Contrast RISK: Reducing Injury Sustained by Kidneys

Contrast Risk Workshop

Enhancing Clinical Decision Support for Prevention of Contrast-Induced Acute Kidney Injury in Cardiac Catheterization

Project Partners

- **Steering Committee:** Matthew James (Co-PI, APPROACH Research Lead), Dr. Michelle Graham (Co-PI, UAH Site Lead), Dr. Bryan Har (FMC Site Lead), Dr. Ben Tyrrell (RAH Site Lead), Diane Galbraith (APPROACH Manager)
- **Funding Agency:** Alberta Innovates – Health Solutions: Partnership for Research & Innovation in the health system (PRIHS)
- **AHS Strategic Clinical Network Partners:** AHS Cardiovascular Health and Stroke Strategic Clinical Network, AHS Kidney Health Strategic Clinical Network
- **Partner Sites and Leads:** Foothills Medical Centre - Libin Cardiovascular Institute of Alberta (Dr. David Goodhart, Tanya Federico), Royal Alexandra Hospital - CK Hui Heart Centre (Dr. Neil Brass, Michael Powell), University of Alberta - Mazankoswski Alberta Heart Institute (Dr. Robert Welsh, Cheryl Loughlin)
- **Collaborating Teams:** Alberta Provincial Project for Outcomes Assessment in Coronary Heart Disease (APPROACH Team), AHS Analytics (Allan Ryan), AHS Research Facilitation (Peter Faris), Health Outcome Sciences (Dr. John Spertus, Ryan Fox)
- **Project Team:** Eleanor Benterud (Senior Project Coordinator), Pantea Javaheri (Project Coordinator), Denise Kruger (Research Coordinator- Edmonton sites), Tolu Sajobi (Project Biostatistician), Zhi Tan (Senior Analyst)

Intention of the workshop

- **Plenary**: Dr. John Spertus
- **Why**: Rational for the Project
- **Where We've Been**: The Year in Review
  - Break
- **How in Theory**: Intro of the tools
- **How in Practice** : Case Study
- **How it Varies**: Interactive Session
- **Audit and Feedback**
- **Where We are Going**: Looking ahead
- **Wrap Up**

By the end of the workshop you should:

- Recognize four solutions for CI-AKI Prevention
- Gain insight into how the solutions will be implemented across the 3 sites in Alberta
- Understand the workflow, tools, and the changes you may encounter
- Be informed regarding the steps that lie ahead

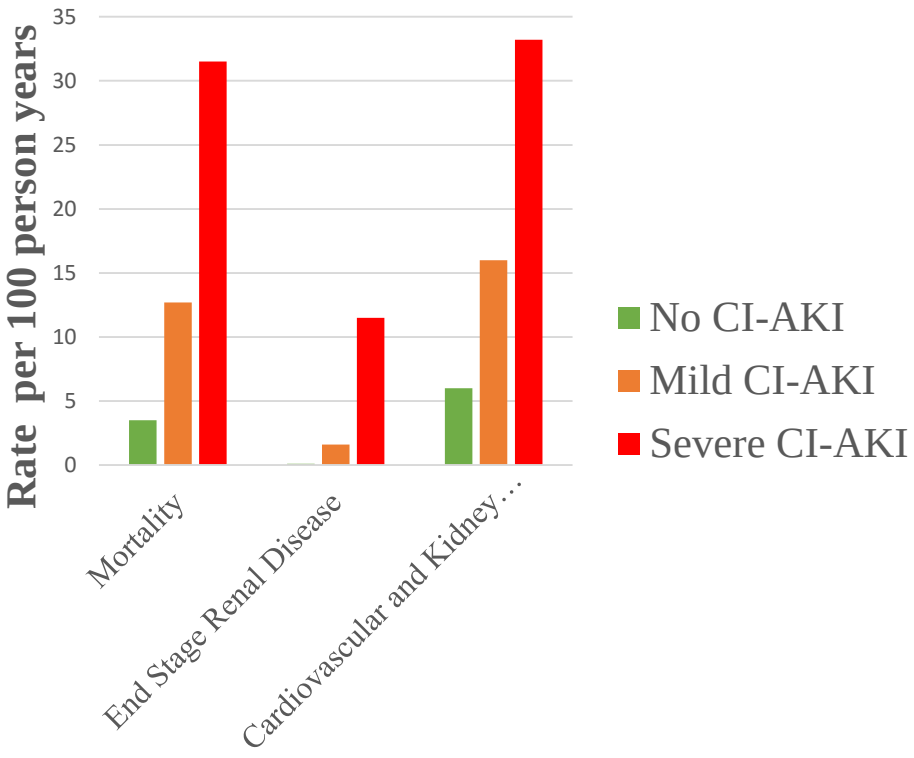
Contrast RISK Reducing Injury Sustained by Kidneys

Plenary: Dr. John Spertus

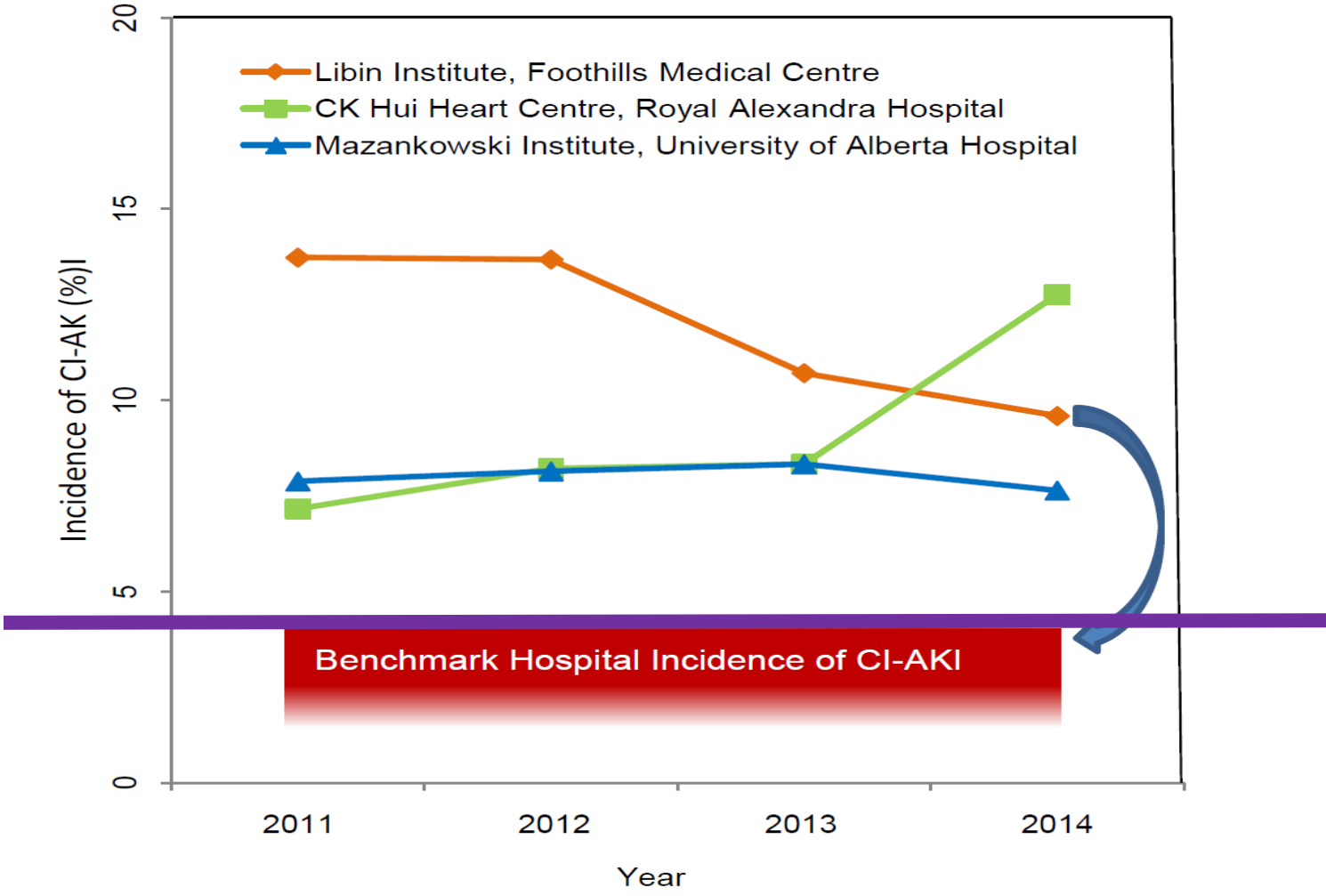
Setting the Stage for Precision Medicine


WHY

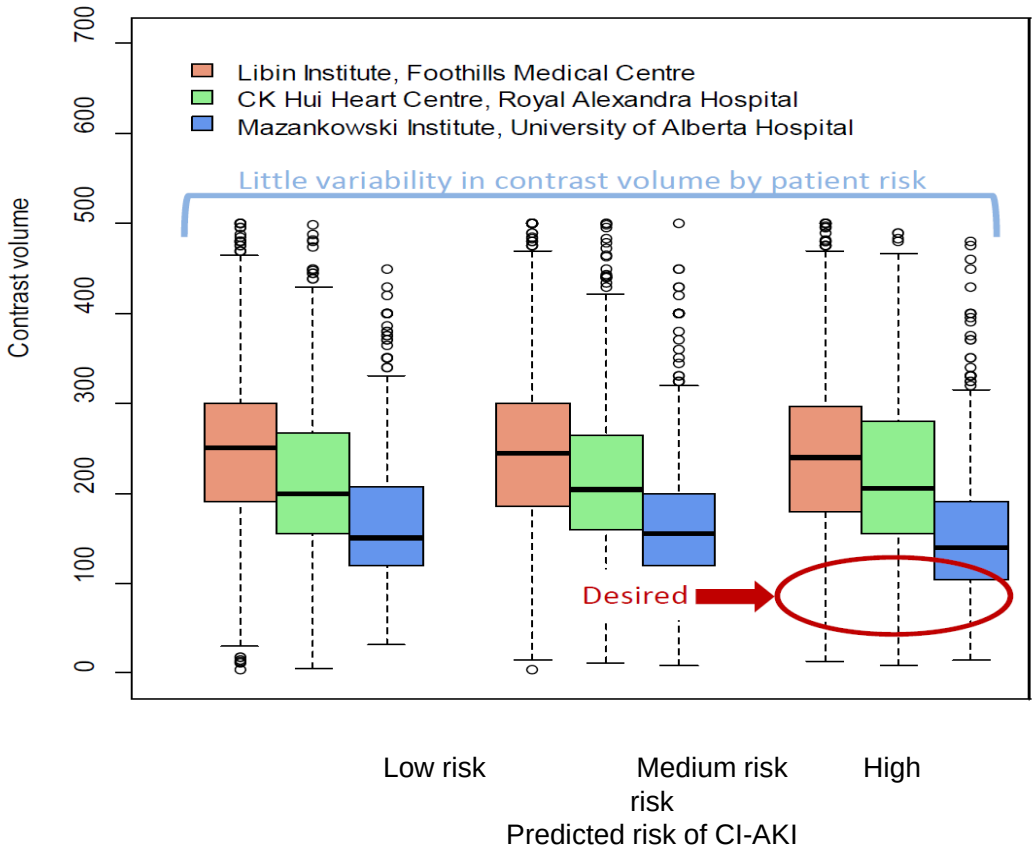
CONTRAST-INDUCED ACUTE KIDNEY INJURY (CI-AKI)



Current state
Annual number of CI-AKI cases after cardiac catheterization in Alberta; n=1,344: Stage 1 (mild) AKI n=1021 Stage 2 (moderate) AKI n=188 Stage 3 (severe) AKI n=94 Dialysis requiring AKI n=40
Annual costs attributable to CI-AKI after cardiac catheterization in Alberta (due to additional time in hospital, consultations, readmissions, and dialysis): Stage 1 (mild) AKI $3.8 million Stage 2 (moderate) AKI $1.1 million Stage 3 (severe) AKI $3.7 million Dialysis requiring AKI $0.9 million
Annual costs attributable to need for ongoing chronic hemodialysis (~30% of all patients who require acute dialysis for CI-AKI don't recovery) n=12 x $80,000 per year = $960,000


Libin Institute, Foothills Medical Centre
CK Hui Heart Centre, Royal Alexandra Hospital
Mazankowski Institute, University of Alberta Hospital
Incidence of CI-AK (%)I
0
5
10
15
20
2011
2012
2013
2014
Year
Benchmark Hospital Incidence of CI-AKI

CURRENT PRACTICE AT EACH SITE



CURRENT PRACTICE AT EACH SITE

LVEDP of Patients at Increased Risk of CI-AKI, by Site

Site	LVEDP	
	Median	IQR
Libin Institute, Foothills Medical Centre	17	14-22
CK Hui Heart Centre, Royal Alexandra Hospital	14	10-21
Mazinkowski Institute, University of Alberta Hospital	14	10-20

