Reducing the incidence and severity of Acute Kidney Injury in people with ileostomies

An integrated project between patients, Acute Kidney Injury and Colorectal Nurse Specialists

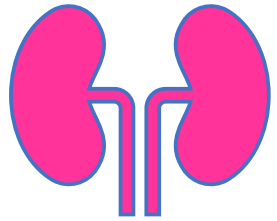
Shelagh Bickerton
Lead AKI Nurse Specialist, RWT
National Chair of ANN UK AKI COP
Shelagh.Bickerton@nhs.net

Working in partnership
The Royal Wolverhampton NHS Trust
Walsall Healthcare NHS Trust

Care Colleagues Collaboration Communities



The Kidneys



- Most people have two kidneys
- Bean-shaped organs which sit in the middle of your back
- They are the hardest working organs in your body
- Make approximately 2 litres urine/day

They filter waste products from the body.

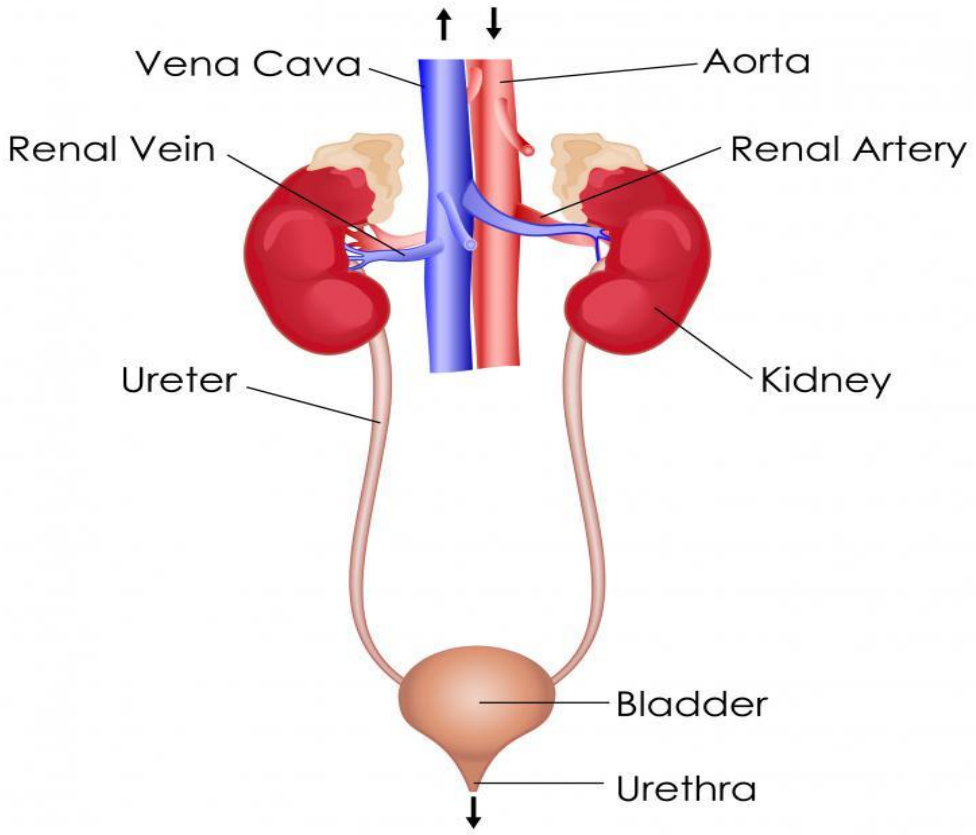
They control the amount of salt and water in your body

They help to regulate blood pressure

They help to keep the bones strong and healthy

They help to make red blood cells which carry oxygen around the body

To function, kidneys need….



