

Supplemental material is neither peer-reviewed nor thoroughly edited by CJASN. The authors alone are responsible for the accuracy and presentation of the material.

Supplemental Material Table of Contents

Supplemental Table 1: Definitions

Supplemental Table 2: Care needed for AKI prevention and management.

Supplemental Table 3: Example Quality Improvement Initiatives for Diagnostic Evaluation of AKI

Supplemental Table 4: Example Quality Initiations to Avoid the Progression and Duration of AKI

Supplemental Table 5: Examples of monitoring, management, and documentation of AKI complications

Supplemental Figure 1: Risk dimensions and risk factors.

Supplemental Figure 2: Quality measures of care for AKI primary prevention

Supplemental Figure 3: Control-run chart for finding outliers and the need for policy changes.

Supplemental Figure 4: Root-cause analysis

Appendix A

Appendix B

References

Supplemental material is neither peer-reviewed nor thoroughly edited by CJASN. The authors alone are responsible for the accuracy and presentation of the material.

Supplemental Table 1: Definitions

Term	Definition
Risk factor	A risk factor is any attribute, characteristic, or exposure of an individual that increases the likelihood of developing a disease or injury. (1)
Exposure	The process by which an agent comes into contact with a person or animal in such a way that the person or animal may develop a relevant outcome, such as a disease. (2)
High-Risk strategy	Clinically oriented approach to preventive medicine that focuses on individuals with the highest levels of the risk factor and utilizes the established framework of medical services as “targeted rescue operation for vulnerable individuals”. The aim is to help each person reduce the high level of exposure to a cause or to some intermediate variable. Main strengths of this strategy include that the intervention may be matched to the needs of the individual; it may avoid interference with those who are not at a special risk; it may be accommodated within the ethical and cultural values, organization, and economics, of the healthcare system; selectivity may increase the likelihood of a cost-effective use of resources. Main weaknesses are that prevention may become medicalized; success may be palliative and temporary; the contribution to overall (population) control of a disease may be small; the preventive intervention may be behaviorally or culturally inadequate or unsustainable; it has a relatively low ability to predict which individuals will benefit from the intervention.(2)
Community-Acquired AKI (CAKI)	Community-acquired acute kidney injury if they first presented to the hospital with an acute kidney injury. (3)
Hospital Acquired AKI (HAKI)	Hospital-acquired AKI is when AKI, based on the KDIGO criteria, is observed after hospital admission. (3, 4)
Prevention	<ul style="list-style-type: none"> - Primary prevention aims to reduce the incidence of disease by personal and communal efforts, such as decreasing environmental risks, enhancing nutritional status, immunizing against communicable diseases, or improving water supplies. It is a core task of public health, including health promotion. - Secondary prevention aims to reduce the prevalence of disease by shortening its duration. If the disease has no cure, it may increase survival and quality of life; it will also increase the prevalence of the disease. It seldom prevents disease occurrence; it does so only when early detection of a precursor lesion leads to complete removal of all such lesions. It is a set of measures available to individuals and communities for the early detection and prompt intervention to control disease and minimize disability; e.g., by the use of screening programs. It is a core task of preventive medicine. Both early clinical detection and population-based screening usually aim at achieving secondary prevention. In certain diseases, these activities may also contribute to tertiary prevention. - Tertiary prevention aimed at softening the impact of long-term disease and disability by eliminating or reducing impairment, disability, and handicap; minimizing suffering; and maximizing potential years or useful life. It is mainly a task of rehabilitation. - Quaternary prevention: procedures and policies that identify individuals and groups at risk of over-diagnosis or overmedication, and that decrease excessive medical and sanitary intervention. Actions that prevent iatrogenesis and “disease mongering.”(2)
ADKAR	Awareness of the need for change - Desire to participate and support the change - Knowledge on how to change - Ability to implement required skills and behaviors - Reinforcement to sustain the change
Cause & Effect Diagram	A cause-and-effect diagram is a visual tool used to logically organize possible causes for a specific problem or effect by graphically displaying them in increasing detail. It helps to identify root causes and ensures a common understanding of the causes. It is also called an Ishikawa or Fishbone diagram.
Cause & Effect Matrix	A prioritization matrix or diagram that enables selection of those process input variables (X's) that have the greatest effect on the process output variables (Y's). The tool is also used to emphasize the importance of understanding the customer requirements.
Project Champion	Selected senior leaders familiar with basic and advanced statistical tools, who allocate resources and remove barriers for process improvement projects; create the vision of improvement for the company; select high impact projects; select potential people; construct and improve deployment mechanism; monitor projects; recognize people for their efforts and contribution.
Change Management	A structured approach to engage members of the workforce at various stages of a change to ensure clear understanding and support for the changes which may result from an improvement project. Change management is vital for quality improvement projects to be successful.
Counter Balance Measure	A measure that identifies unintended consequences or external factors impacted by the project intervention
Critical to Quality (CTQ)	Explicit customer requirements (specifications) which if not met are considered defects.

Supplemental material is neither peer-reviewed nor thoroughly edited by CJASN. The authors alone are responsible for the accuracy and presentation of the material.

