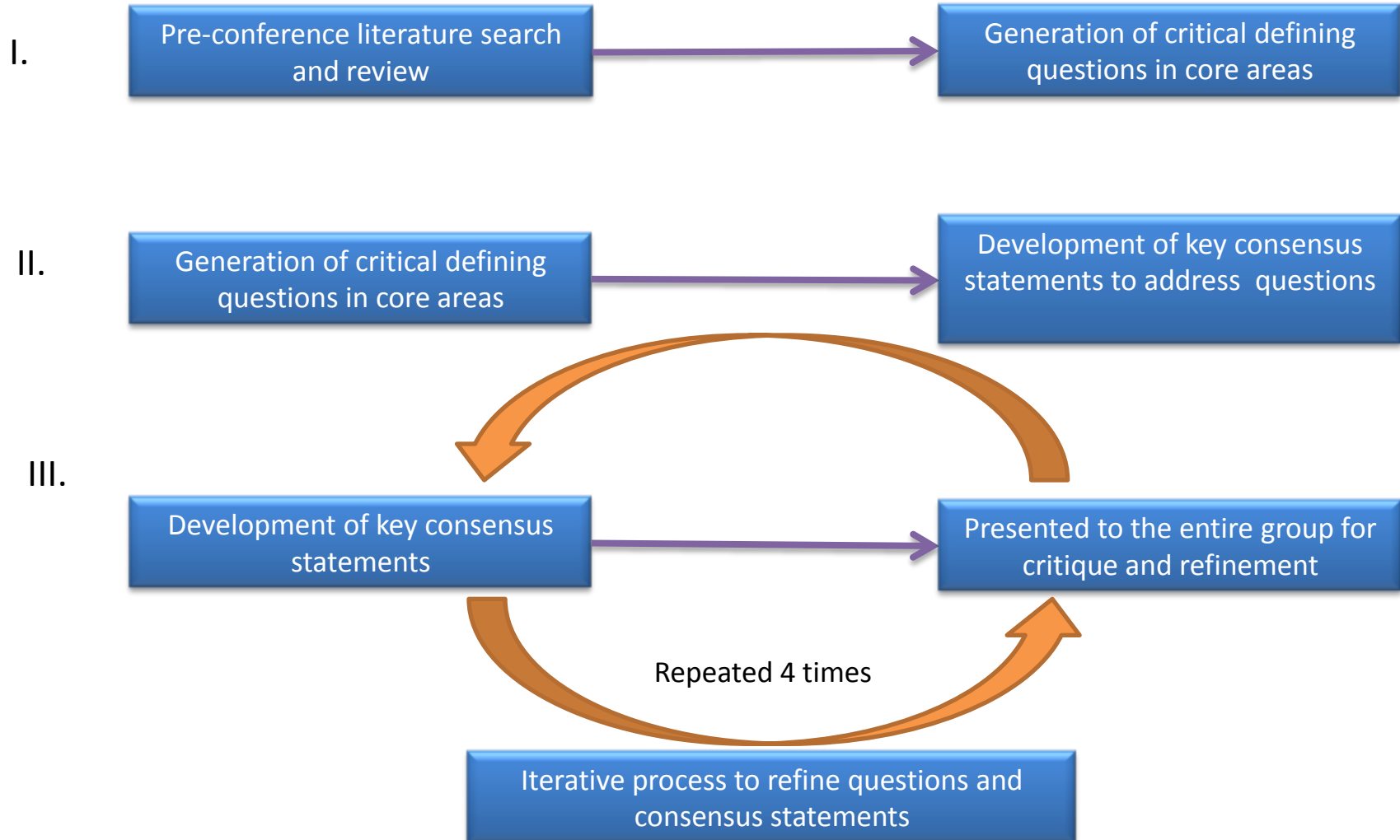
- Goals:
 - Provide an objective, dispassionate distillation of literature
 - Describe current state of practice, diagnosis, and management of AKI and dialysis
- 21 prior consensus groups covered essential topics in AKI, dialysis and critical care