Contrast RISK Reducing Injury Sustained by Kidneys

Automated Identification of Patients at High Risk of CI-AKI and Dialysis

Embedded clinical decision support on safe contrast limits

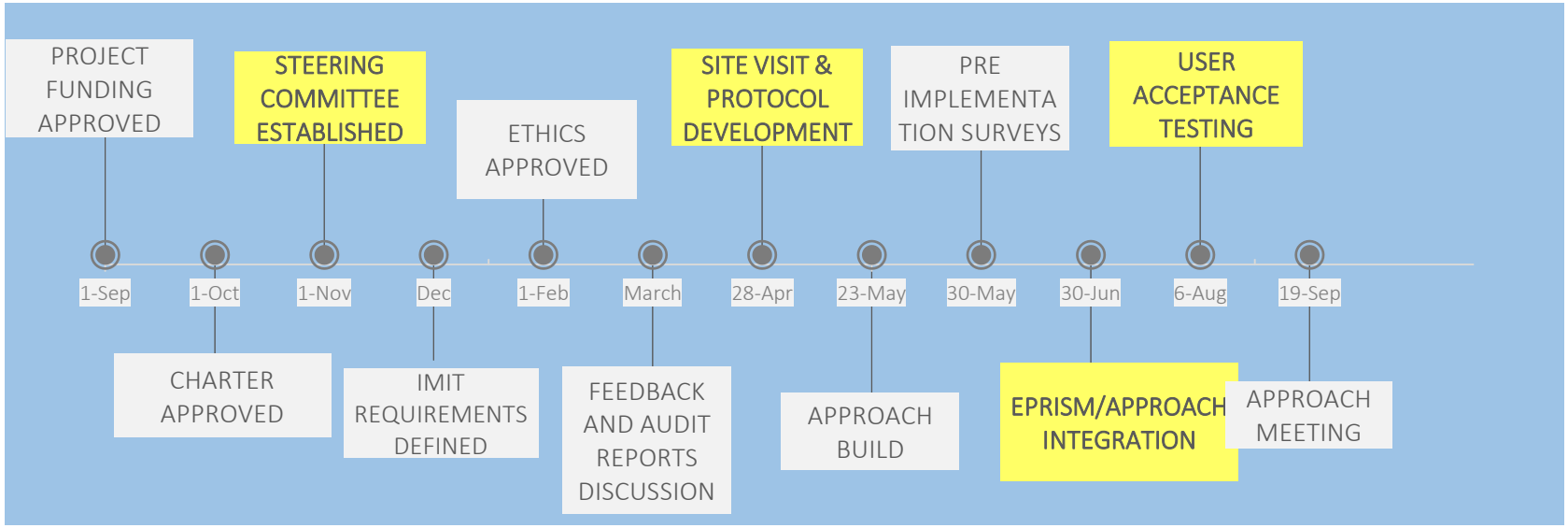
Tailored recommendation for prophylactic IV fluids

Information and follow-up plan according to patient risk

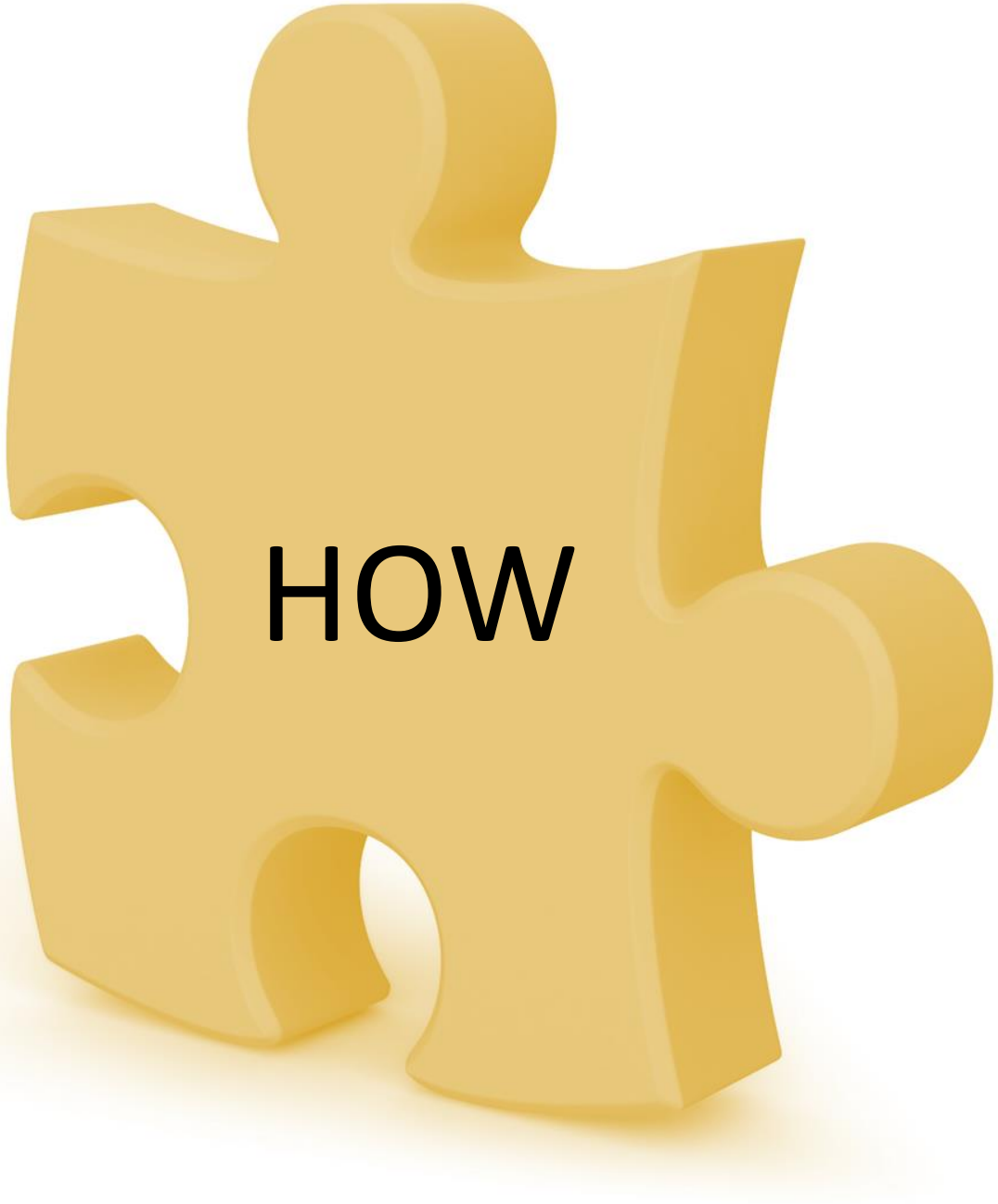
Computerized Decision Support **Education & Academic Detailing** **Audit & Feedback**

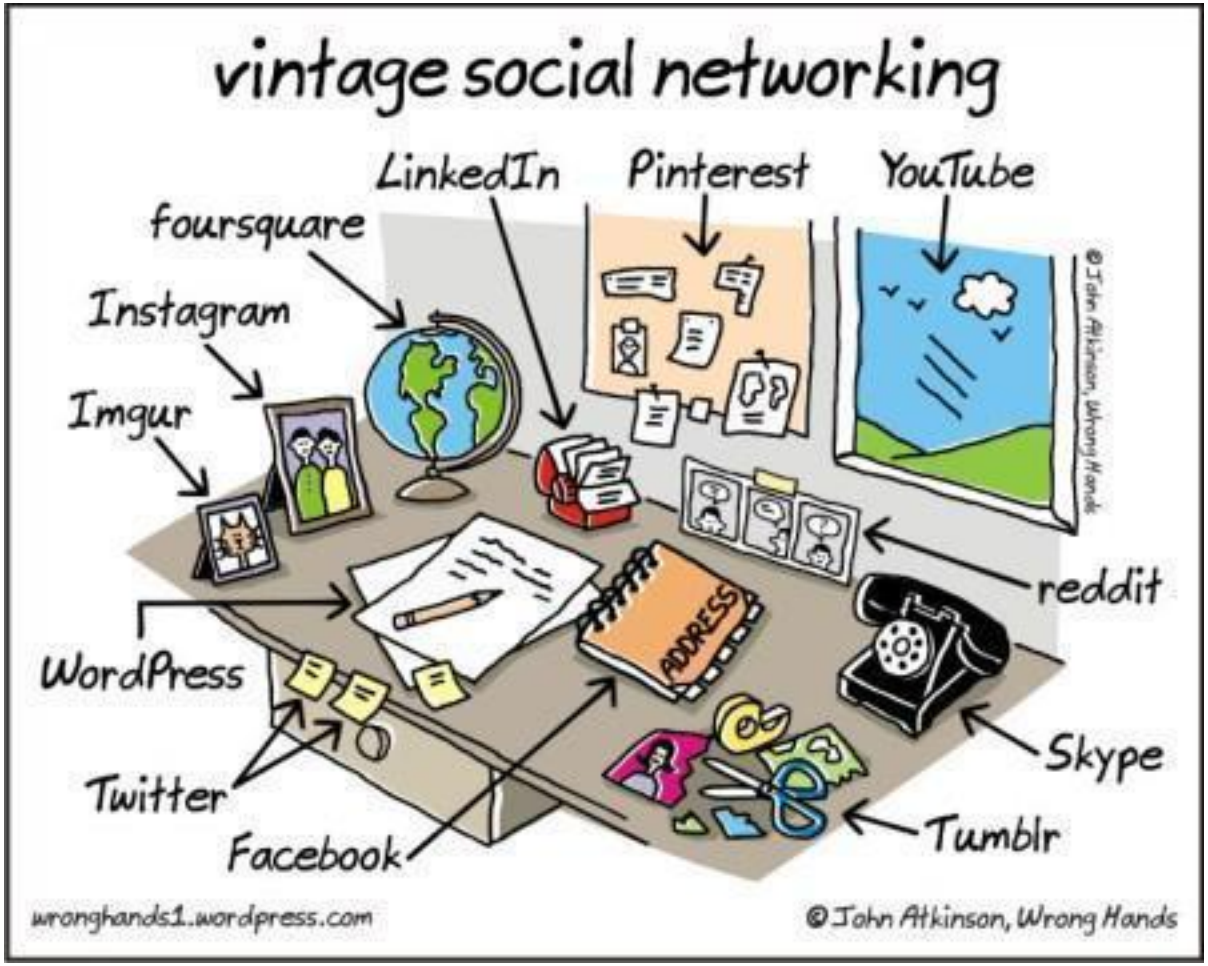

Where

Year in Review



Break


HOW


vintage social networking
LinkedIn
Pinterest
YouTube
foursquare
Instagram
Imgur
reddit
WordPress
Twitter
Facebook
Skype
Tumblr
ADDRESS
wronghands1.wordpress.com
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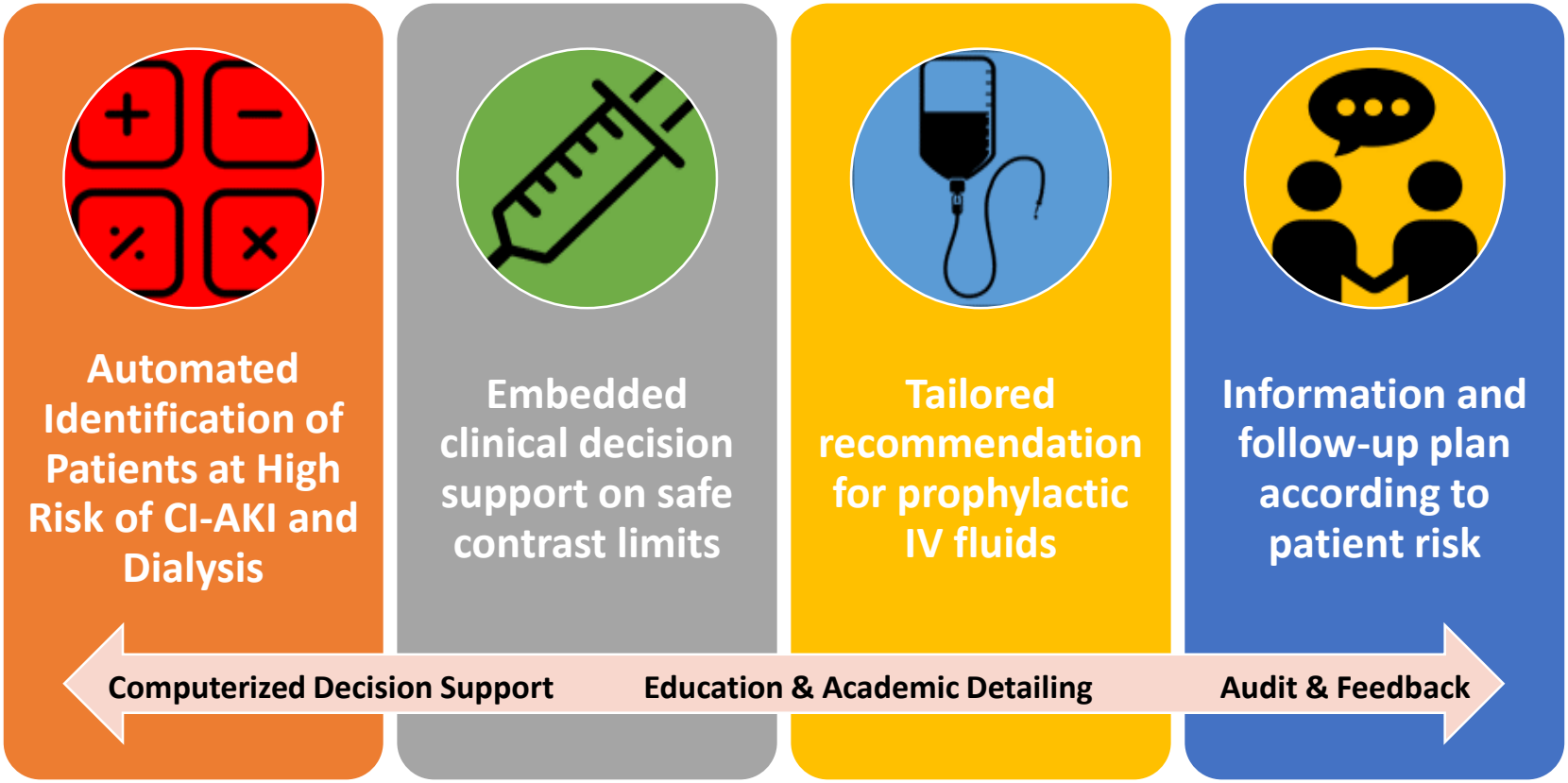
The What: Implementation Strategy