Adequate blood pressure/blood volume

(pre-renal)

eg, dehydration, sepsis, acute heart/liver failure, bleeding, shock

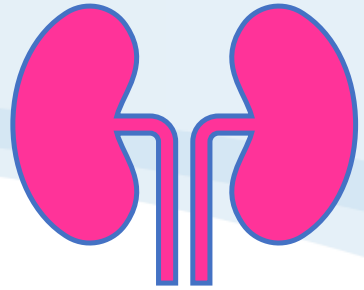
To be healthy, rather than damaged or inflamed by disease process (intrinsic)

eg, vasculitis, glomerular nephritis, ATN

To drain urine freely through a functioning urinary tract (post-renal)

eg, kidney stones, enlarged prostate, pelvic cancers, constipation

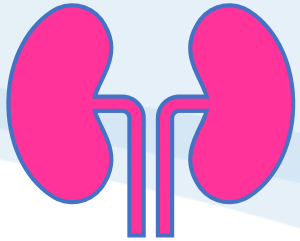
Acute Kidney Injury



- **Acute Kidney Injury (AKI)** is the acute deterioration in kidney function that presents over a period of hours or days.
- It is estimated that **one in five people** with admitted to hospital each year as an emergency has AKI. (NCEPOD Adding Insult to Injury 2009).
- In the UK, up to **100,000 deaths** each year in hospital are associated with AKI. Up to **30%** could be prevented with the right care and treatment.
- Financial burden to the NHS estimated to cost **£3.2 billion** pa (1% of the NHS budget).

Care Colleagues Collaboration Communities

Chronic Kidney Disease (CKD)



CKD is a **long-term condition** characterised by a gradual deterioration in kidney function occurring over months or years.

Stages 1-5 (mild to end-stage)

Associated with an increased risk of cardiovascular complications such as a heart attack or stroke.

Main causes

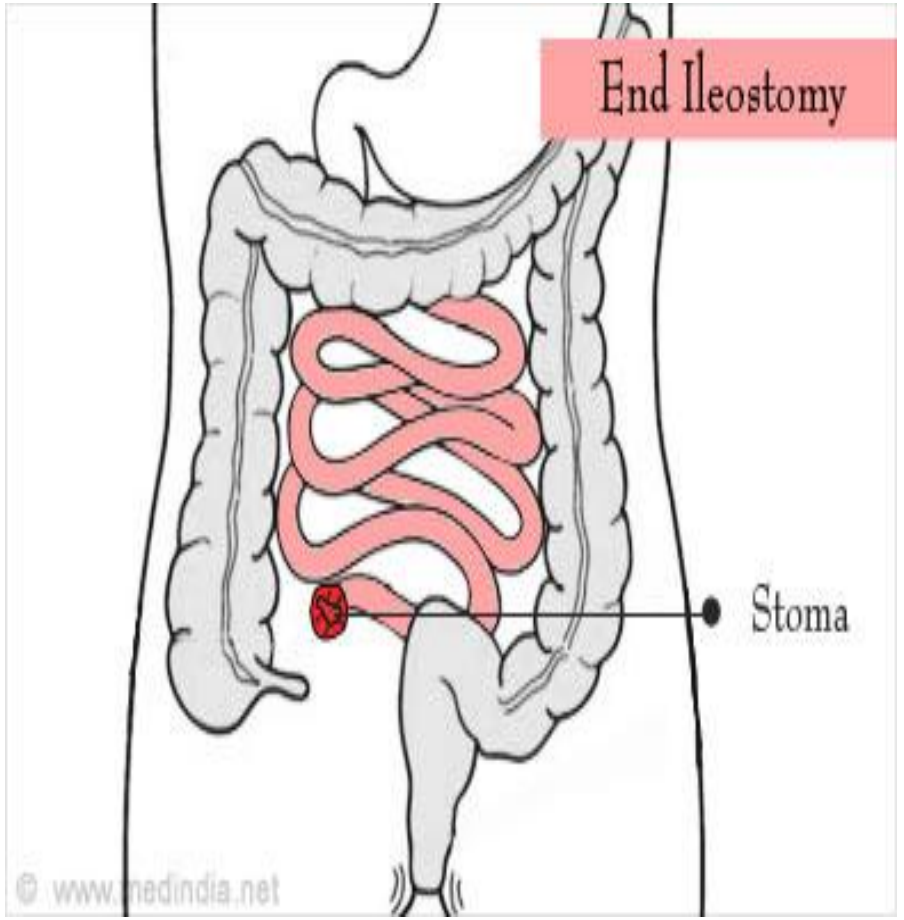
- Poorly controlled diabetes
- High bloods pressure
- Inflammation within the kidneys
- Family history of kidney disease (inherited causes)
- Blockages to flow of urine (eg enlarged prostates, kidney stones, pelvic masses)
- Certain medications
- **Repeated AKIs**

Care Colleagues Collaboration Communities

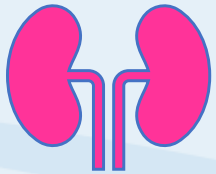
What is an ileostomy?