ADQI XXII consensus meeting

- Diverse panel of experts
 - Nephrology
 - Critical care
 - Nursing
 - Pharmacy
 - Epidemiology
 - Biostatistics
 - Medical informatics
- Quality improvement processes
 - Knowledge gaps
 - Research agenda
- October 28-30, 2018

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Modified Delphi



ADQI XXII groups and objectives

Group #	Assignment	Objectives
I	Primary prevention-Community	<ul style="list-style-type: none"> - Provide consensus recommendation to mitigate the risk of AKI in the populations of resource-limited or resource sufficient environments - Current best practices at the community levels - Novel strategies to detect higher risk patients, raising awareness, communicating with primary physicians, and legislative strategies to achieve the goals
II	Primary prevention-Hospital	<ul style="list-style-type: none"> - Provide recommendations regarding the AKI risk modification and primary prevention following medical encounters - Strategies for optimization of AKI prevention before its occurrence - Risk stratification, early detection, use of biomarkers or other novel risk detecting tools, and optimal management
III	Secondary Prevention	<ul style="list-style-type: none"> - Provide recommendations about quality indicators to mitigate the impact of AKI after its occurrence (secondary prevention) - Indicate the best practices in the management of patients with AKI in different stages
IV	Quality improvement of RRT programs	<ul style="list-style-type: none"> - Provide an approach to improve quality of care and safety measures of renal replacement therapy (RRT) provided for AKI - Recommendations regarding how to enhance the quality of RRT to comply with current or future knowledge - Structure, process, and outcomes of RRT Programs
V	Tertiary Prevention after hospital	<ul style="list-style-type: none"> - Provide recommendations regarding the quality of care and safety measures for the care of patients during acute kidney disease (AKD) phase (7-90 days after AKI) - Identify the quality indicators that are acceptable for the management of AKI patients beyond the index hospitalization (tertiary prevention) - Standardized to optimize the follow-up visits and short- and long-term outcomes of AKI patients

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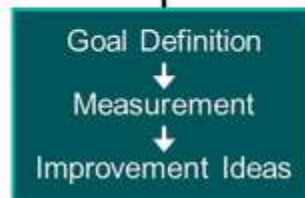
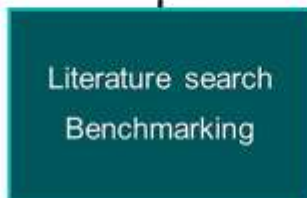
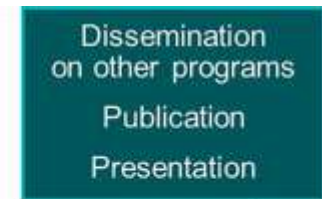
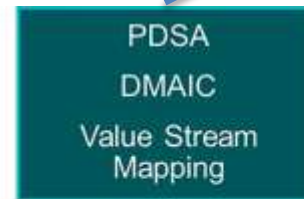
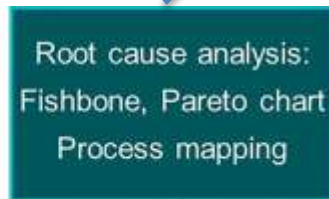
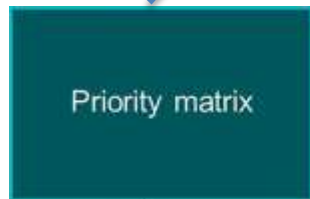
Time to start working