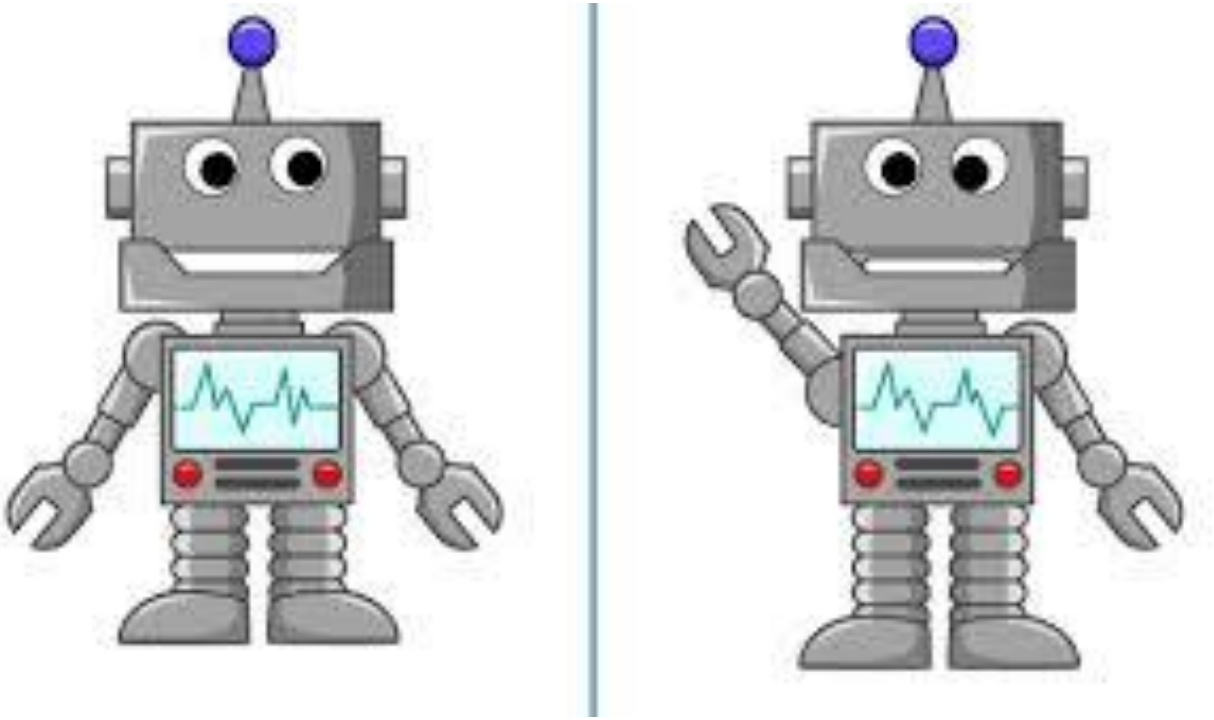
Contrast RISK Reducing Injury Sustained by Kidneys



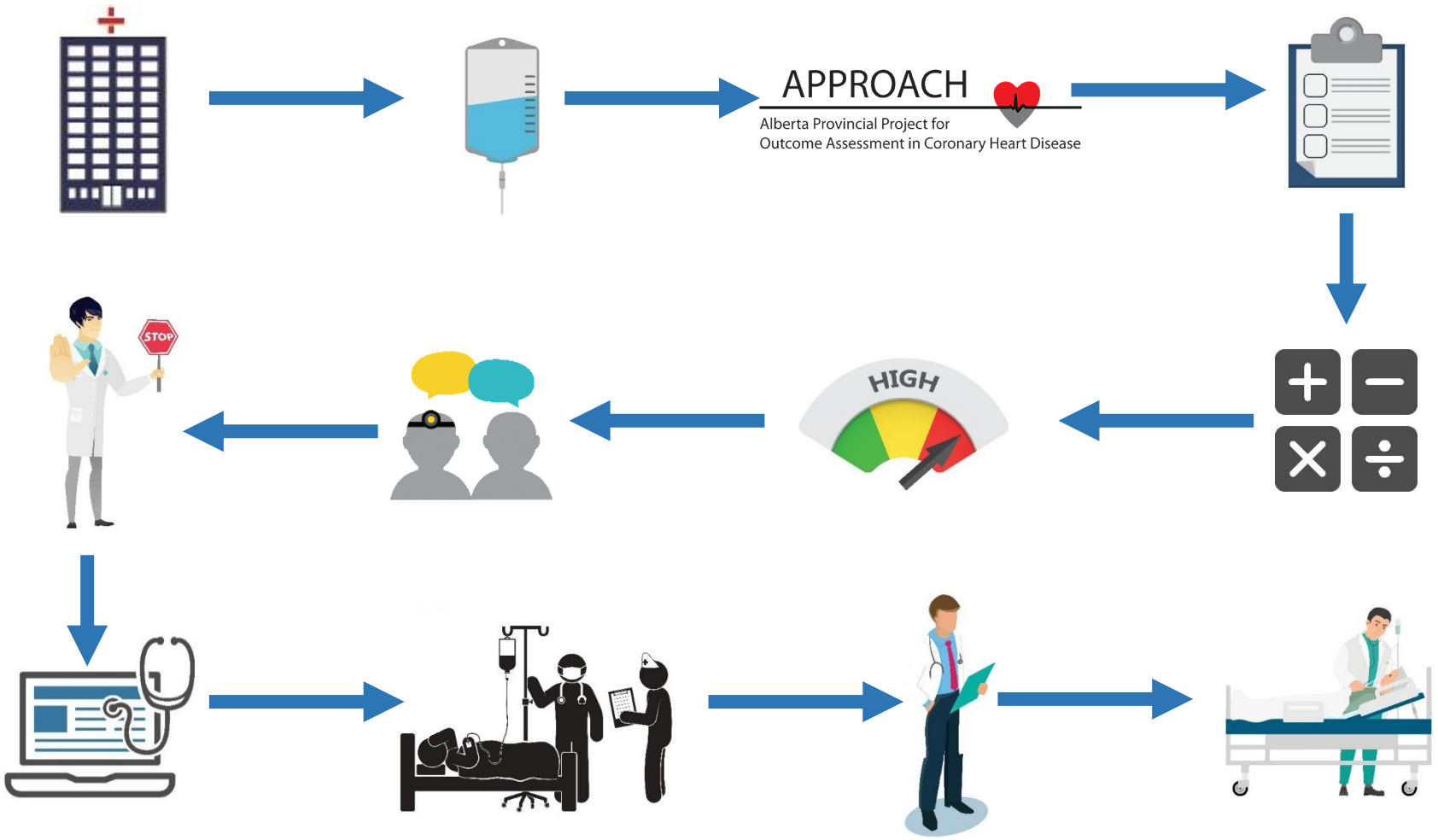

implementation
process
plan
management
data
complex
retention
risk
identification
assessment
cost
impact
resources
context
evaluation
scope
research
strategy
treatment
important
project
organization
performance
monitor
planning
customer
sales
opportunity

SPOT the Difference

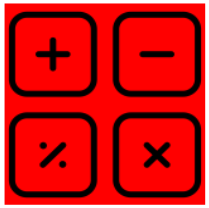
Contrast RISK Reducing Injury Sustained by Kidneys

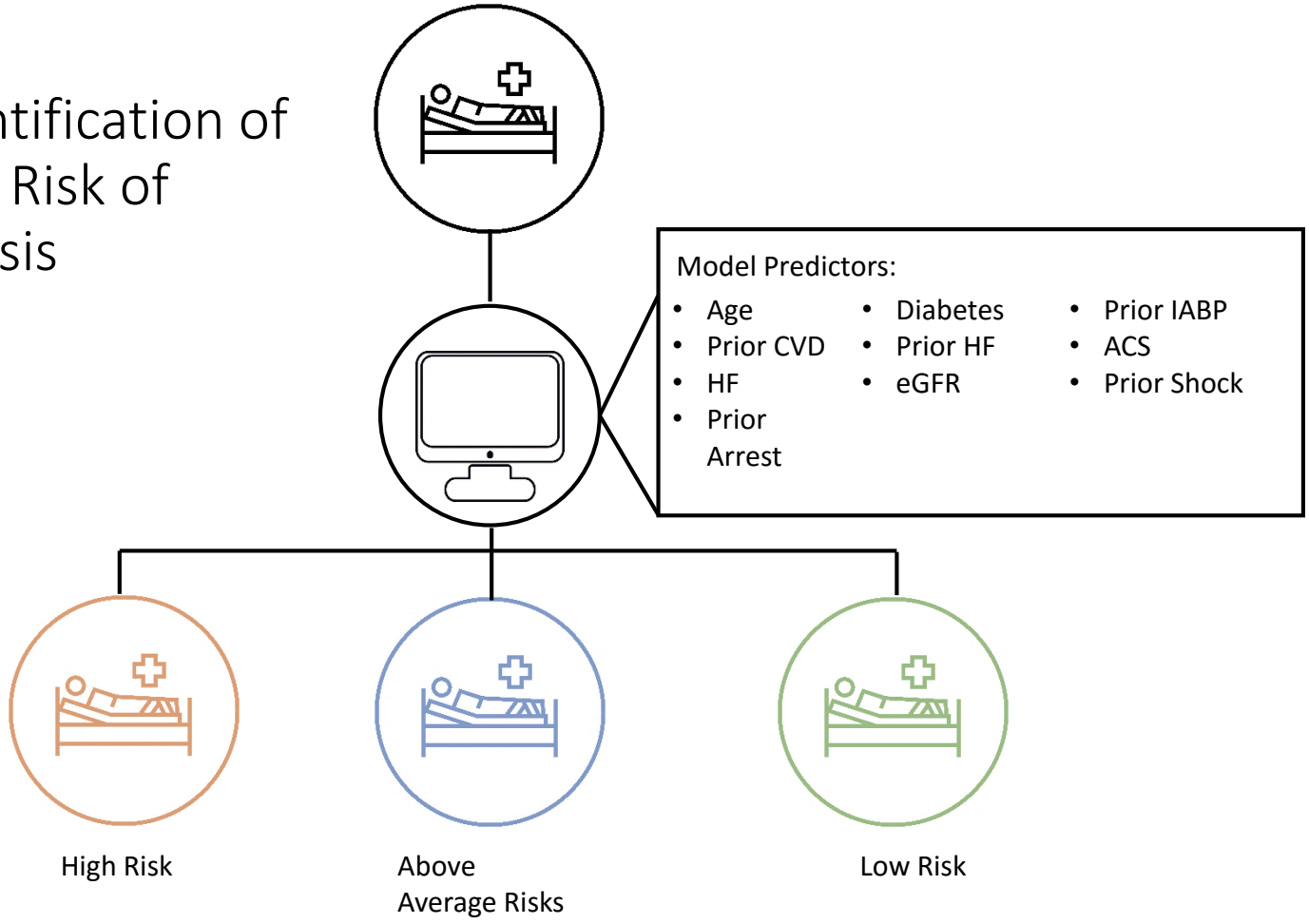


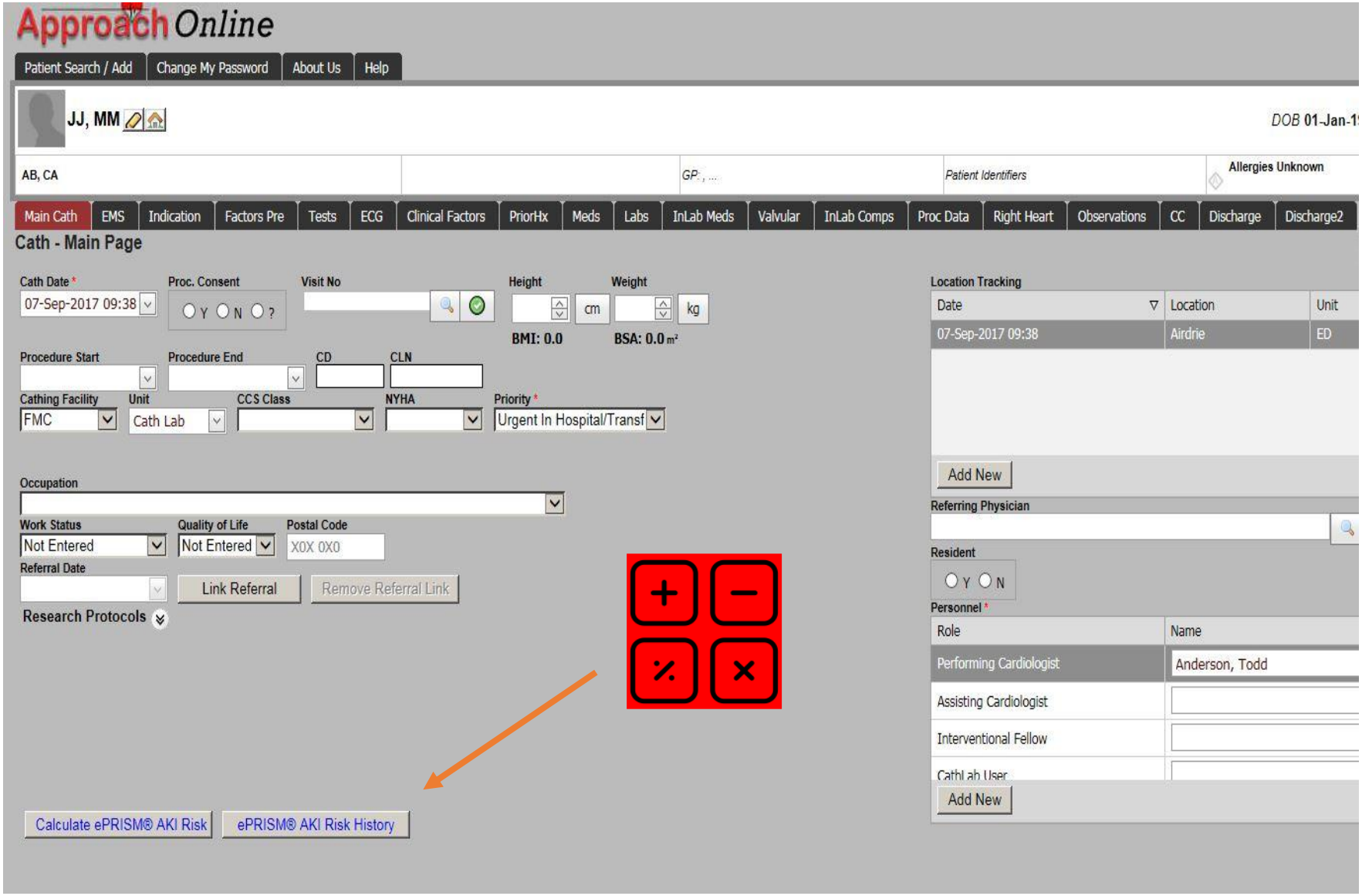
Contrast RISK Reducing Injury Sustained by Kidneys