A surgical procedure that involves creating an opening (stoma) in the abdomen by disconnecting the end of the small bowel (ileum) and bringing it to the surface.

Can be **temporary** or **permanent**, depending on the underlying condition, such as inflammatory bowel disease or cancer.



Risk of AKI in patients with ileostomies



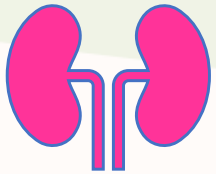
- **1 in 340** people have a stoma in the UK (over 200,000 people).
- Having an ileostomy is an **independent risk factor** for the development of AKI, due to the increased risk of dehydration.
  - **25-40%** of patients will develop a high output ileostomy (HOI) [1]
  - Up to **38%** will require hospital admission due to HOI and AKI [2]
  - Readmission rates are **> 10%** within 60 days [3]
  - **25%** will develop chronic kidney disease (CKD) within two years of stoma formation [4]
  - **66.6% - 75.3%** of patients with CKD will develop cardiovascular disease (CVD), with mortality increasing with declining kidney function [5]
  - CVD is the **leading cause of death** in patients with CKD [6]

Ileostomy>>AKI>>CKD>>increased risk of morbidity and mortality

Care Colleagues Collaboration Communities

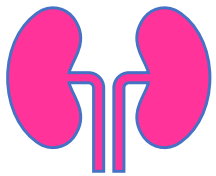
Causes of high output stomas >1.2L/24hrs

(watery consistency)



- Newly formed stoma
- Bowel affected by disease or treatment (eg, gastroenteritis, IBD, chemotherapy)
- Short gut syndrome
- Partial bowel obstruction
- Non-compliancy with diet/medications such as loperamide.

Care Colleagues Collaboration Communities



Consequences of high output stomas/fistulas

Dehydration – low BP/circulating volume – poor renal perfusion – AKI.

Medications may not be absorbed properly due to fast gut transit time.

Under nourishment – weight loss, muscle loss.

Electrolyte imbalance – heart arrythmias.

Leaking stoma bags – poor skin integrity.

Psychological consequences – loss of confidence, social isolation, depression & anxiety.

Driver

Lead AKI CNS used to be a colorectal CNS.

High numbers of admission/readmission with AKI secondary to HOI.

Inconsistency with in-patient care.

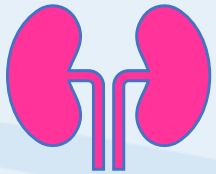
Lack of support for colorectal nurses in triaging patients with HOI.

Patients' lack of knowledge and understanding of AKI risk and self-management.

Driven by patients for more information.

Care Colleagues Collaboration Communities

Understanding the issue….



No current national projects looking at reducing AKI in this patient group.

Aim: to reduce both the incidence and severity of AKI in people with ileostomies.

Method: Understanding where the issues arose through **process mapping** and **collaboration** between the AKI and colorectal nurse specialists.

Involving patients right from the beginning and at every step of the process.

Involving the wider MDT from across the medical-surgical spectrum in project development.

Care Colleagues Collaboration Communities

Addressing the issue….

Development of a **patient information leaflet** for people with ileostomies to improve knowledge and understanding and therefore foster independence and promote kidney health.

Development of an **assessment tool** for colorectal/stoma nurses to triage patients for early intervention, which will reduce the risk of short and long-term kidney damage.

Improving in-patient care for patients with HOI – extending current national guidelines to include renal-protective strategies, including post – discharge care.