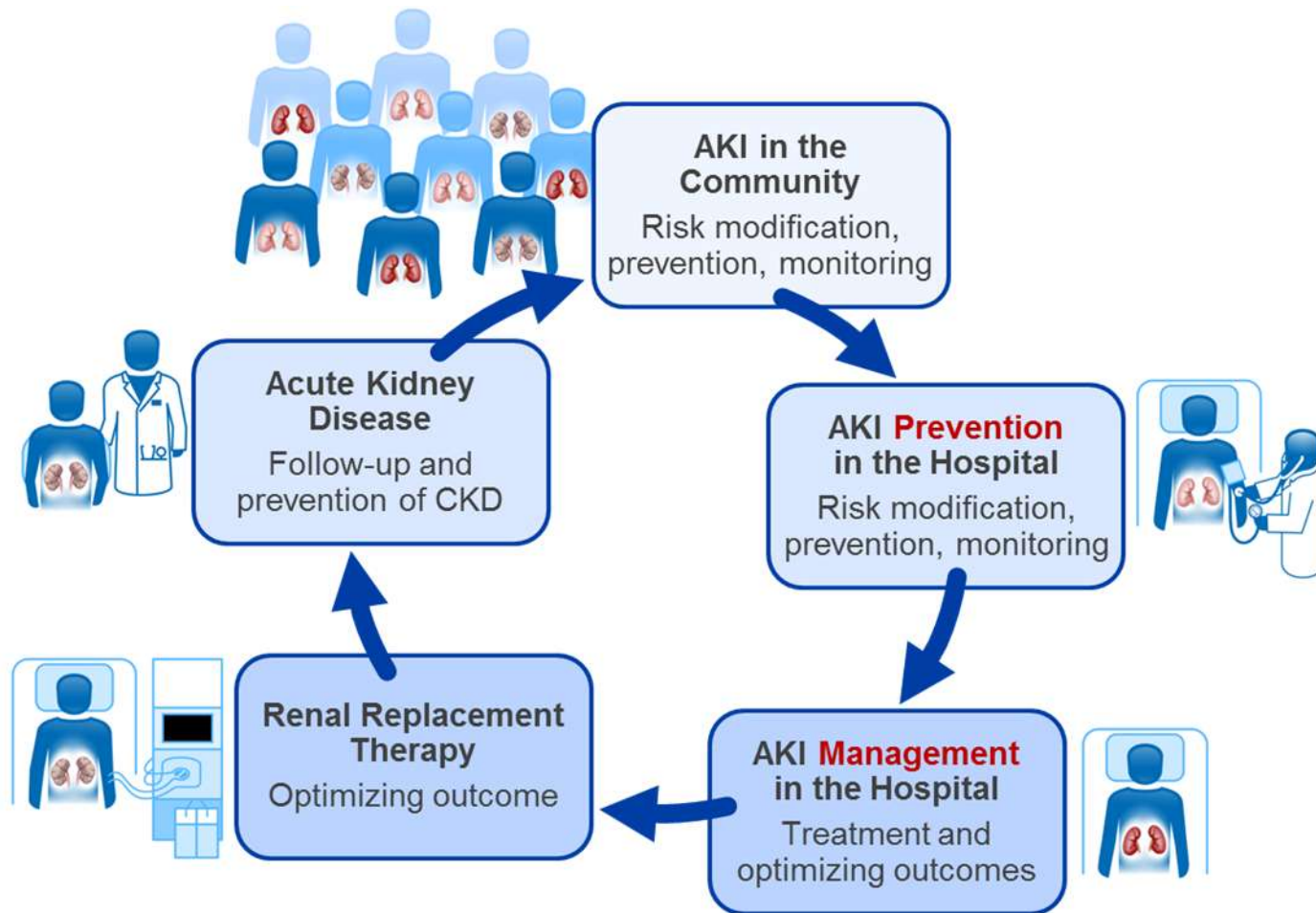
Background

- Recent literature
 - AKI and its progression can be preventable
- Care pathways for AKI → not well defined
 - Considerable variability in care
 - Most institutions do not track compliance
- Identifying quality indicators and care pathways
 - → Critical step in improving outcome of patients at risk or with AKI

Background



AKI care a continuum



Community Healthcare Standards for AKI

Group 1

- Roles and responsibilities of patients, clinicians, and healthcare systems
 - Healthcare systems and clinicians should identify populations- and patients-at-risk of AKI and implement monitoring and preventive interventions to decrease AKI risk.