CTQ Tree	A Critical to Quality Tree is used to decompose broad customer requirements into more easily quantified requirements.
Failure Mode & Effect Analysis (FMEA)	A structured approach for preventing defects by documenting failure events, the way in which a process can fail, estimating the risk associated with specific causes, and prioritizing potential problems and their resolution.
Fishbone Diagram	A channeled brainstorming tool used for determining root-causes (the bones of the fish) for a specific effect, or problem.
Gantt chart	To illustrate the start and finish dates of the terminal elements and summary elements of a project.
Impact/Effort Matrix	allows recognition of those "possible options" in a structured way and enables making a well 'informed choice.'
Key Process Indicators	Key process indicators (KPI's) are measures of performance that are commonly used to help an organization define and evaluate how successful it is, typically in terms of making progress towards its long-term organizational goals.
Mistake Proofing	Mistake-proofing is a behavior-shaping constraint or a method of preventing errors by putting limits on how an operation can be performed in order to force the correct completion of the operation.
Pareto Chart	A tool for establishing priorities based on the Pareto principle, also known as the 80/20 rule, which is that 20% of the causes result in 80% of the impact.
Process	A series of individual operations required to produce a product.
Process Improvement	Making changes to a process which make the process produce better outcome measures.
Project Charter	A document that clearly addresses an improvement project scope, target(s), project Champion, team involved and project timeline, etc.
Project Prioritization	A structured approach to classify and/or score a collection of projects being considered by a team, committee, or leadership.
Quality Improvement (QI)	Quality improvement is the application of quality improvement methods and tools to improve structure, process, or outcome measures for any product or service, including business and clinical services.
RACI Matrix	It is used to describe the roles and responsibilities of various teams or people in delivering a project: R esponsible, A ccountable, C onsulted, I nformed
Run Charts/ Trend Charts/ Time Series Plots	A graphical display often used in process variation studies in which observations (data points) are plotted to show the trend over time. All processes vary, so single point measurements can be misleading. Displaying data over time increases understanding of the real performance of a process, particularly with regard to an established target or goal.
SIPOC	A high level process mapping technique used to help an improvement team understand who the suppliers to a process are (S), the inputs received from those suppliers (I), the process steps involved (P), the outputs created by the process being studied (O), and the customers to whom those outputs are delivered (C).
Value Stream Map	The output (map) from the process derived from a Lean technique used to analyze the flow of materials and information currently required to bring a product or service to a consumer.
Voice of the Customer (VOC)	It describes the process of capturing a customer's requirements

Supplemental material is neither peer-reviewed nor thoroughly edited by CJASN. The authors alone are responsible for the accuracy and presentation of the material.

Supplemental Table 2: Care needed for AKI prevention and management.

Diagnostic	Monitoring	Therapeutic	Documentation
Determine etiology using context appropriate laboratory testing such as urine microscopy, serological testing, urine electrolytes/proteins, renal ultrasound and other tests	Serial laboratory measures with interval dependent on clinical context (monitor changes in creatinine, potassium, acid-base status)	Etiology-specific (such as immunosuppression for glomerulonephritis or plasma exchange for thrombotic microangiopathy)	Document AKI as problem with description of: -Stage -Possible Etiology -Care Plan
Stage AKI with measurement of serum creatinine and urine output	Urine output and fluid balance (weights, physical examination)	Consider Nephrology referral	Ensure documentation in discharge summary
Determine appropriate level of care: home, inpatient ward, ICU	Hemodynamics (blood pressure and other values depending upon clinical context)	Kidney biopsy if etiology not identified	Follow-up care plan and hand-off of care
Estimate risk of AKI and AKI progression (e.g., scores/biomarkers)	Medication levels when appropriate and available	Manage complications (hyperkalemia, metabolic acidosis, volume overload)	Education of patient and family
Attempt for early diagnosis of AKI and estimate chance of AKI recovery	Neurological status (signs and symptoms of uremia)	Renal replacement therapy when indicated	

Minimum care pays attention to diagnostic, monitoring, therapeutic and documentation aspects.

Supplemental material is neither peer-reviewed nor thoroughly edited by CJASN. The authors alone are responsible for the accuracy and presentation of the material.

Supplemental Table 3: Example Quality Improvement Initiatives for Diagnostic Evaluation of AKI

Recognition	Action	Results
High readmission rates for progressive AKI after cardiac catheterization	Increasing follow-up serum creatinine measurements in post-angiography AKI to determine reversibility versus persistence	Improved proportion of patients with AKI that have a follow-up serum creatinine Reduced re-hospitalizations for severe/complications of AKI
High prevalence of progressive AKI following gynecologic surgery	Improved imaging frequency	Improved frequency of evaluation for ureteral injury
General Hospital Population with persistent AKI (any stage)	Urinalysis, follow-up serum creatinine, nephrotoxin evaluation, ultrasound in patients with risk factors	Increased detection of potential nephrotoxin exposures Reduced severity/duration of AKI

Supplemental material is neither peer-reviewed nor thoroughly edited by CJASN. The authors alone are responsible for the accuracy and presentation of the material.

Supplemental Table 4: Example Quality Initiations to Avoid the Progression and Duration of AKI

Recognition	Action	Results
High prevalence of continued nephrotoxin-exposure after AKI	Improved alerting (manual/electronic) of potential nephrotoxin exposures “Nephrotoxin Stewardship” Program Automated or Pharmacists-guided Recommendations for Therapeutic Drug Monitoring	Reduction in avoidable nephrotoxin exposure Reduced supra-therapeutic drug exposure (e.g., vancomycin levels) Reduction in AKI Severity/Duration
High incidence of intradialytic hypotension observed	Educational Interventions, alternative dialysis strategies	Reduced Intra Dialytic Hypotension Reduction in AKI Duration
High Frequency of Delayed Antibiotics, Resuscitation in septic AKI	Implementation of resuscitation protocol	Lower duration/frequency of hypotension Reduced Progression of AKI