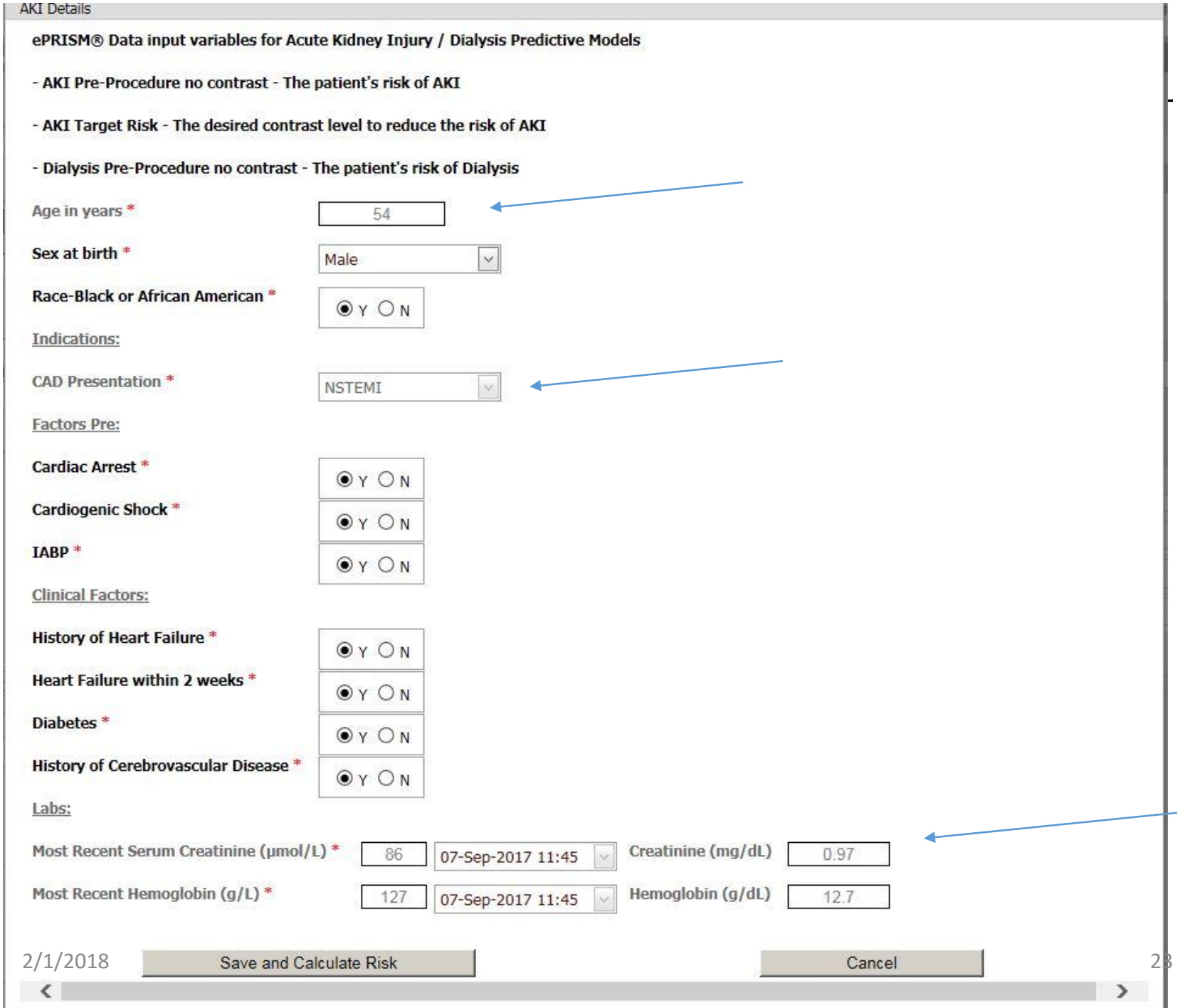


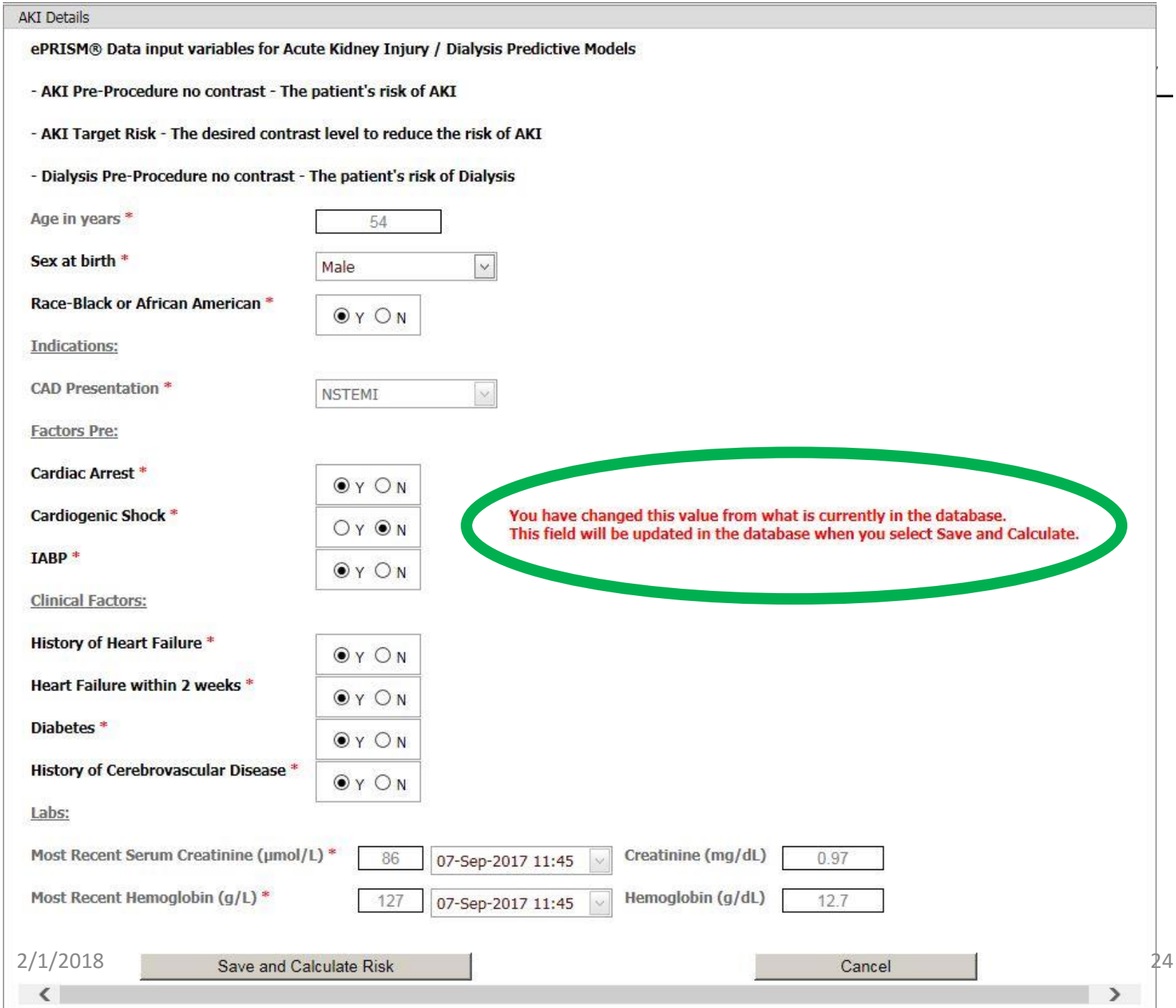
Automated Identification of Patients at High Risk of CI-AKI and Dialysis

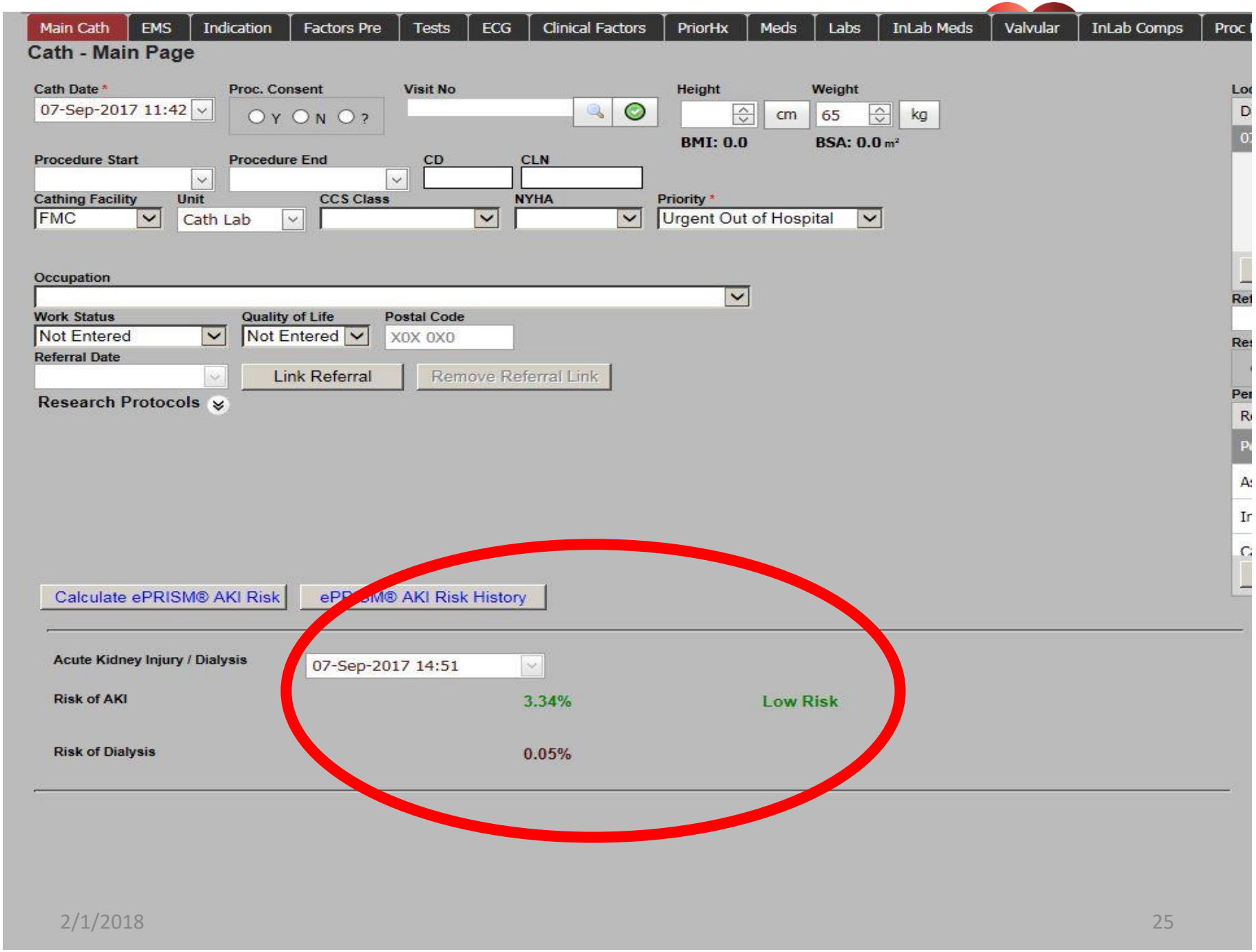





Approach Online
Patient Search / Add
Change My Password
About Us
Help
JJ, MM
DOB 01-Jan-1
AB, CA
GP: , ...
Patient Identifiers
Allergies Unknown
Main Cath
EMS
Indication
Factors Pre
Tests
ECG
Clinical Factors
PriorHx
Meds
Labs
InLab Meds
Valvular
InLab Comps
Proc Data
Right Heart
Observations
CC
Discharge
Discharge2
Cath - Main Page
Cath Date *
07-Sep-2017 09:38
Proc. Consent
Y N ?
Visit No
Height
cm
Weight
kg
BMI: 0.0
BSA: 0.0 m²
Procedure Start
Procedure End
CD
CLN
Cathing Facility
FMC
Unit
Cath Lab
CCS Class
NYHA
Priority *
Urgent In Hospital/Transf
Occupation
Work Status
Not Entered
Quality of Life
Not Entered
Postal Code
X0X 0X0
Referral Date
Link Referral
Remove Referral Link
Research Protocols
Location Tracking
Date
Location
Unit
07-Sep-2017 09:38
Airdrie
ED
Add New
Referring Physician
Resident
Y N
Personnel *
Role
Name
Performing Cardiologist
Anderson, Todd
Assisting Cardiologist
Interventional Fellow
Cath Lab User
Add New
Calculate ePRISM® AKI Risk
ePRISM® AKI Risk History