Population

(National monitoring for variation in AKI incidence)



High-Risk Population

Education

Community Healthcare Standards for AKI

Group 1

- How should AKI high-risk populations be monitored?
 - High-risk patients/populations have a “Kidney Health Assessment” (KHA)
 - At least 30 days before AND again within 2-3 days after an AKI risk exposure
 - Tailored
 - Clinical context
 - Clinician judgment
 - Healthcare system resources

Population
(National monitoring for variation in AKI incidence)



Periodically

High-Risk Population

Periodically

Education



AKI History Kidney Health Assessment (**A****B****C****D**) **C**KD/**C**reatinine
Blood Pressure **D**rugs/**D**ipstick

Population

(National monitoring for variation in AKI incidence)



Periodically

High-Risk Population

Periodically

Education

Acute exposure

Acute exposure

Medications

Imaging

Surgery

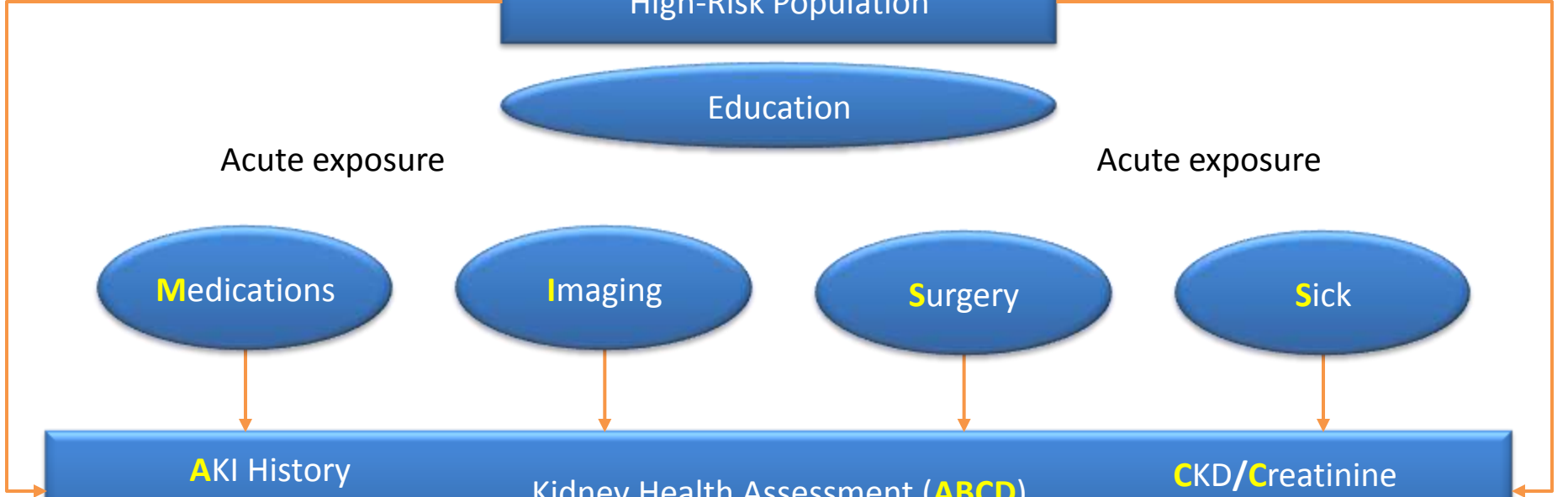
Sick



AKI History
Blood Pressure

Kidney Health Assessment (**A****B****C****D**)

CKD/**C**reatinine
Drugs/**D**ipstick



Community Healthcare Standards for AKI

Group 1

- Preventive strategies for high-risk populations
 - Clinicians review KHA before a planned or immediately after unplanned acute exposure
 - KHA followed by Kidney Health Response (KHR) after acute high-risk AKI exposures
 - Raising awareness
 - Coordination between all stakeholders to monitor the rate, etiologies, and outcomes of AKI

Population
(National monitoring for variation in AKI incidence)