Care Colleagues
Collaboration Communities

Patient information leaflet (V6)

Developed in **collaboration** with patient representatives from the Ileostomy Association

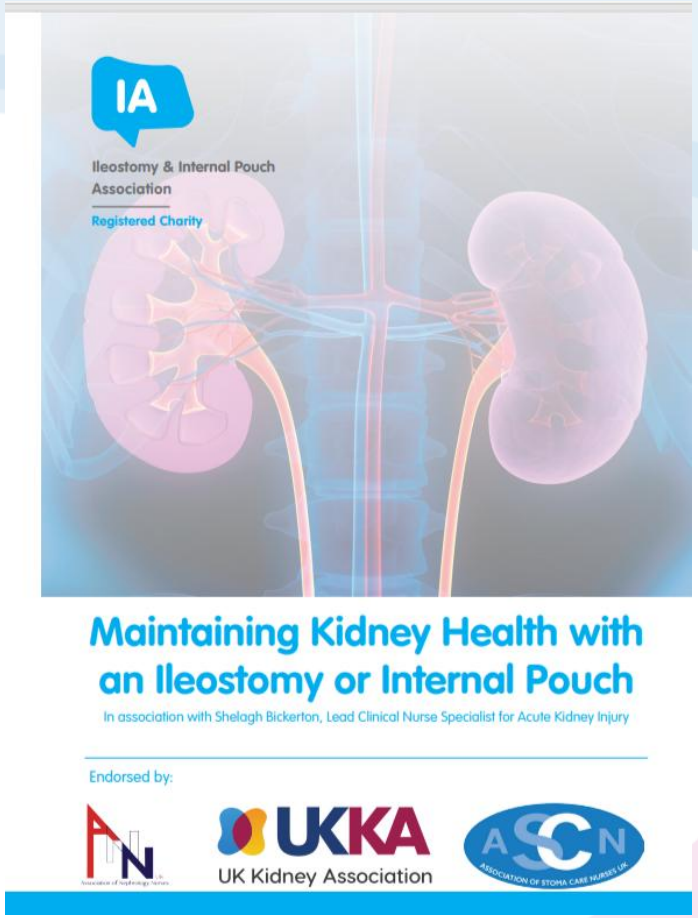
Aims to improve **understanding** and foster **independence** and **confidence.**

Uses a **traffic light system** for patients to self-assess and understand when and where to refer to if clinically unwell

Nationally endorsed by UK Kidney Association, Association of Nephrology Nurses UK, Association of Stoma Care Nurses UK.

Incorporated into post stoma surgery d/c information, 6-week review and also any episodes of AKI/post discharge AKI follow-up.

Free to order from the Ileostomy Association: *iasupport.org*



Care Colleagues Collaboration Communities

Maintaining Kidney Health with an Ileostomy or Internal Pouch

What do your kidneys do?

The kidneys are bean-shaped organs, about the size of your fist, which sit in the middle of your back.

They play a vital role in keeping you healthy.
Their main functions are to:



filter blood and clean it of toxins and waste products



manage blood pressure



balance fluid and hydration levels



control salts (e.g potassium, sodium, magnesium) and mineral levels



help to make red blood cells, which carry oxygen around the body

In order for the kidneys to function well, they need:

- an adequate blood pressure and blood volume
- to be healthy, rather than damaged or inflamed by disease processes
- to drain urine freely through a functioning urinary tract, without obstruction.

Healthy kidneys produce around two litres of urine per day.

What is Acute Kidney Injury?

In Acute Kidney Injury (AKI) there is a sudden deterioration in kidney function that happens over a period of hours or days. It is thought to occur in 20% of all emergency admissions to hospital, many of which could be avoided with the right care and early treatment. In most cases kidney function will fully recover once AKI is treated, but for some, it can lead to the development of Chronic Kidney Disease (CKD) which is associated with an increased risk of cardiovascular complications such as heart disease and stroke.

Common causes of Acute Kidney Injury

Acute Kidney Injury can be caused by:

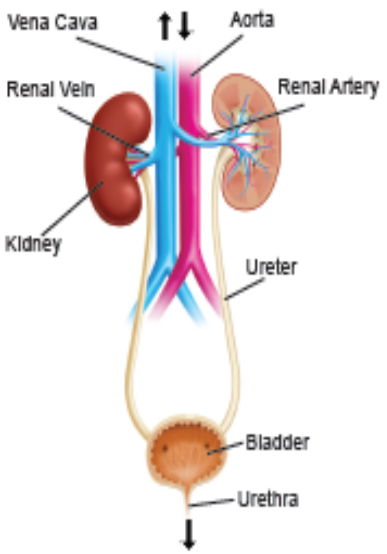
- dehydration
- low blood pressure
- severe infection
- a reaction to a medication
- kidney stones
- enlarged prostate
- pelvic masses (such as a benign or malignant tumour or abscess).