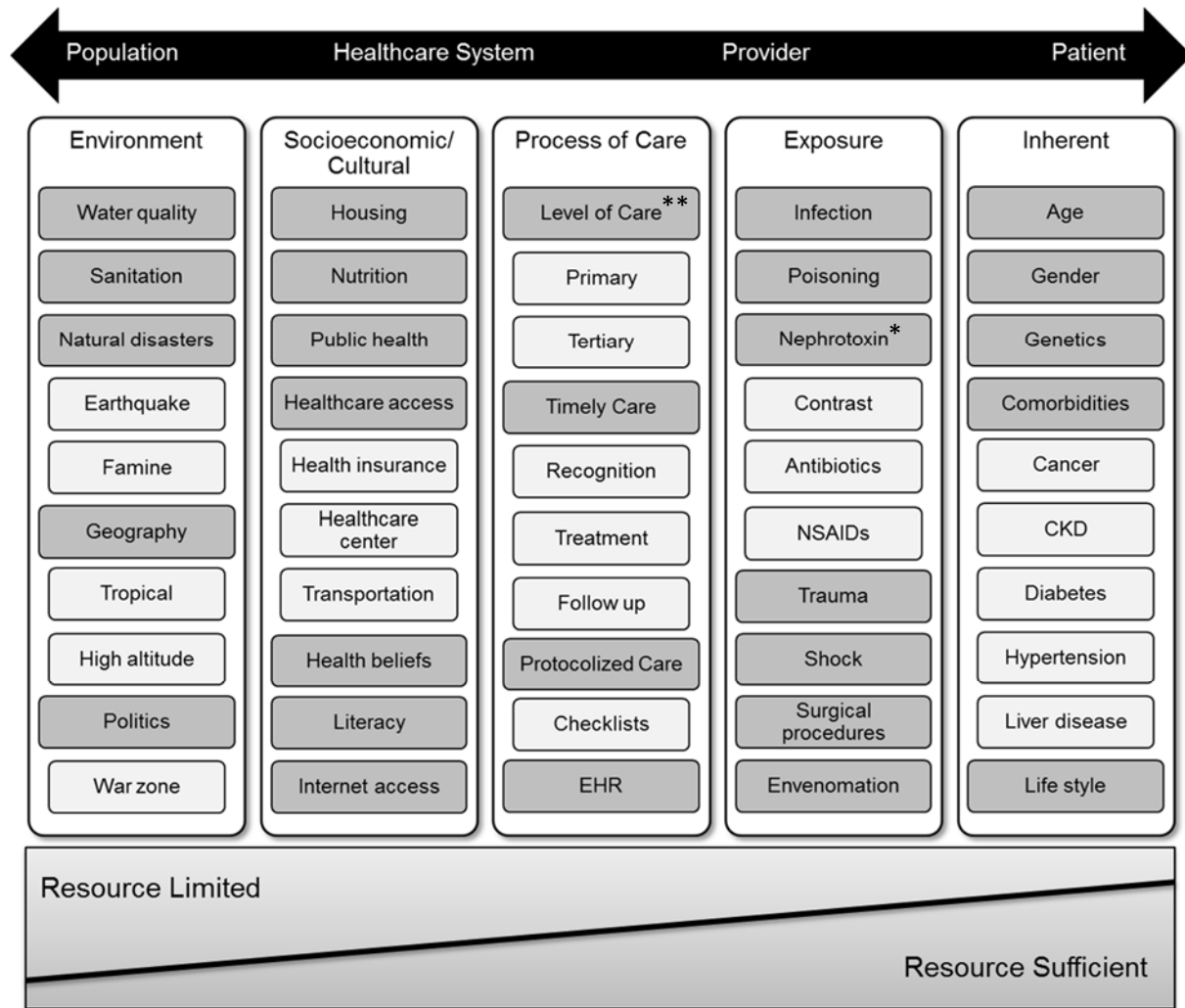
Supplemental material is neither peer-reviewed nor thoroughly edited by CJASN. The authors alone are responsible for the accuracy and presentation of the material.

Supplemental Table 5: Examples of monitoring, management, and documentation of AKI complications

Recognition	Action			Results
	Monitoring	Risk reduction	Management	Result
Hyperkalemia (K>6 mEq/L)	Serial Monitoring (Daily while in AKI)	Discontinuation of potentiating therapies (K replacement, K-sparing diuretics, K affecting drugs)	Time to intervention, effectiveness, follow-up	Frequency of severe hyperkalemia, dialysis, death from hyperkalemia
Avoidable Severe Adverse Drug Event (e.g. renal-eliminated opiates)	Detection of no-go meds, complication monitoring	Stop ‘no-go’ meds (e.g., morphine, meperidine) Use of alternative analgesics, dose adjustment (challenging), augmented monitoring for ADEs	Time to intervention, effectiveness, follow-up	Avoidable ADE (e.g., respiratory depression, sedation, death), Improved Therapeutic Drug Monitoring
Volume Overload > 10% of admission body weight	strict I/O, daily weights	Daily Assessment, avoidance of ‘maintenance IV fluid’	Time to intervene	Measure % volume overload in EHR flowsheet

Supplemental material is neither peer-reviewed nor thoroughly edited by CJASN. The authors alone are responsible for the accuracy and presentation of the material.

Supplemental Figure 1: Risk dimensions and risk factors.(5, 6)