Periodically

High-Risk Population

Periodically

Education

Acute exposure

Acute exposure

Medications

Imaging

Surgery

Sick



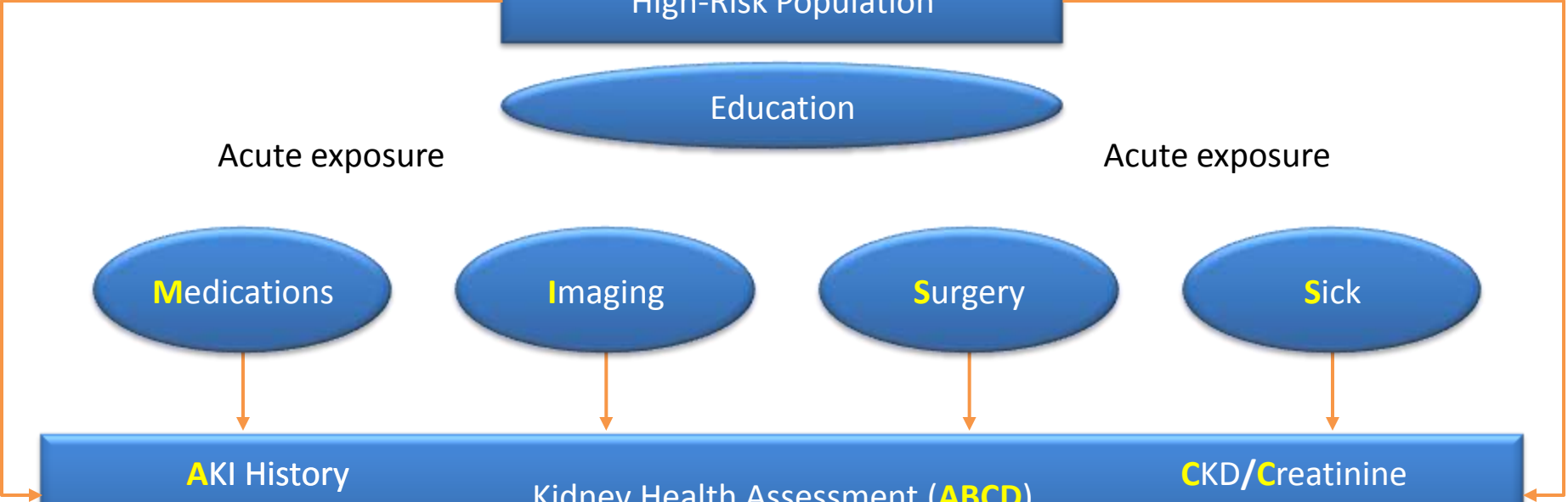
AKI History
Blood Pressure

Kidney Health Assessment (**A**BCD)

CKD/**C**reatinine
Drugs/**D**ipstick



Kidney Health Response (4Ms)
Medication adjustment, **M**inimize exposures, **M**essage care team and patient, **M**onitor



Community Healthcare Standards for AKI

Group 1- Quality Indicators

Quality Indicators	Structure	Process	Outcome
Community	Trained staff availability Laboratory availability Population-based databases	Kidney Health Assessment Percentage receiving KHA	Population based AKI incidence Percentage of AKI patients requiring admission Proportion of patients with AKI risk exposure
	History/physical, Minimal lab tests	Physician-dependent, education, SCr, urine dipstick/output	Percentage of patients admitted to hospital/ward/ICU
	'Self-pay' Resource-limited regions	No specialists/limited resources and medications sickness	Number of patients presented to outpatient clinics with CAKI
	'Insurance' pharmacist/case manager Resource-sufficient regions	Exposure evaluation (MISS) Kidney Health Response	Number of AKI stage 1-2-3, QoL, mortality, adverse events, iatrogenic complications, functional status, economic effects

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Primary Prevention of AKI

Group 2

- How and when should hospitalized high-risk be identified?
 - All patients at hospital admission should be screened for AKI risk
 - Periodic risk reassessment
 - All AKI at-risk patients
 - Serum creatinine, urine dipstick analysis, and urine output
 - Complementary diagnostic tests
 - Local availabilities
 - Clinical context
 - Clinician judgment

Primary Prevention of AKI

Group 2

- Preventive measures
 - Early correction or mitigation of context-specific modifiable AKI risk factors should be considered for all high-risk patients

Primary Prevention of AKI

Group 2

- Quality indicators for AKI risk profiling?
 - a) Proportion of patients screened for AKI risk among all admissions
 - b) Proportion of identified AKI high-risk patients among all screened patients
 - c) Proportion of AKI high-risk exposures among all hospitalized population and all high-risk patients
 - d) Proportion of patients who received an appropriate intervention around a high-risk exposure
 - e) Proportion of patients who developed AKI among all admissions, and all high-risk patients