AKI Details
ePRISM® Data input variables for Acute Kidney Injury / Dialysis Predictive Models
- AKI Pre-Procedure no contrast - The patient's risk of AKI
- AKI Target Risk - The desired contrast level to reduce the risk of AKI
- Dialysis Pre-Procedure no contrast - The patient's risk of Dialysis
Age in years *
54
Sex at birth *
Male
Race-Black or African American *
Y N
Indications:
CAD Presentation *
NSTEMI
Factors Pre:
Cardiac Arrest *
Y N
Cardiogenic Shock *
Y N
IABP *
Y N
Clinical Factors:
History of Heart Failure *
Y N
Heart Failure within 2 weeks *
Y N
Diabetes *
Y N
History of Cerebrovascular Disease *
Y N
Labs:
Most Recent Serum Creatinine (µmol/L) *
86
07-Sep-2017 11:45
Creatinine (mg/dL)
0.97
Most Recent Hemoglobin (g/L) *
127
07-Sep-2017 11:45
Hemoglobin (g/dL)
12.7
Save and Calculate Risk
Cancel


AKI Details
ePRISM® Data input variables for Acute Kidney Injury / Dialysis Predictive Models
- AKI Pre-Procedure no contrast - The patient's risk of AKI
- AKI Target Risk - The desired contrast level to reduce the risk of AKI
- Dialysis Pre-Procedure no contrast - The patient's risk of Dialysis
Age in years *
54
Sex at birth *
Male
Race-Black or African American *
Y N
Indications:
CAD Presentation *
NSTEMI
Factors Pre:
Cardiac Arrest *
Y N
Cardiogenic Shock *
Y N
IABP *
Y N
You have changed this value from what is currently in the database.
This field will be updated in the database when you select Save and Calculate.
Clinical Factors:
History of Heart Failure *
Y N
Heart Failure within 2 weeks *
Y N
Diabetes *
Y N
History of Cerebrovascular Disease *
Y N
Labs:
Most Recent Serum Creatinine (µmol/L) *
86
07-Sep-2017 11:45
Creatinine (mg/dL)
0.97
Most Recent Hemoglobin (g/L) *
127
07-Sep-2017 11:45
Hemoglobin (g/dL)
12.7
Save and Calculate Risk
Cancel


Main Cath
EMS
Indication
Factors Pre
Tests
ECG
Clinical Factors
PriorHx
Meds
Labs
InLab Meds
Valvular
InLab Comps
Cath - Main Page
Cath Date *
07-Sep-2017 11:42
Proc. Consent
Y N ?
Visit No
Height
cm
Weight
65
kg
BMI: 0.0
BSA: 0.0 m²
Procedure Start
Procedure End
CD
CLN
Cathing Facility
FMC
Unit
Cath Lab
CCS Class
NYHA
Priority *
Urgent Out of Hospital
Occupation
Work Status
Not Entered
Quality of Life
Not Entered
Postal Code
X0X 0X0
Referral Date
Link Referral
Remove Referral Link
Research Protocols
Calculate ePRISM® AKI Risk
ePRISM® AKI Risk History
Acute Kidney Injury / Dialysis
07-Sep-2017 14:51
Risk of AKI
3.34%
Low Risk
Risk of Dialysis
0.05%

Main Cath | EMS | Indication | Factors Pre | Tests | ECG | Clinical Factors | PriorHx | Meds | Labs | InLab Meds | Valvular | InLab Comps

Cath Main Page

Cath Date * 07-Sep-2017 11:42 | Proc. Consent: Y N ? | Visit No | Height | Weight 65 kg

BMI: 0.0 BSA: 0.0 m²

Procedure Start | Procedure End | CD | CLN

Cathing Facility: FMC | Unit: Cath Lab | CCS Class | NYHA | Priority *: Urgent Out of Hospital

Occupation

Work Status: Not Entered | Quality of Life: Not Entered | Postal Code: X0X 0X0

Referral Date | Link Referral | Remove Referral Link

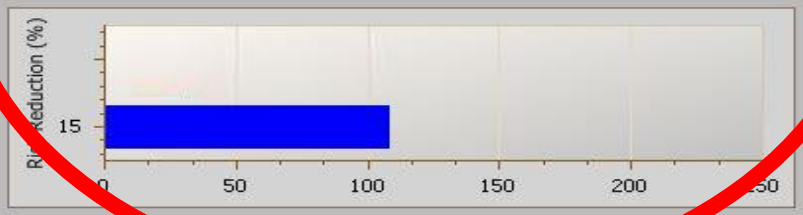
Research Protocols

Calculate ePRISM® AKI Risk | ePRISM® AKI Risk History

Acute Kidney Injury / Dialysis — 07-Sep-2017 14:53

Risk of AKI: 5.27% — Above Average

To reduce risk of AKI, limit contrast to: 108 cc



Risk of Dialysis: 0.11%

AB, CA | GP: , ... | Patient Identifiers | Allergies Unknown

Main Cath | EMS | Indication | Factors Pre | Tests | ECG | Clinical Factors | PriorHx | Meds | Labs | InLab Meds | Valvular | InLab Comps | Proc Data | Right Heart | Comments | CC | Discharge | Discharge2

Cath - Main Page

Cath Date * 07-Sep-2017 11:42 | Proc. Consent ○ Y ○ N ○ ? | Visit No | Height cm | Weight kg

BMI: 0.0 BSA: 0.0 m²

Procedure Start | Procedure End | CD | CLN

Cathing Facility: FMC | Unit: Cath Lab | CCS Class | NYHA | Priority *: Urgent Out of Hospital

Occupation

Work Status: Not Entered | Quality of Life: Not Entered | Postal Code: X0X 0X0

Referral Date | Link Referral | Remove Referral Link

Research Protocols

Location Tracking

Date	Location	Unit
07-Sep-2017 11:42	Banff	CCU

Add New

Referring Physician

Resident ○ Y ○ N

Personnel *

Role	Name
Assisting Cardiologist	
Interventional Fellow	
CathLab User	
CathLab User	

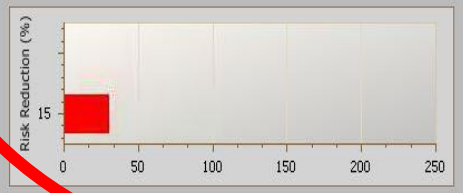
Add New

Calculate ePRISM® AKI Risk | ePRISM® AKI Risk History

Acute Kidney Injury / Dialysis 07-Sep-2017 11:48

Risk of AKI 68% High Risk

To reduce risk of AKI, limit contrast to: 30 cc



Risk of Dialysis 1.62%

Created By: 16353

Contrast Reducing Injury Sustained by Kidneys

Mean PA (mm Hg)

Radiation Dose (mGy)

Total DAP(cGycm2)

Closure Device: None

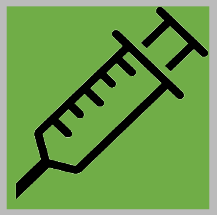
Patient Discharged To

Fluoro Time (min)

Contrast Minimization Strategies

- [ ] Avoid LV/Aortogram
- [ ] Rotational or biplane angiography
- [ ] Stage PCI

Dye 1 Vol(cc): 0

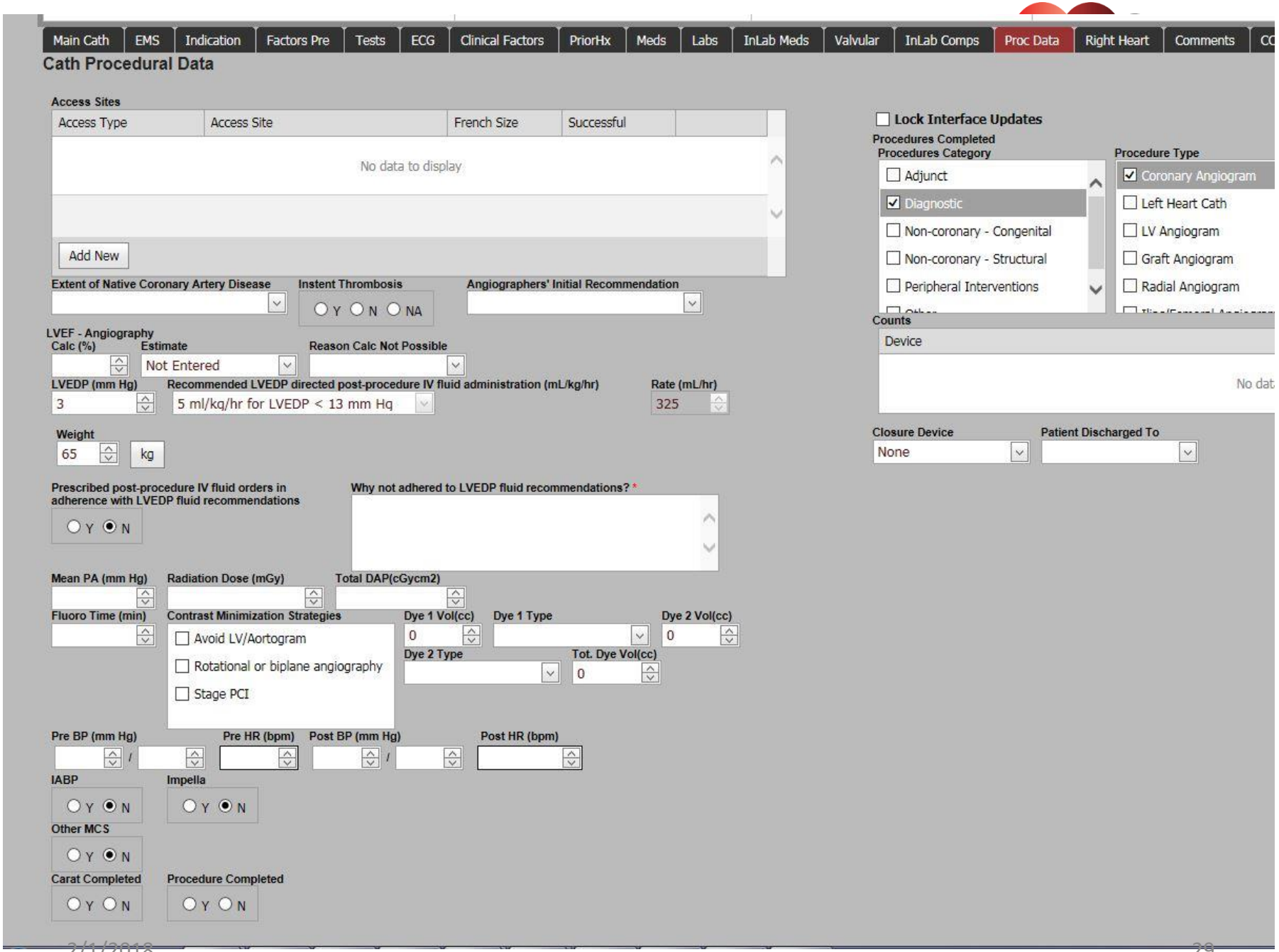


Dye 1 Type

Dye 2 Vol(cc): 0

Dye 2 Type

Tot. Dye Vol(cc): 0


Main Cath
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Factors Pre
Tests
ECG
Clinical Factors
PriorHx
Meds
Labs
InLab Meds
Valvular
InLab Comps
Proc Data
Right Heart
Comments
Cath Procedural Data
Access Sites
Access Type
Access Site
French Size
Successful
No data to display
Add New
Extent of Native Coronary Artery Disease
Instent Thrombosis
Y N NA
Angiographers' Initial Recommendation
LVEF - Angiography
Calc (%)
Estimate
Not Entered
Reason Calc Not Possible
LVEDP (mm Hg)
3
Recommended LVEDP directed post-procedure IV fluid administration (mL/kg/hr)
5 ml/kg/hr for LVEDP < 13 mm Hg
Rate (mL/hr)
325
Weight
65
kg
Prescribed post-procedure IV fluid orders in adherence with LVEDP fluid recommendations
Y N
Why not adhered to LVEDP fluid recommendations? *
Mean PA (mm Hg)
Radiation Dose (mGy)
Total DAP(cGycm2)
Fluoro Time (min)
Contrast Minimization Strategies
Avoid LV/Aortogram
Rotational or biplane angiography
Stage PCI
Dye 1 Vol(cc)
0
Dye 1 Type
Dye 2 Vol(cc)
0
Dye 2 Type
Tot. Dye Vol(cc)
0
Pre BP (mm Hg)
Pre HR (bpm)
Post BP (mm Hg)
Post HR (bpm)
IABP
Y N
Impella
Y N
Other MCS
Y N
Carat Completed
Y N
Procedure Completed
Y N
Lock Interface Updates
Procedures Completed
Procedures Category
Adjunct
Diagnostic
Non-coronary - Congenital
Non-coronary - Structural
Peripheral Interventions
Procedure Type
Coronary Angiogram
Left Heart Cath
LV Angiogram
Graft Angiogram
Radial Angiogram
Counts
Device
No dat
Closure Device
None
Patient Discharged To

Reducing Injury Sustained by

Main Cath | EMS | Indication | Factors Pre | Tests | ECG | Clinical Factors | PriorHx | Meds | Labs | InLab Meds | Valvular | InLab Comp

Cath Procedural Data

Access Sites

Access Type	Access Site	French Size	Successful
No data to display			

Add New

Extent of Native Coronary Artery Disease

Instent Thrombosis ○ Y ○ N ○ NA

Angiographers' Initial Recommendation

LVEF - Angiography

Calc (%)

Estimate Not Entered

Reason Calc Not Possible

LVEDP (mm Hg) 3

Recommended LVEDP directed post-procedure IV fluid administration (mL/kg/hr) 5 ml/kg/hr for LVEDP < 13 mm Hg

Rate (mL/hr) 325

Weight 65 kg

Prescribed post-procedure IV fluid orders in adherence with LVEDP fluid recommendations ○ Y ◉ N

Why not adhered to LVEDP fluid recommendations? *

☐ Lock Interfa

Procedures Compl

Procedures Categ

☐ Adjunct

☑ Diagnostic

☐ Non-coronar

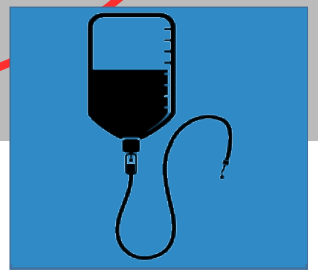
☐ Non-coronar

☐ Peripheral Ir

Counts

Device

Closure Device None



Alberta Health Services

Contrast RISK Reducing Injury Sustained by Kidneys

Patient's Name:_____

Physician Name:_____
Physician Phone: _____ Fax: _____

Your patient had a cath lab procedure on_____(date) and was given_____mls of intravenous contrast at the Foothills Medical Center.