If you have an ileostomy or internal pouch

Having an ileostomy or an internal pouch is one of the risk factors for the development of AKI. This is because you are at a higher risk of developing dehydration and low blood pressure when high, watery stoma/internal pouch output occurs. Studies have shown that 30% of all people with ileostomies will experience high output at some point with 20% being admitted to hospital due to AKI.

Causes of high output (more than 1.5 litres/24 hours)

- newly formed stoma/pouch - it is not uncommon to experience high output as the remaining bowel adjusts
- bowel affected by disease or treatment (for example, gastro-enteritis, food intolerance, inflammatory bowel disease, chemo/immunotherapy, antibiotics)
- partial bowel obstruction
- non-adherence with diet, medications such as loperamide
- excess intake of low concentration fluids such as water (see IA's leaflet *'Staying Hydrated'* for more details).



Consequences of high output

- dehydration causing an AKI – low blood pressure and low blood volume so that the kidneys do not receive the blood supply they need to function well
- medications may not be absorbed adequately due to the fast transit time through the gut
- undernourishment/weight loss
- salt imbalances which can cause heart rhythm problems/muscle weakness, cramps or spasms
- physical consequences - increased frequency of emptying bag or pouch/risk of leaks caused by watery stool and thus potential of sore skin
- psychological consequences – anxiety/depression/loss of confidence.

What can you do to protect your kidneys?

> Step 1: Prevention of High Output

Adherence with low fibre diet; use of loperamide (tablets or melts) to manage consistency of stoma output; maintain hydration by drinking 6-8 cups of suitable fluid per day *(see IA's leaflet 'Staying Hydrated' for more information).*

> Step 2: Understanding your risk factors for AKI

Having a stoma or a pouch is not the only risk factor for AKI. There are other ones too which are listed across.

The more risk factors you have, the earlier you should seek help if you experience high output.

Risk factors for AKI:

- ileostomy/internal pouch
- heart failure
- diabetes
- Chronic Kidney Disease
- liver failure
- increasing age
- kidney-sensitive medications
- previous AKI

Important: If you have severe heart failure or advanced Chronic Kidney Disease (CKD) please seek treatment early irrespective of your symptoms.

> Step 3: Adhere to the Medicine Sick Day Guidance (MSDG)

This guidance has been produced to aid patients in understanding which medicines they should stop taking **TEMPORARILY** during any illness which could result in dehydration

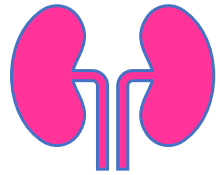
Patient-public involvement through Ileostomy Association.







What can be done to protect the kidneys?



- Prevention of high output
- Understand individual's risk of developing AKI
- Adhere to the Medicine Sick Day Rules
- Assess their symptoms according to **RAG** chart and take appropriate actions

Care Colleagues Collaboration Communities

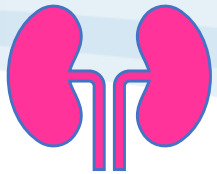
Prevention of high output



- Comply with low-fibre diet
- Stagger eating and drinking
- Take loperamide if needed to maintain output which is of porridge consistency
- Drink 6-8 cups of suitable fluid per day to maintain hydration
- Education about prevention and self-management of high output

Care Colleagues Collaboration Communities

Understand the risk factors for AKI



Ileostomy/ Pouch	Chronic Kidney Disease	Diabetes	Heart failure	Cognitive/ physical restriction
Liver failure	Age	Kidney-sensitive medications	Enlarged prostate/pelvic masses/stones	History of AKI

If they have severe heart failure, or severe CKD, seek help early, regardless of symptoms