Primary Prevention of AKI

Group 2

- Utility of quality indicators for AKI risk profiling
 - Quality indicators should be reviewed and utilized to identify areas of improvement and action
 - Frequency of reporting
 - Local resources
 - Regulatory requirements
 - Periodic; At least once a year

Primary Prevention of AKI

Group 2- Quality Indicators

Quality Indicators	Structure	Process	Outcome
Reporting	Paper-based <i>Resource-limited regions</i>	Number of high risk procedures total hospital admissions	Incidence of AKI, RRT
	Electronic E-queries AE-reporting <i>Resource-sufficient regions</i>	% compliance reporting: <ul style="list-style-type: none"> • Screening/total admission • High-risks/screened patients • Active surveillance/high-risk patients • High-risk procedures/total patients • High-risk procedures/high-risk patients • Primary prevention/high-risk patients 	Rate and severity of AKI, RRT, relationship to risk status and intervention

Secondary Prevention of AKI

Group 3

- Key considerations for diagnosis/evaluations
 - Optimize proportion of patients who undergo:
 - Context-appropriate
 - Timely evaluation
 - Cost saving

Secondary Prevention of AKI

Group 3

- Limiting the duration and severity of AKI
 - Implementation and reporting of the proportion of patients that receive timely and diagnosis-appropriate interventions
 - Compliance with these interventions should be measured, reported and reviewed on periodic basis
 - At least an annual basis

Secondary Prevention of AKI

Group 3

- Key considerations for reducing the complications of AKI
 - Prevention of avoidable AKI-related complications requires:
 - Monitoring
 - Implementation of risk reduction strategies
 - Reported as context-specific adverse events

Secondary Prevention of AKI

Group 3

	Diagnosis and Evaluation	Limiting Severity and Duration of AKI	Prevention avoidable AKI Complications
Recognition	AKI stage-dependent threshold met	<ul style="list-style-type: none"> - Nephrotoxin or contributing medication - Poor hemodynamics - Cause-specific diagnosis delayed 	<ul style="list-style-type: none"> - AKI has occurred - High frequency of hyperkalemia in patients with AKI - Poor extubation rates in patients with AKI due to volume overload - Adverse drug events
Action	Context-appropriate Evaluation	<ul style="list-style-type: none"> - “Nephrotoxin Stewardship” - Assess and optimize hemodynamics <ul style="list-style-type: none"> o Invasive/ noninvasive - Avoid hyperglycemia - Nephrology referral guidelines - Monitoring of kidney function with serum creatinine and urine output 	<ul style="list-style-type: none"> - Improved monitoring for complications (e.g. BMP/bicarbonate/phosphorus measurement) - Risk reduction strategies (e.g. reduced K intake, unnecessary maintenance fluids, review of appropriate dosing of meds) - Management of complications (e.g. treatment of hyper K, fluid removal)
Results	<ul style="list-style-type: none"> - Improved frequency of context-appropriate diagnostic evaluation - Improved recognition of cause-specific AKI 	<ul style="list-style-type: none"> - Improved rates of nephrotoxin alerting/ evaluation/ discontinuance - Hemodynamic intervention applied - Improved timeline of cause-specific diagnosis/ interventions - Reduced duration and severity of AKI (e.g. maximum stage, length, recovery) 	<ul style="list-style-type: none"> - Process (improved monitoring/detection, reduction in unnecessary K supplementation, med reconciliation/ evaluation) - Clinical (reduced incidence of severe hyperkalemia, treatment of severe acidosis pH <7.2, less adverse drug events related to inappropriate drug dosing/selection in AKI)

Secondary Prevention of AKI

Group 3 – Quality Indicators

Quality Indicators

Structure

Process

Outcome

Hospital admission

EMR
E-alert
Biomarkers
Imaging

Mandate risk-assessment
System-driven identification and prevention

Percentage of patients admitted to hospital/ward/ICU/ specialist unit who develop AKI