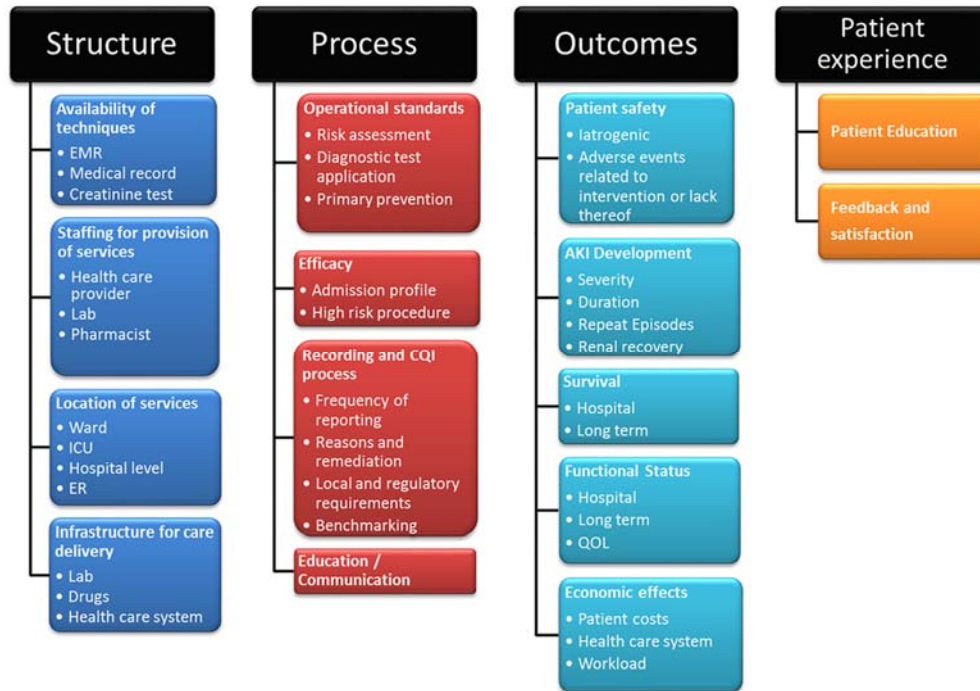
* Although three most important classes of nephrotoxins are named here, there are other medications that are renally eliminated or have nephrotoxic characteristics which also may need to be considered.

** Availability of experts and specialists (i.e., physician, nurses, pharmacists, etc.) is one of the important factors in the determination of processes of care provided

Source: Acute Disease Quality Initiative XVIII; www.adqi.org. Used with permission

Supplemental material is neither peer-reviewed nor thoroughly edited by CJASN. The authors alone are responsible for the accuracy and presentation of the material.

Supplemental Figure 2: Quality measures of care for AKI primary prevention

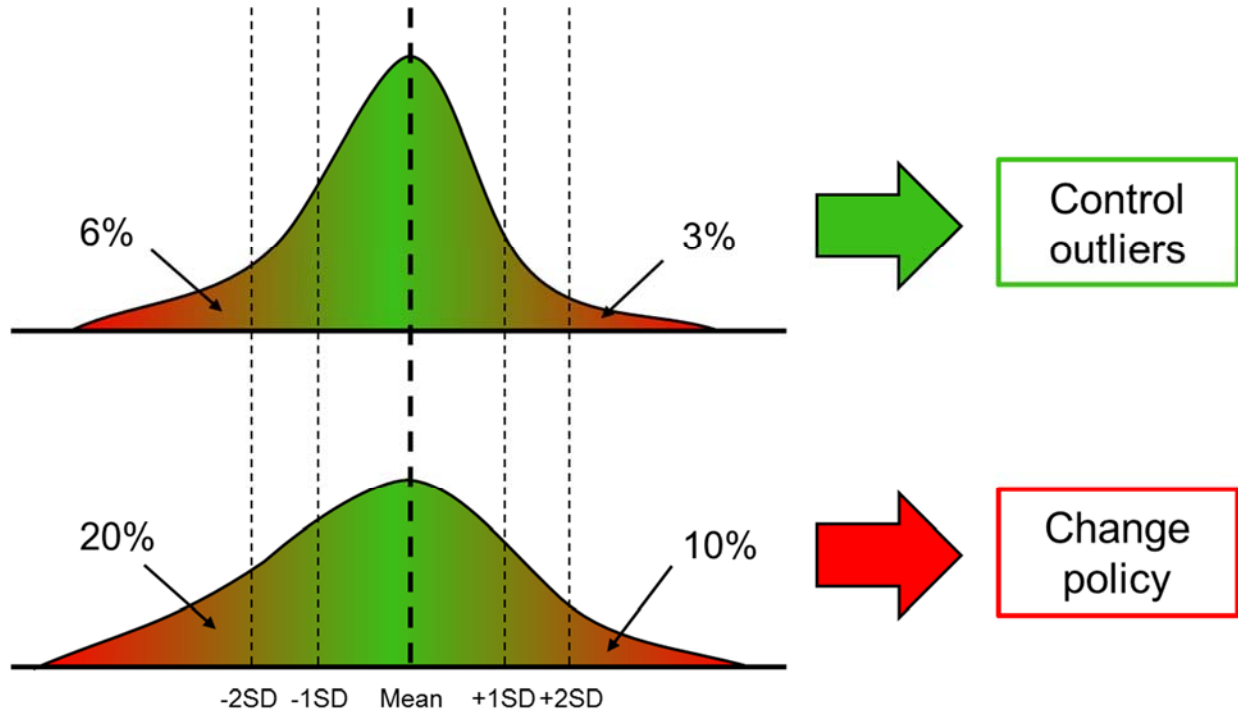


Abbreviations: EMR, electronic medical records; ICU, intensive care unit; ER, emergency room; CQI, continues quality improvement; QoL, quality of life

Source: Acute Disease Quality Initiative XXII; www.adqi.org. Used with permission

Supplemental material is neither peer-reviewed nor thoroughly edited by CJASN. The authors alone are responsible for the accuracy and presentation of the material.