- ☐ Your patient is at risk for contrast nephropathy
- ☐ Your patient has an elevated serum creatinine

You are treating your diabetic patient with Metformin. Your patient has been instructed to

- ☐ Hold metformin for 48 hours, and restart on_____(date).

  OR
- ☐ Continue with metformin along with close outpatient monitoring of serum creatinine.

Your patient has been given a requisition for a serum creatinine to be checked at 3 days post procedure and has been asked to make an appointment to see you within a week.

Sincerely,
Short Stay Cardiology
Foothills Medical Centre
Ph. 403-944-2380

Guidance for management of patients with kidney disease can be found at www.ckdpathway.com

Alberta Health Services

Patient Identifier

Contrast RISK Reducing Injury Sustained by Kidneys

Physician Name: _____
Physician Phone: _____ Fax: _____

Your patient received cardiac catheterization on _____ (date) and was identified as being at risk of contrast-induced acute kidney injury.

Your patient has been given a requisition for a serum creatinine level to be checked 2 to 3 days after the procedure and these results will be sent to you. It has been recommended to your patient that they see you within a week after their procedure, including follow-up of their kidney function.

Information and the management and referral of patients identified with kidney disease can be found on the Alberta online chronic kidney disease clinical pathway at:

www.diagnoseckd.ca

Sincerely,

Site name
Hospital name
Phone number

Managing the Transition

- Communication
- Adaptability
- Support
- Action
- Knowledge

Upcoming Education Sessions

Resources available:

Version 1 as of June 15, 2017

CONTRAST INDUCED APPROACH CHEAT SHEET

Step by Step procedure:

Pre Procedure

1) **Review and Update** any data elements on the AKI risk Popup Window if required
2) **Save and Calculate Risk button** to execute risk of AKI , Risk of Dialysis and Safe contrast limit displayed on main page
3) **Safe contrast limits** will only be displayed if the AKI risk calculator identifies that the patient is ABOVE average or High-Risk
4) **Communicate** the safe contrast volume limit to the cardiologist PRIOR to the start of the procedure
5) **Inform** the cardiologist at the time the safe contrast limit is reached - The cardiologist will decided to continue or end the case at their discretion
6) **Enter actual contrast volume used,** along with any strategies used to minimize contrast volume
7) **Enter LVEDP and Weight** manually into APPROACH in order to obtain the recommend post procedure IV fluid order
8) **Communicate the recommended IV** rate to the cardiologist who will determine to follow or not follow the recommendation. If not following the recommendation enter reason into APPROACH

Contrast RISK Reducing Injury Sustained by Kidneys

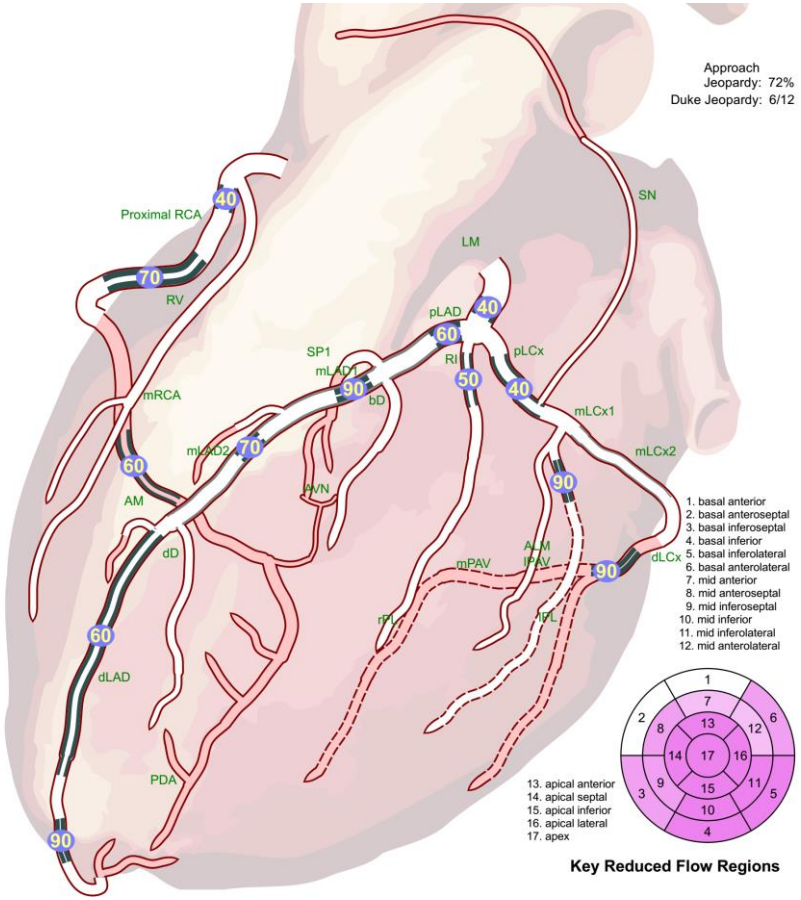
How In Practice: Contrast AKI Case Study

Dr. Bryan Har

Case

- 74 year old male:
  - Heart Failure and declining LVEF < 35%
  - Prior MI's
  - Creatinine = 110 (GFR=57)
  - Diabetes
  - Cognitive deficit due to anoxic brain injury

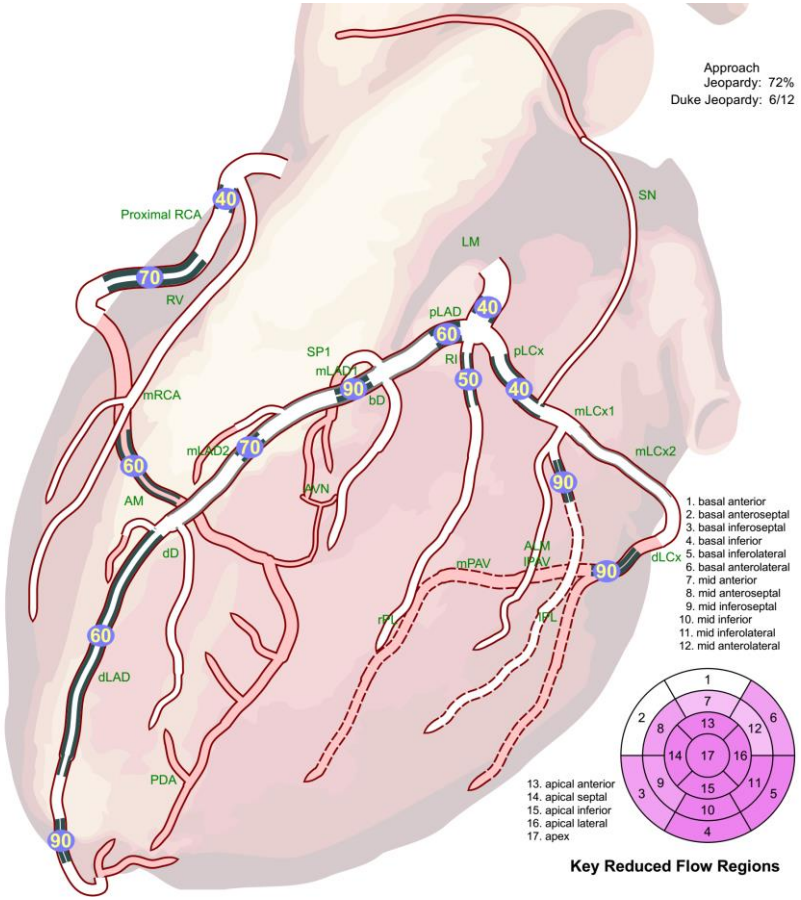
April 2016 Angiogram



Case

- The patient was turned down for CABG and PCI previously
- May 2017: Referred for another opinion and repeat angiogram given worsening EF, with goal of avoiding ICD

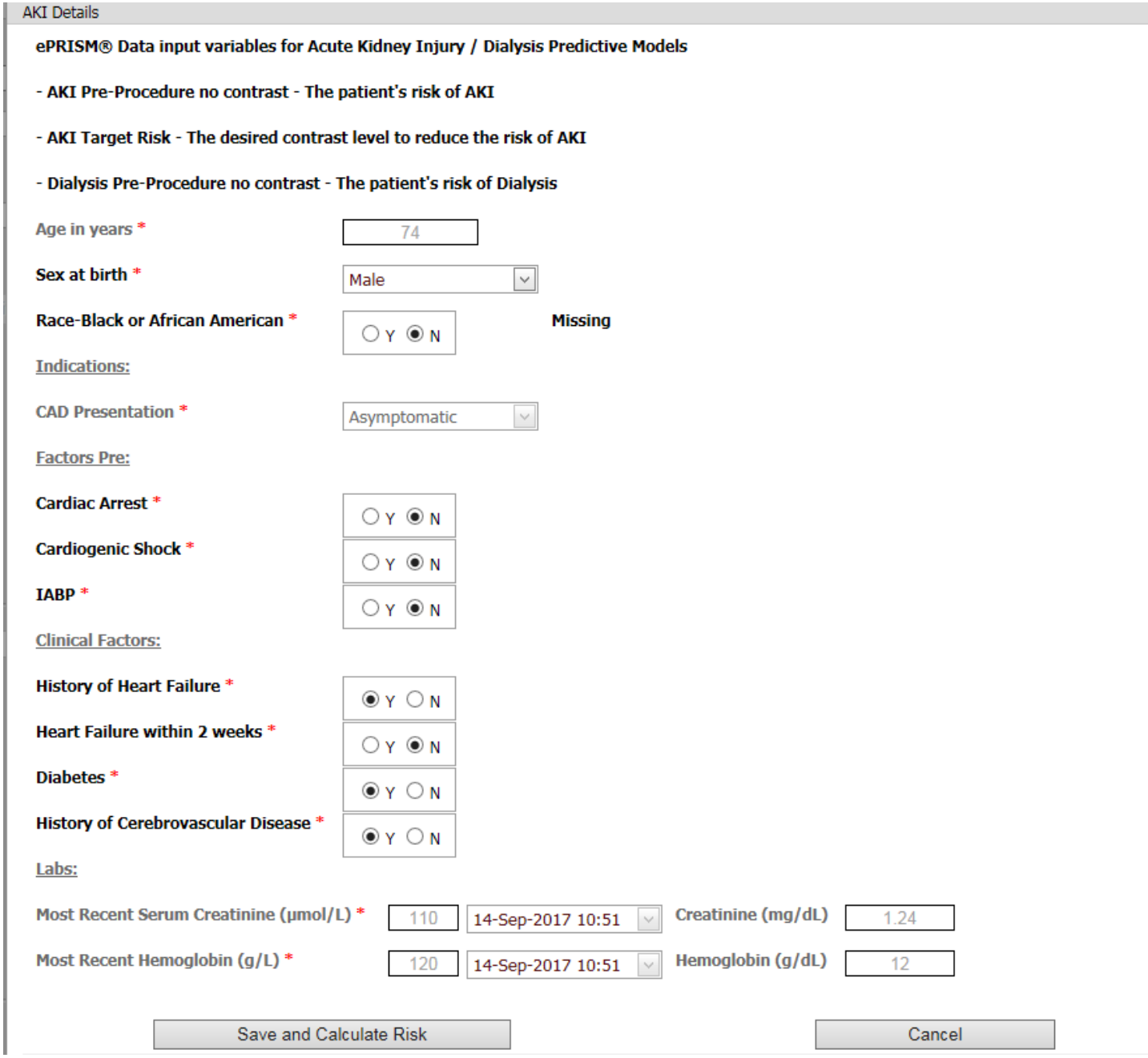
April 2016 Angiogram



Initial operator considerations

- **How can I reduce this patient's contrast risk?**
    - What is the risk of acute kidney injury?
    - How much contrast can I safely use?
    - How can I limit my contrast use and reduce the risk of AKI while still achieving the desired goals of the procedure?