History/physical,
Minimal lab tests

Physician-dependent, education, SCr, urine dipstick/output

Percentage of patients admitted to hospital/ward/ICU

Hospital stay

'Self-pay'
Resource-limited regions

No specialists/limited resources and medications sickness

Number of AKI, RRT, mortality

'Insurance' pharmacist/case manager
Resource-sufficient regions

Specialist-driven/e-alert medication, imaging, surgery, sickness (ICU)

Number of AKI stage 1-2-3, QoL, mortality, adverse events, iatrogenic complications, functional status, economic effects

Quality indicators of renal replacement therapy

Group 4

- How should the quality of acute RRT be monitored, evaluated, and reported?
 - Quality indicators should integrate **structure**, **process**, and **outcome** indicators for each therapeutic modality, both in the ward and ICU

Quality indicators of renal replacement therapy

Group 4

- Minimum **structure** quality indicators
 - *Specifically target*
 - *Clinician*
 - *Nursing*
 - *Allied health professionals*
 - *Capacity and expertise for providing acute RRT*
 - *Identify a responsible team to implement and report quality metrics for acute RRT services*

Quality indicators of renal replacement therapy

Group 4

- Minimum **process** quality indicators
 - Incorporate methodologies to standardized procedures and protocols
 - Increased efficiency and consistency
 - Safety
 - Specific to each RRT modality

Quality indicators of renal replacement therapy

Group 4

- Minimum **outcome** indicators
 - Patient-centered outcomes
 - Provider and patient satisfaction
 - Mortality
 - Quality of life among survivors
 - Dialysis liberation rates
 - Health-economic outcomes

Quality indicators of renal replacement therapy

Group 4 – Quality Indicators

Quality Indicators

Structure

Process

Outcome

Trained personnel
Minimal technology availability

Resource-limited regions

Therapy prescription
Medication adjustment
Small solute clearance

Bleeding
Filter clotting
Adverse events

RRT

24 hr staffing model
Specialist availability
Multimodality technology availability

Resource-sufficient regions

Delivered does evaluation
Downtime
Optimized fluid management
Time from prescription to therapy
Filter life

CLABSI
Time on dialysis
Catheter dysfunction
RRT goals achieved

Tertiary prevention of AKI

Group 5

- Appropriate post-AKI/AKD care
 - Healthcare systems need to ensure
 - Appropriate follow-up
 - **Quantitate** the proportion of patients who need post-AKI/AKD follow-up
 - Evaluate **quality** of care for those who received post-AKI/AKD follow-up

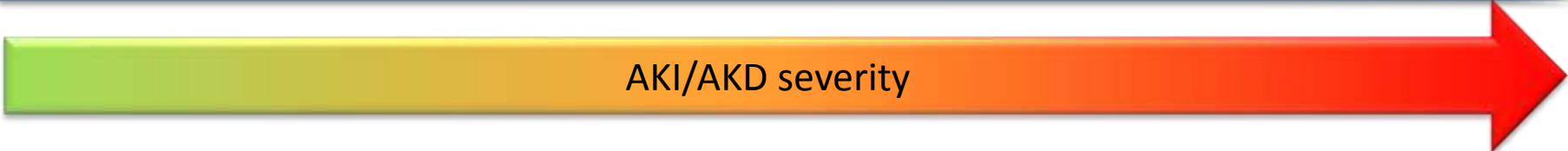
Tertiary prevention of AKI

Group 5

- Key elements of an appropriate post-AKI/AKD care
 - **Structure**
 - Needed personnel and resources
 - **Process**
 - Who and by whom, what, where, when, why, and how
 - **Outcome**
 - CKD progression, continued or new need for dialysis, mortality, etc.