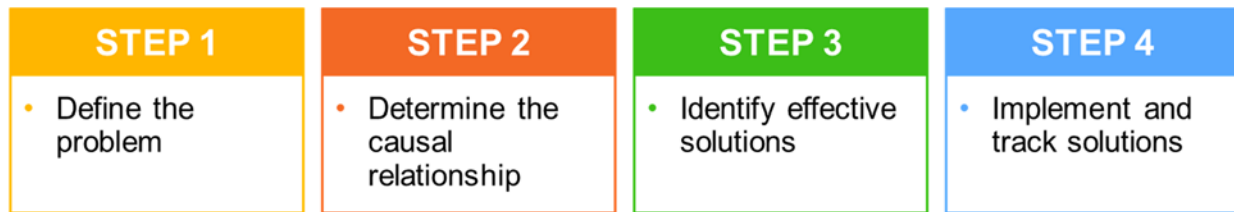
Supplemental Figure 3: Control-run chart for finding outliers and the need for policy changes.



Source: Acute Disease Quality Initiative XXII; www.adqi.org. Used with permission

Supplemental material is neither peer-reviewed nor thoroughly edited by CJASN. The authors alone are responsible for the accuracy and presentation of the material.

Supplemental Figure 4: Root-cause analysis



Source: Acute Disease Quality Initiative XXII; www.adqi.org. Used with permission

Appendix A:

The Institute of Medicine defines quality in health care as “a direct correlation between the level of improved health services and the desired health outcomes of individuals and populations,” and the Centers for Medicare & Medicaid Services (CMS) lists the six goals of quality care in healthcare as 1) making care safer by reducing harm caused in the delivery of care, 2) strengthening person and family engagement as partners in their care, 3) promoting effective communication and coordination of care, 4) promoting effective prevention and treatment of chronic disease, 5) working with communities to promote best practices of healthy living, and 6) making care affordable.(7) Similarly, the World Health Organization defines quality improvement (QI) as “the extent to which health care services provided to individuals and patient populations improve desired health outcomes. In order to achieve this, health care must be safe, effective, timely, efficient, equitable and people-centered.”(8) Before we describe the suggested structure of QI projects, it is critical to distinguish the QI and research similarities and differences. Appendix A Table 1 highlights some of the differences.

In order to conduct a successful QI project, adherence to validated tools and work frames is strongly recommended. This would not only allow an improved workflow for the QI project, but it also permits the clinicians and providers who conduct these projects have the ability to secure needed funds and infrastructure, generalize and distribute their results, attract buy-in, and hence have higher chances of success in undertaking these projects.

Prioritization

It is essential to select the right project for the right situations to enhance the chances of success and avoid risks of waste in resources. Therefore, prioritizing projects among a list of potential projects (described by each group throughout the paper) seems to be critical. The prioritization

matrix defined as a simple tool that enables sorting a diverse set of items into an order of importance and identifies their relative importance by deriving a numerical value for the priority of each item. Using measures like the prioritization matrix considering the extent of the impact of each project, their alignment with the institutional and healthcare system goals and priorities, describing the risks of not conducting specific projects and their resource intensities (funds and staff), and their barriers (policies, cultural, economic, etc.) would allow the teams to have a better view on which project should be selected among several possible projects (Appendix A Figure 1).(9)

QI frameworks

For any successful QI project, the main three components to be considered are structure, process, and outcome.(10) In medicine, many QI projects are inspired by using tools and frameworks that in other industries found to be effective and impactful. Here, we describe a six-sigma validated workflows for the conduct of successful QI projects (i.e., DMAIC [Define, Measure, Analyze, Implement, Control]) in the field of acute kidney injury and describe each section within the three main QI components, i.e., structure, process, outcome.(10, 11)

Define:

Structure/tools:

Project Charter is one of the first steps the clinical providers need to take. In the Project Charter, a brief description of the project needs to be followed by a reason that necessitates the project and project goals and objectives, metrics of success, scope, governance, project team, the timeline for completion of the project and finally approvals that need to be attained. Describing the risks of the project, assumptions, and constraints and finally, financial planning would add

Supplemental material is neither peer-reviewed nor thoroughly edited by CJASN. The authors alone are responsible for the accuracy and presentation of the material.

value to the project charter. Stakeholder and cost/benefit analyses, the voice of customer acquisition, detailed project, communication, and change management plans are also necessary structures for any QI project.

Process:

While the clinical providers work on their project structure, it is necessary to think and start forming teams and map a high-level view of their projects.

Outcomes:

In this phase, team composition and availability list, determination of sponsor name, preparation of a list of customers (patients, providers, populations, healthcare system directors, benefactors, funding organizations, etc.), preparation of strong project charter and high-level mapping of the current state considered appropriate outcomes.

Measure

Structure:

Collecting appropriate data for baseline measurement and control phase is essential in the success of a QI project. Using figures and charts to visualize the data better allows a higher-level view of the information and enhances the providers' ability to make more clear decisions for the next steps. Value Stream Mapping originally was designed as a technique used to document, analyze and improve the flow of information or materials required to produce a product or service for a customer.(11) for syndromes like Aki that their management is time sensitive and required appropriate preventive measures in the right time to be provided to the right patients Value Stream mapping could be an essential tool. It helps with the management and information systems that support the basic process.

Supplemental material is neither peer-reviewed nor thoroughly edited by CJASN. The authors alone are responsible for the accuracy and presentation of the material.

It is crucial to understand the nature of each process in order to improve it. The right plan of action could be selected by using special or common cause variations. Common cause variation is a variation is chronic and depends on the system (e.g., differences on timeliness IV fluid responsiveness assessment during day or night). Common cause variations are usually stable, predictable, and in control. If common cause dominates the providers ask "what is happening" to identify the sources of variation and make permanent changes to the system rather than tampering it. ,Special cause variations, in contrary to common cause variations, are unpredictable (e.g., inadvertent administration of intravascular calcium in the subcutaneous tissue). The processes exhibiting special cause variations are often called out-of-control and/or unstable. When special cause variations are observed, providers ask "what happened" in the period of interest and if the variations are likely to continue or re-occur. They identify and address the root cause of the problem while they should avoid overcorrection.