EPrism


AKI Details
ePRISM® Data input variables for Acute Kidney Injury / Dialysis Predictive Models
- AKI Pre-Procedure no contrast - The patient's risk of AKI
- AKI Target Risk - The desired contrast level to reduce the risk of AKI
- Dialysis Pre-Procedure no contrast - The patient's risk of Dialysis
Age in years *
74
Sex at birth *
Male
Race-Black or African American *
Y N
Missing
Indications:
CAD Presentation *
Asymptomatic
Factors Pre:
Cardiac Arrest *
Y N
Cardiogenic Shock *
Y N
IABP *
Y N
Clinical Factors:
History of Heart Failure *
Y N
Heart Failure within 2 weeks *
Y N
Diabetes *
Y N
History of Cerebrovascular Disease *
Y N
Labs:
Most Recent Serum Creatinine (µmol/L) *
110
14-Sep-2017 10:51
Creatinine (mg/dL)
1.24
Most Recent Hemoglobin (g/L) *
120
14-Sep-2017 10:51
Hemoglobin (g/dL)
12
Save and Calculate Risk
Cancel

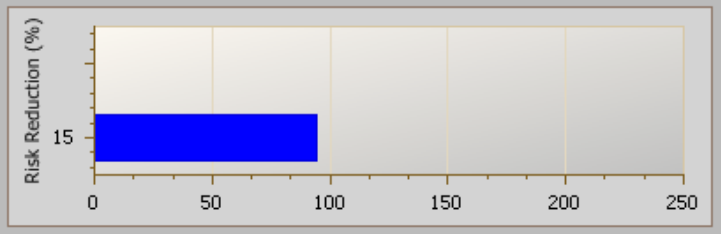
Contrast RISK — Reducing Injury Sustained by Kidneys

Calculate ePRISM® AKI Risk | ePRISM® AKI Risk History

Acute Kidney Injury / Dialysis 14-Sep-2017 10:53

Risk of AKI 7.69% Above Average

To reduce risk of AKI, limit contrast to: 94 cc



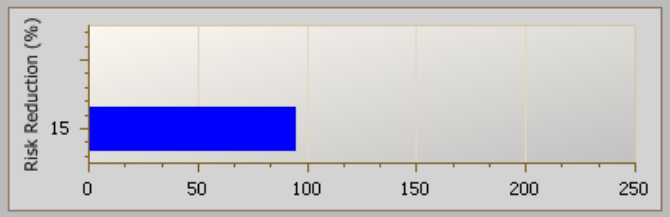
Risk of Dialysis 0.06%

Calculate ePRISM® AKI Risk | ePRISM® AKI Risk History

Acute Kidney Injury / Dialysis: 14-Sep-2017 10:53

Risk of AKI: 7.69% — Above Average

To reduce risk of AKI, limit contrast to: 94 cc



Risk of Dialysis: 0.06%

LVEDP (mm Hg): 12

Recommended LVEDP directed post-procedure IV fluid administration (mL/kg/hr): 5 ml/kg/hr for LVEDP < 13 mm Hg

Rate (mL/hr): 450

Prescribed post-procedure IV fluid orders in adherence with LVEDP fluid recommendations: (•) Y ( ) N

Mean PA (mm Hg)

Radiation Dose (mGy)

Total DAP(cGycm2)

Fluoro Time (min)

Contrast Minimization Strategies

- [x] Avoid LV/Aortogram
- [ ] Rotational or biplane angiography
- [ ] Stage PCI

Dye 1 Vol(cc): 200

Dye 1 Type

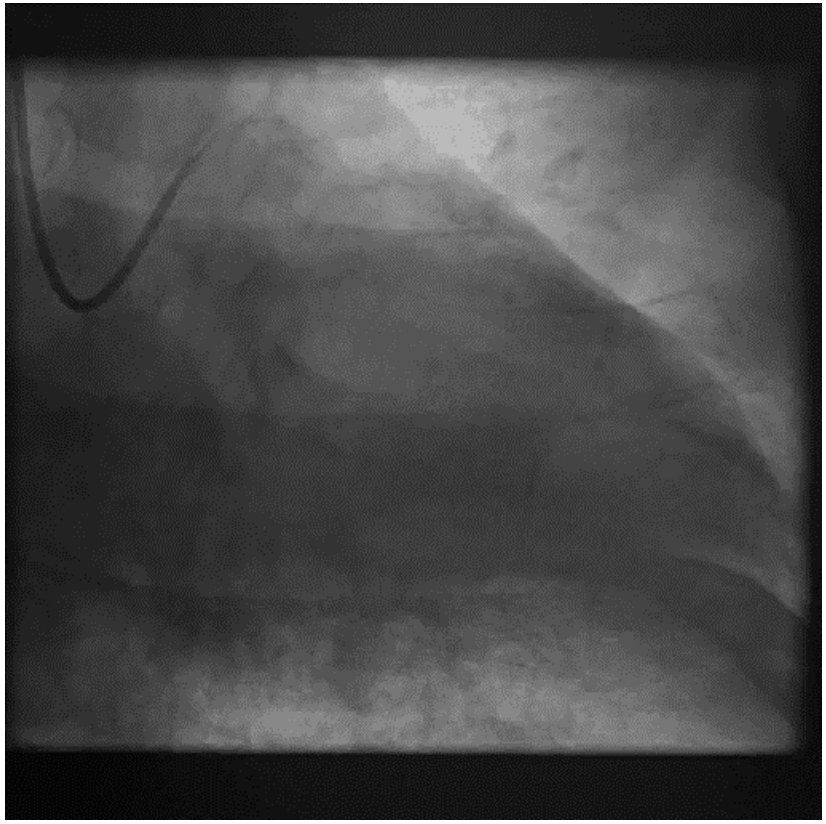
Dye 2 Vol(cc): 0

Dye 2 Type

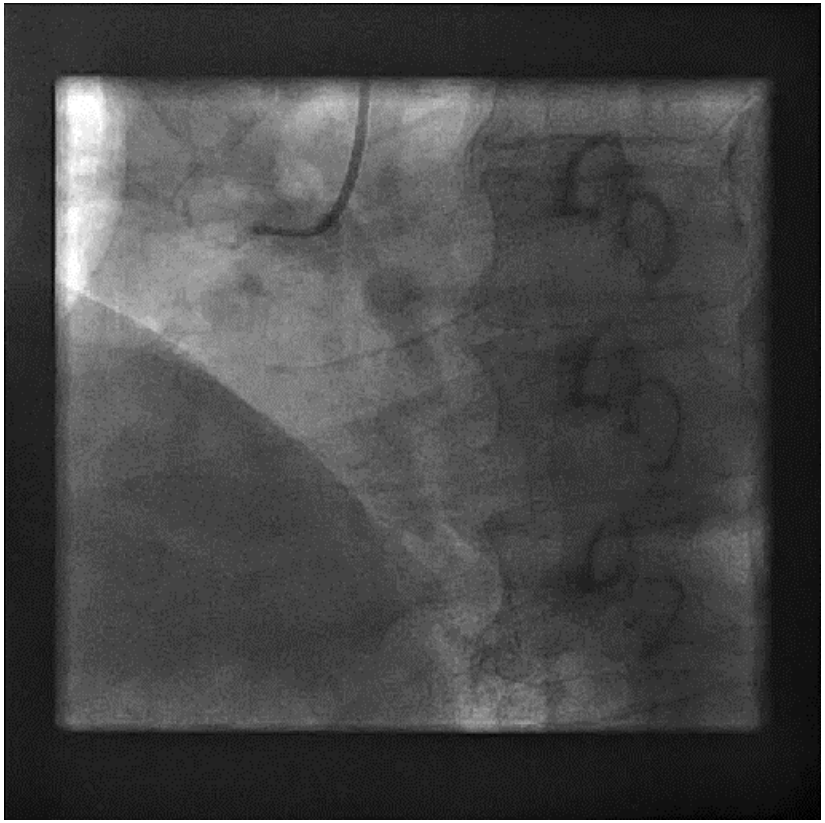
Tot. Dye Vol(cc): 200

Pre BP (mm Hg) | Pre HR (bpm) | Post BP (mm Hg) | Post HR (bpm)