Post-AKI Care Summary

<p>Stage 1 AKI of Short Duration (1 day)</p> <p>SCr normal or returns to baseline</p> <p>Hospital Limited Event in healthy pt</p> <p>Consider RAMPS/ bundle within 1 year</p>	<p>Duration of Stage 1 AKI (1-3)</p> <p>Limited Co-morbidities</p> <p>No prior CKD</p> <p>SCr not returning to baseline</p> <p>Consider RAMPS in 6months</p>	<p>Prolonged Stage 1 AKI or Stage 2 AKI for shorter duration</p> <p>Increasing co-morbidities (advancing age, some mild CKD)</p> <p>SCr persistently elevated</p> <p>Labs in next weeks – month with long term RAMPS/neph appt</p>	<p>Prolonged Stage 2 AKI with UA showing injury</p> <p>Multiple co-morbidities (age, cancer, DM, CV dx established CKD)</p> <p>SCr persistently elevated in some but some recovery</p> <p>Labs in 1-2 weeks w/ neph appt / RAMPS in weeks</p>	<p>Stage 3 AKI and Persistent other forms of AKI</p> <p>History of Prior AKI, significant CV dx, comorbidities and advanced CKD</p> <p>Labs within days of discharge and follow up with Nephrology-RAMPS within 1 week</p>	<p>AKI –D recovered and non-recovered</p> <p>Prior CKD 4</p> <p>Recurrent AKI/AKD</p> <p>RAMPS</p> <p>WATCH ME – Labs within days of discharge and follow up with Nephrology within 1 week</p>
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POST AKI/ AKD Kidney Health Care Bundle -RAMPS

<u>Renal Function Check</u>	<ul style="list-style-type: none">• Checking kidney function through serum creatinine and eGFR• Checking proteinuria / albuminuria• When available consider biomarkers, imaging and other tests as feasible
<u>Advocacy</u>	<ul style="list-style-type: none">• Patient and Caregiver education about AKI and CKD• Communication with other allied health care providers (general practitioners, primary care doctors, dieticians, nurses, pharmacists and social workers)
<u>Medications</u>	<ul style="list-style-type: none">• Medication reconciliation, review and management• Specifically discuss risk benefits of ACE/ ARB• Review nephrotoxins, drugs requiring renal dose adjustment and over the counter medications
<u>Pressure</u>	<ul style="list-style-type: none">• Ensure patient understands blood pressure goals and targets• Specifically discuss risk benefits of ACE/ ARB• Discuss fluid status, ideal weight and the role of diuretics
<u>Sick Day Protocols</u>	<ul style="list-style-type: none">• Educate patients on medications that need monitoring during intercurrent illnesses• Consider protocols to hold medications like NSAIDS, ACE / ARB, diuretics, metformin, calcineurin inhibitors, SGLT2 inhibitors

AKI-D/ AKD-D Kidney Health Care Bundle –WATCH ME

Weight Assessment

- Discuss Dry Weight monitoring and permissive hypervolemia
- Discuss the role for diuretics in maintaining urine output and ideal volume status

Access

- Educate patients about the care of central venous catheters
- Vein preservation protocols / awareness
- When appropriate begin to plan and educate about the role of arterio-venous access and other renal replacement therapy modalities

Teaching

- Patient and Caregiver education about dialysis requiring AKD and short and long-term risks and consequence
- Communication with other allied health care providers (general practitioners, primary care doctors, dieticians, nurses, pharmacists and social workers) about patient needs. (e.g. alterations in medication regimens in the setting of new renal replacement therapy).

Clearance

- Frequent assessments of underlying renal function (via pre-dialysis labs or timed clearances)
- Frequent assessments of the quality of the renal replacement therapy being provided to ensure adequate clearance

Hypotension

- Education about hypotension avoidance
- Education around blood pressure medications administration in the peri-RRT period

Medications

- Medication reconciliation, review and management
 - Specifically discuss risk benefits of ACE/ ARB
 - Review nephrotoxins, drugs requiring renal dose adjustment and over the counter medications
-

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Summary

- We have identified 5 phases of AKI care spanning the clinical spectrum
- We proposed quality indicators to develop, measure and study across structure, process, outcomes and patient experience domains
 - Goal is improve the quality of AKI care
 - → Improve patient outcomes
- With new knowledge
 - Targets should change
 - QI process should not change

ADQI XXII

Organizers and Sponsors

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- Kianoush Kashani, MD
- Michael Haase, MD



- Founders:

- John A. Kellum, MD
- Claudio Ronco, MD
- Ravindra L. Mehta, MD
- Rinaldo Bellomo, MD

- Sponsors



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