Process:

Following appropriate planning, in this phase, QI teams collect measurements. Collecting baseline data on defects and their possible causes, plotting defect data over time and analyze for special cause variations, creating and stratify frequency of events, calculating process sigma and/or process yield, generating detailed process maps, and finally validating measurement system (i.e., reproducibility, repeatability, bias , residual error) belong to this phase.

Outcome:

By the end of the “Measure” phase, the key measures and high impact defects should be identified, process variation based on the collected data should be displayed, long- and short-term variability characterized, current state baseline performance should be clarified (e.g., defect

Supplemental material is neither peer-reviewed nor thoroughly edited by CJASN. The authors alone are responsible for the accuracy and presentation of the material.

per million occurrences (DPMO), process sigma , yield, and/or process capability, based on the data collected)(11) and measurement system should be validated.

Analyze

Structure:

In order to complete the “analyze” phase, control or run charts, cause and effect diagrams, Failure Mode and Effects Analysis (FMEA), qualitative analysis techniques (e.g., Spaghetti Diagram, Circle of Work , TAKT (German for Pulse) Time [maximum amount of time of production in order to satisfy customer demand], and change management tools (e.g., ADKAR: Awareness, Desire, Knowledge, Ability, Reinforcement) could be used.(12)

Process:

By using analysis tools, providers would be able to understand the root cause of the problem by using measures like Pareto analysis(13) or root cause analyses (i.e., exploring potential causes, organizing them and collecting additional data) to prove or quantify cause-and-effect relationships.

Outcome:

By the end of this phase, the providers should be able to identify the gaps between current and desired performance, quantify and prioritize them, list the possible root causes and sources of defect or variation, and verify and quantify the " vital few" root causes.

Implement

Structure:

Tools and measures that are available for this phase are plenty, and they should be chosen based on the nature of the root cause and the main problem. Appendix A Table 2 describes some of these tools.

Supplemental material is neither peer-reviewed nor thoroughly edited by CJASN. The authors alone are responsible for the accuracy and presentation of the material.

Process:

During this phase process should include interventions to create possible solutions for root causes, select solutions, create future state process map and quantify projected costs/ benefits, develop implementation plan based on the future state map, run a pilot and measure results, verify benefits, modify future state process map and finally implementation plan, if needed , based upon pilot results.

Outcome:

The outcomes of “Implement” phase should include ability to list of possible or optimal solutions, based on testing and analysis, Map the future state map to include target performance, implement plans that address the gaps between current and future state, analyze cost/benefit of the proposed future state, and implement pilots in small scale to test the proposed future state and results.

Control

Structure:

In this phase using tools like control charts, control, transition, or reaction plans, project closure documents, and change management measures allow the clinical providers establish and monitor the improvement that has been implemented in the QI project.

Process:

In the process of “Control” phase, the conductors of the QI project need to be able to develop and document standard practices, train teams regarding the changes and new standards, an update procedures, determine process control points and quality indicators for monitoring and communicating, launching the full implementation plan, and summarize and communicate learnings and recommend future plans.

Supplemental material is neither peer-reviewed nor thoroughly edited by CJASN. The authors alone are responsible for the accuracy and presentation of the material.

Outcome:

Outcomes of this phase include 1) control or transition plan to ensure that the gains are sustained, 2) document process standardization (e.g., new Standard Operating Procedures (SOP), templates, visual cues, etc.), 3) reaction plan in order to determine what happens if the process goes out of standard, 4) project closure and handoff plan, and finally 5) list of key learning points from the project, to be disseminated to others (e.g., institutional pamphlets, abstracts or papers, local newspapers or national/global journals).

Supplemental material is neither peer-reviewed nor thoroughly edited by CJASN. The authors alone are responsible for the accuracy and presentation of the material.

Appendix A

Table 1: Differences and similarities between research and quality improvement.

	QI	Research
Similarities		
Academic process	<ul style="list-style-type: none"> - Question - Design <ul style="list-style-type: none"> o Sample size o Data collection - Results - Implication - Publication 	<ul style="list-style-type: none"> - Question - Design <ul style="list-style-type: none"> o Sample size o Data collection - Results - Implication Publication
Differences		
Methodology	DMAIC (see below), etc.	Qualitative/Quantitative
Human subjects	Questionable need for ethics approval	Need Ethics approval
Data collection	<ul style="list-style-type: none"> - Rapid cycles - Minimal resources 	<ul style="list-style-type: none"> - Internal/external Validity - High resources
Results	Improve process	Add knowledge
Implications	Process change	Understanding change
Dissemination	Unit/Agency	Scientific community
Protocols	Informal Changes frequently	Formal Needs to be decided a priori

Appendix A









Table 2: QI implementation tools

Tool	Description
Improvement	
6-3-5	Brainstorming: six participants, supervised by a moderator, who are required to write down three ideas on a specific worksheet within five minutes
Affinity Grid	Brainstorming: random ideas or suggestions are eventually organized within natural groupings
Impact-Effort Grid	
<p>The diagram is a 2x2 matrix with 'Effort' on the vertical axis and 'Impact' on the horizontal axis. The quadrants are:</p> <ul style="list-style-type: none"> Top-Left: High Impact – Low Effort (Just Do It!!) Top-Right: High Impact – High Effort (Major Planning!!) Bottom-Left: Low Impact – Low Effort (No Rush. Fill Ins!!) Bottom-Right: Low Impact – High Effort (Maybe Some Day!!) 	
Value Stream Mapping	Document, analyze and improve the flow of information or materials required to produce a product or service for a customer
Stabilization	
5S	Sort (separate the essential from the non-essential items), Straighten (organize essential materials where everything has its place), Shine (clean work area), Standardize (establish a system to maintain and make 5S a habit), Sustain safety (create a safe and sanitary work environment)
Mistake Proofing	Design processes and tools to be mistake-proof (e.g., different sizes for tubing and connection for tube feed vs. IV medications)
Flow optimization	
Standard Work in	Establish the best, safest, and most efficient sequences and methods for each