Contrast RISK Reducing Injury Sustained by Kidneys

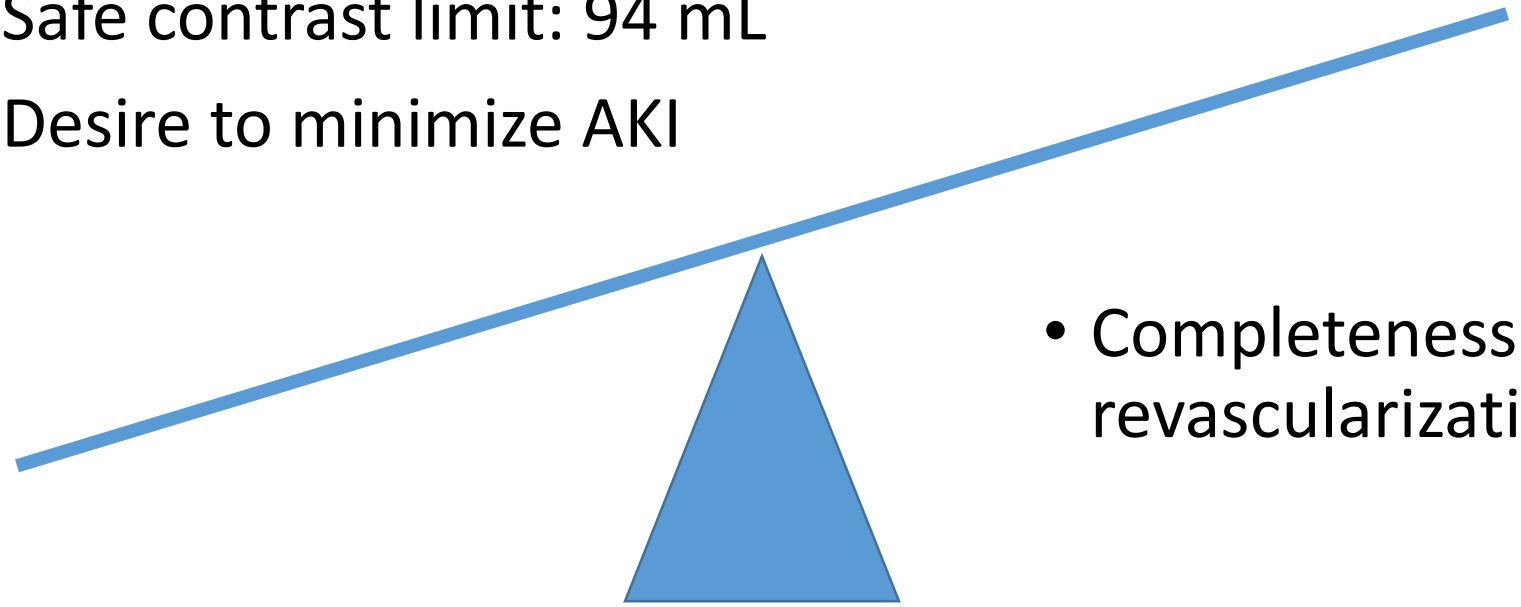


Contrast RISK Reducing Injury Sustained by Kidneys



Some issues considered

- Risk of AKI: 7.7%
- Safe contrast limit: 94 mL
- Desire to minimize AKI

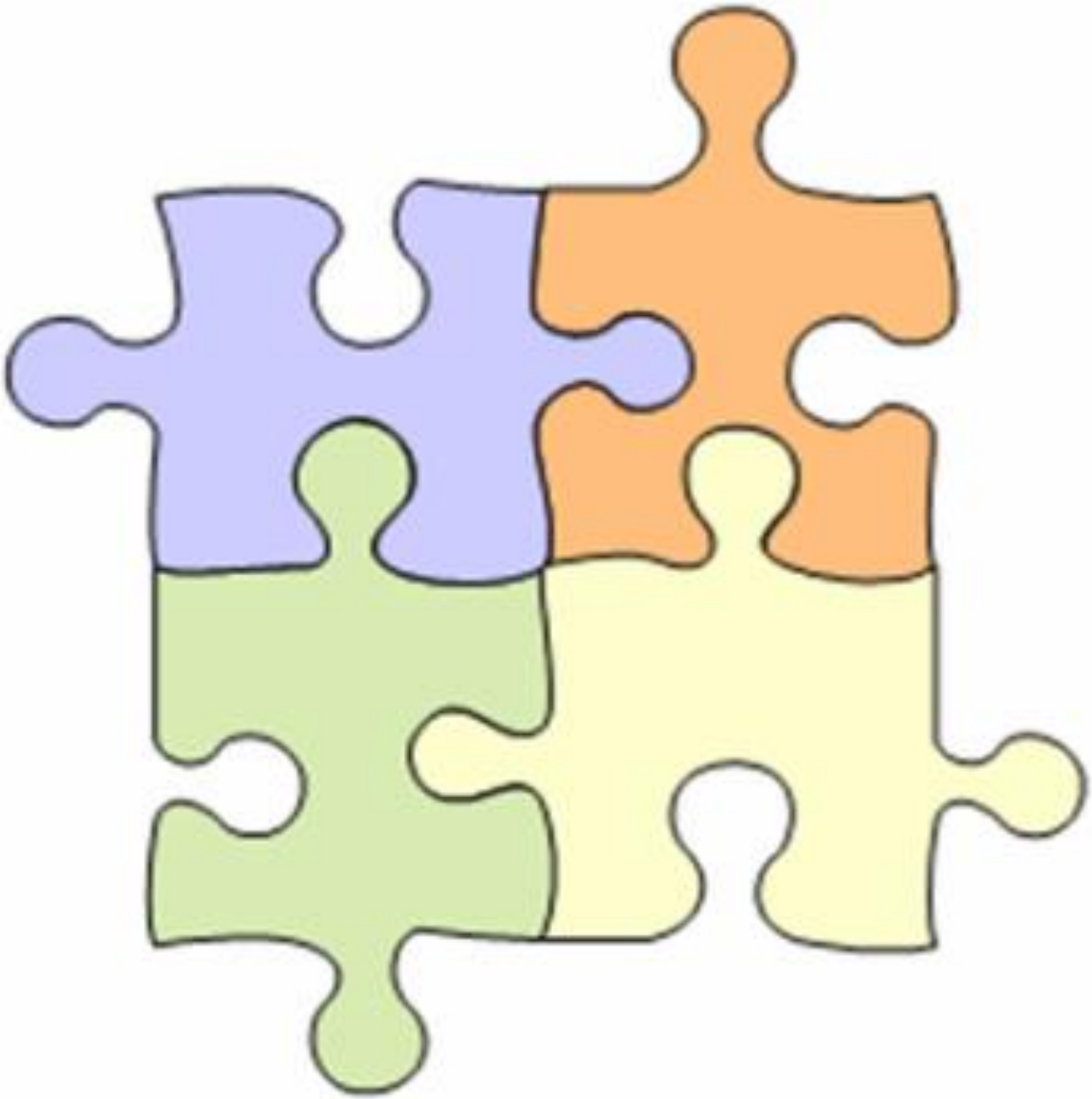


- Completeness of revascularization

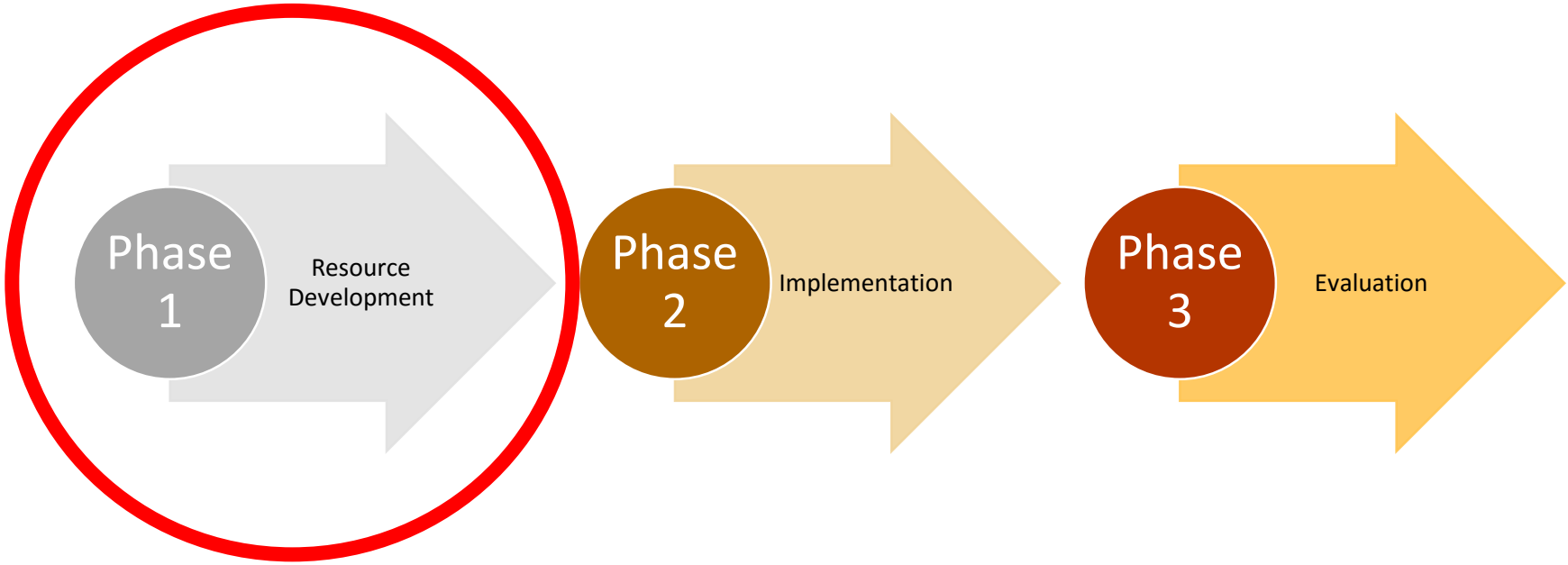
Interactive Site Discussion

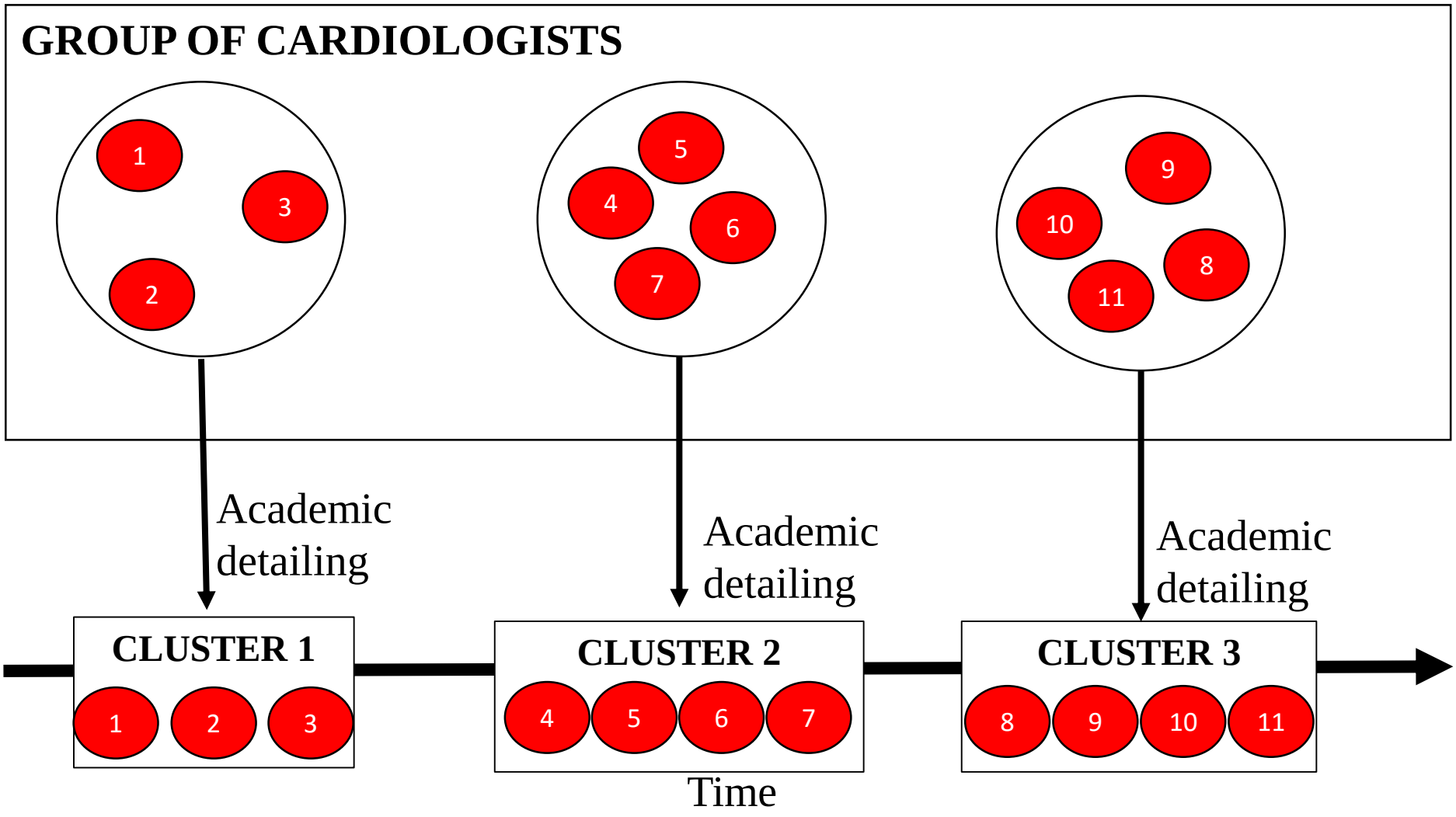
	Consideration	Challenges	Solutions
 **Prediction of Risk** (input of data into APPROACH in a timely manner)	How will risk stratification be completed prior to the procedure at your site?		
 **Safe Contrast** (letting the cardiologist know the recommended contrast limit)	How will you effectively communication the safe contrast limit to the interventional cardiologist?		
 **Optimal Fluid** (ensuring the patient gets the recommended fluids)	How will you facilitate timely fluid order entry?		
 **Follow Up** (high risk patients should get their creatine level checked)	How will knowledge be transferred to the patient and health care providers for follow up care?		

Audit and Feedback

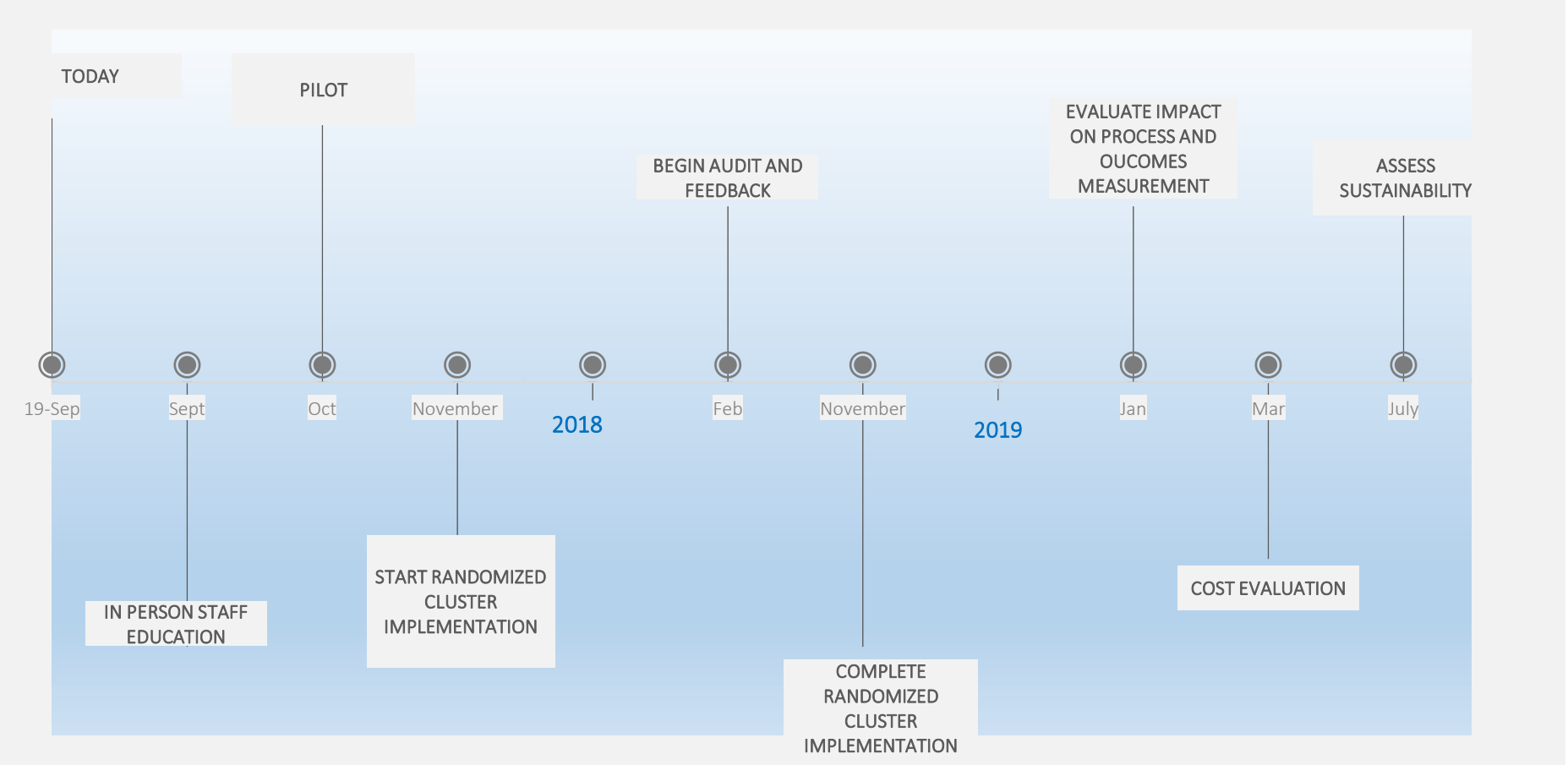


Project Work Stream

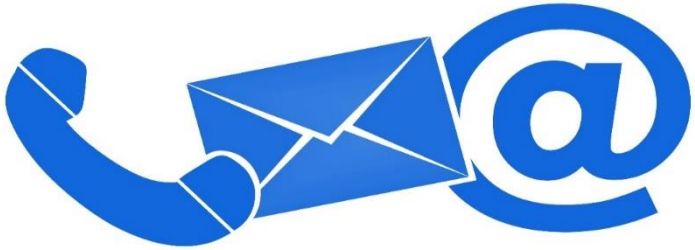



GROUP OF CARDIOLOGISTS
1
3
2
5
4
6
7
9
10
8
11
Academic detailing
Academic detailing
Academic detailing
CLUSTER 1
1
2
3
CLUSTER 2
4
5
6
7
CLUSTER 3
8
9
10
11
Time

Next Steps


TODAY
PILOT
BEGIN AUDIT AND FEEDBACK
EVALUATE IMPACT ON PROCESS AND OUCOMES MEASUREMENT
ASSESS SUSTAINABILITY
19-Sep
Sept
Oct
November
2018
Feb
November
2019
Jan
Mar
July
IN PERSON STAFF EDUCATION
START RANDOMIZED CLUSTER IMPLEMENTATION
COMPLETE RANDOMIZED CLUSTER IMPLEMENTATION
COST EVALUATION

Contact us:



Need Help after today?

- Pantea Amin Javaheri Project Coordinator:

Pantea.Javaheri@ucalgary.ca or 403-210-6267

Do you have any questions or comments?

- If you have questions or comments regarding APPROACH, please email:

support@approach.org and in the subject line put: *AHS QA for AKI*


рахмат
danke
謝謝
ngiyabonga
Баярлалаа
spas
teşekkür ederim
mersi
barka
welalin
tack
спасибо
faafetai lava
dank je
misaotra
paldies
grazzi
mahalo
tapadh leat
vinaka
спасибі
blagodaram
matondo
kiitos
dankie
thank you
gracias
хвала
nanni
nandri
dhanyavad
asante
manana
bedankt
hvala
maururu
köszönöm
akun dankon
obrigada
tenki
enkosi
bayarlalaa
gràcie
djiere dieuf
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mochchakkeram
murakoze
dziękuję
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sagolun
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trugarez
najis tuke
tanemirt
grazie
didi madloba
terima kasih
rahmet
diolch
dhanyavadagalu
shukriya
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мерси
kam sah hamnida
rahmat
তোমাকে ধন্যবাদ
감사합니다
xièxie
ευχαριστώ
merci