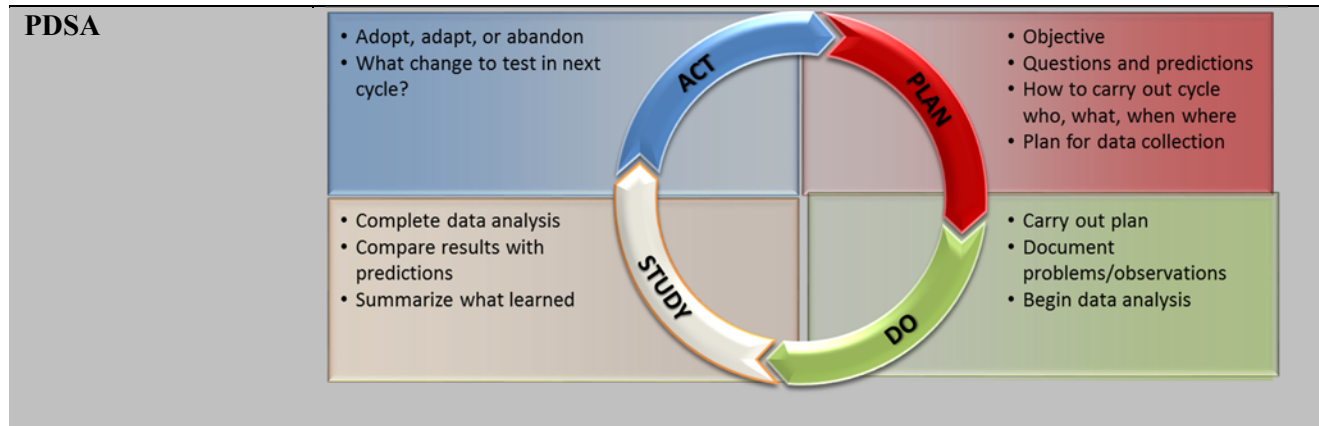
Supplemental material is neither peer-reviewed nor thoroughly edited by CJASN. The authors alone are responsible for the accuracy and presentation of the material.

Process	process and each task is done in a workplace
Balanced Workload	Matching capacity and demand across the process line to evenly distribute work units, obtain accurate cycle times for each process, define the order that process steps are completed, define the number of staff required for a given demand, assist in creating the future state map, improve productivity.
Constraint Management	Theory of constraints (TOC) focuses on the weakest link in a process. Constraint Management is the identification of the core problem, solution, and implementation of the solution for each successive weakest link
Push/Pull	Pull system request resources when capacity reaches a certain level Push system resources are designed for actual or forecasted demand
Kanban	Kanban is a visual workflow management tool that can help achieve more done with less stress by using sticky notes on a whiteboard (or an electronic equivalent)

Example:

Ready	Development		Verification		Deployed	Done
	Ongoing	Done	Ongoing	Done		
						
						
						

Supplemental material is neither peer-reviewed nor thoroughly edited by CJASN. The authors alone are responsible for the accuracy and presentation of the material.



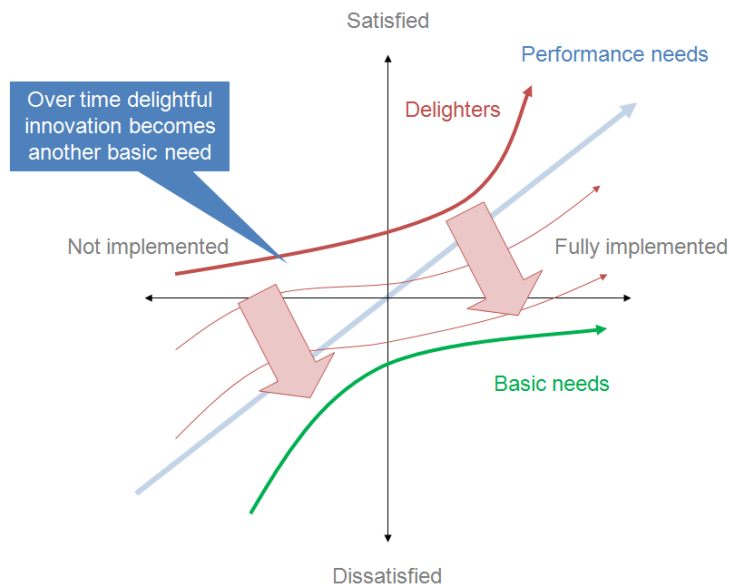
Making Quality Visible (Andon) A system to notify management, maintenance, and other workers of a quality or process problem.

Kaizen events Implies activities that continuously improve all functions and involve all employees regardless of the hierarchy and includes these principles: Teamwork, Personal discipline, Improved morale, Quality circles, Suggestions for improvement (e.g., PDSA is considered a Kaizen method)

Change management tools

ADKAR Awareness, Desire, Knowledge, Ability, Reinforcement

Kano model for satisfaction



Supplemental material is neither peer-reviewed nor thoroughly edited by CJASN. The authors alone are responsible for the accuracy and presentation of the material.

Appendix A

Figure 1: Prioritization Matrix



Appendix B:

ADQI Consensus Conference Methodology

The 22nd ADQI consensus meeting followed the established ADQI process, as previously described (14). The broad objective of ADQI is to provide expert-based statements and interpretation of current knowledge for use by clinicians and investigators according to professional judgment and to identify clinical research priorities to address these gaps. The 22nd ADQI Consensus Conference included a 32-participant diverse panel representing relevant disciplines representing nephrology, critical care medicine, advanced clinical practice, basic and clinical science, epidemiology, and pharmacy from several continents including Asia, North America, Latin America, and Europe. The 22nd ADQI was held around the theme of “Quality improvement for AKI” during two and a half days meeting, in San Diego, CA, USA on October 28-30, 2018.

The activities on the consensus conference were divided into three parts 1) the pre-conference activities involved a comprehensive search of the literature for assessment of the current evidence related to the quality improvement and management strategies for AKI in the communities and during the medical encounters. Each workgroup was tasked to summarize the scope, implementation, and evaluation strategies for the implementation of AKI QI projects. A series of phone conferences and emails involving each workgroup members before the meeting identified the current state of knowledge to enable the formulation of main questions from which discussion and consensus would be developed, 2) during the conference, a series of plenary and breakout sessions were held in which each group developed their consensus positions and recommendations before sharing, debating, and refining them within the plenary session for appraisal by the whole conference. This process (modified Delphi) was repeated three times during conference before the final statements were made and shared with the entire group, 3) following the meeting, this summary reports from each group were collated to generate this report following revision and approval by all members of the ADQI participants.

Below is a breakout of each of the five groups’ assignments:

Group 1: this group was assigned to assess the quality standards at the community and healthcare system levels to provide consensus recommendation to mitigate the risk of AKI in the populations of resource-limited or resource sufficient environments. These recommendations not

only included the current best practices at the community levels but also contain novel strategies to detect higher risk patients, raising awareness, communicating with primary physicians, and legislative strategies to achieve the goals.

Group 2: this group was tasked to discuss and provide recommendations regarding the AKI risk modification and primary prevention following medical encounters which included outpatient clinics, emergency departments, and hospitals or intensive care units. This group focused on strategies for optimization of AKI prevention before its occurrence. These include risk stratification, early detection, use of biomarkers or other novel risk detecting tools, and optimal management of subgroups of AKI high-risk hospitalized patients before AKI development.

Group 3: The assignment of this group was to provide suggestions and recommendations about quality measures to mitigate the impact of AKI after its occurrence (secondary prevention). Group 3 identified quality indexes to indicate the best practices in the management of patients with AKI in different stages.

Group 4: This group was tasked to provide an approach to improve quality of care and safety measures of renal replacement therapy (RRT) provided for AKI. This group made recommendations regarding how to enhance the quality of RRT to comply with current or future knowledge related to the timing, dosing, and modality of RRT.

Group 5: And finally group 5 discussed and made 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). The primary objective of this group was to identify the quality indexes that are acceptable for the management of AKI patients beyond the index hospitalization (tertiary prevention). During AKD, the care of patients needs to be standardized to optimize the follow-up visits and short- and long-term outcomes of AKI patients.

References

1. Health Topics: Risk Factors. http://www.who.int/topics/risk_factors/en/. World Health Organization (WHO), 2016
2. Miquel P: *A dictionary of epidemiology*, Oxford University Press, 2008
3. Mehta RL, Burdmann EA, Cerda J, Feehally J, Finkelstein F, Garcia-Garcia G, Godin M, Jha V, Lameire NH, Levin NW, Lewington A, Lombardi R, Macedo E, Rocco M, Aronoff-Spencer E, Tonelli M, Zhang J, Remuzzi G: Recognition and management of acute kidney injury in the International Society of Nephrology Oby25 Global Snapshot: a multinational cross-sectional study. *Lancet*, 387: 2017-2025, 2016
4. Sawhney S, Fluck N, Fraser SD, Marks A, Prescott GJ, Roderick PJ, Black C: KDIGO-based acute kidney injury criteria operate differently in hospitals and the community—findings from a large population cohort. *Nephrology Dialysis Transplantation*, 31: 922-929, 2016
5. Kashani K, Macedo E, Burdmann EA, Hooi LS, Khullar D, Bagga A, Chakravarthi R, Mehta R: Acute Kidney Injury Risk Assessment: Differences and Similarities Between Resource-Limited and Resource-Rich Countries. *Kidney Int Rep*, 2: 519-529, 2017
6. Mehta R, Bagga A, Patibandla R, Chakravarthi R: Detection and Management of AKI in the Developing World: The 18th Acute Disease Quality Initiative (ADQI) International Consensus Conference. *Kidney International Reports*, 2: 515-518, 2017
7. Centers_for_Medicare_and_Medicaid_Services: CMS Quality Strategy. <https://www.cms.gov/medicare/quality-initiatives-patient-assessment-instruments/qualityinitiativesgeninfo/downloads/cms-quality-strategy.pdf>, 2016
8. World_Health_Organization: How do we define quality improvement? <https://www.who.int/en/>,
9. Brassard M, Ritter D, MacCausland J, Kierstead M, Crovo D: *The Public Health Memory Jogger II: A Pocket Guide of Tools for Continuous Improvement and Effective Planning*, 13 Branch Street, Suite 103, Methuen, Massachusetts 01844, USA, GOAL/QPC, 2016
10. Donabedian A: Evaluating the quality of medical care. *Milbank Mem Fund Q*, 44: Suppl:166-206, 1966
11. Pande PS: *The Six Sigma way team fieldbook : an implementation guide for project improvement teams*, New York : McGraw-Hill, [2002] ©2002, 2002
12. Hiatt J: *ADKAR : a model for change in business, government and our community*, Loveland, Colorado, USA, Prosci Learning Center Publications, 2006
13. The SAGE Encyclopedia of Quality and the Service Economy. Thousand Oaks
Thousand Oaks, California, SAGE Publications, Inc, 2015
14. Kellum JA, Bellomo R, Ronco C: Acute Dialysis Quality Initiative (ADQI): methodology. *The International journal of artificial organs*, 31: 90-93, 2008