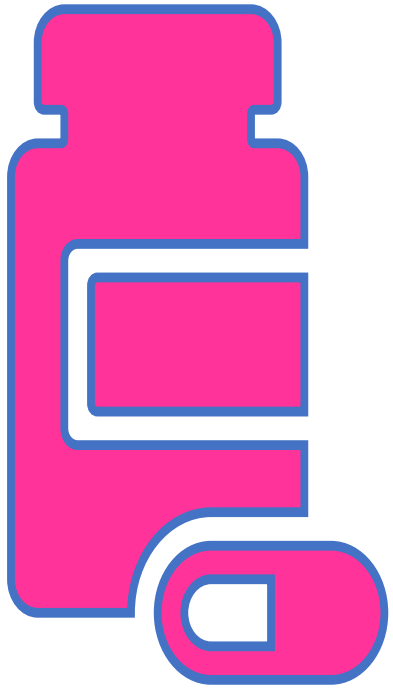
Care Colleagues Collaboration Communities

Medicine Sick Day Rules (MSDR)

Dehydration can be a significant risk to the development of AKI in people taking certain medicines.

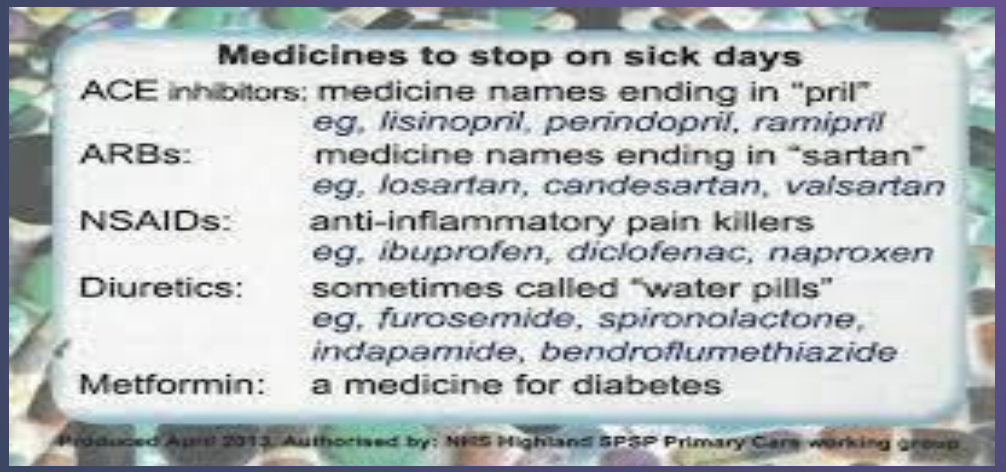
MSDR aid people in understanding which medicines they should temporarily stop during any illness which can result in dehydration.

It is vital that these medicines are restarted when they are well (normally 24-48 hrs) oce the illness settles and they are eating and drinking normally again.




Medicine Sick Day Rules
NHS Highland
When you are unwell with any of the following:
Then STOP taking the medi
Restart when you are wel
of eating and drink
If you are in any doub
pharmacist, GP


Salford Royal NHS
NHS Foundation Trust
NHS
Salford Clinical Commissioning Group
Medicine sick day rules
When you are unwell with any of the following:
• Vomiting or diarrhoea (unless only minor)
• Fevers, sweats and shaking
Then STOP taking the medicines listed overleaf
Restart when you are well (after 24-48 hours of eating and drinking normally)
If you are in any doubt, contact your pharmacist, GP or nurse


Medicines to stop on sick days
ACE inhibitors: medicine names ending in "pril"
eg, lisinopril, perindopril, ramipril
ARBs: medicine names ending in "sartan"
eg, losartan, candesartan, valsartan
NSAIDs: anti-inflammatory pain killers
eg, ibuprofen, diclofenac, naproxen
Diuretics: sometimes called "water pills"
eg, furosemide, spironolactone,
indapamide, bendroflumethiazide
Metformin: a medicine for diabetes
Produced April 2013. Authorised by: NHS Highland SPSP Primary Care working group


ARGYLE
Medicine Sick Day Rules
When a patient has any of the following:
• Vomiting or diarrhoea (unless only minor)
• Fevers, sweats and shaking
Then STOP taking the medicines listed below
Restart when well
(after 24-48 hours of eating and drinking normally)
If in any doubt, contact your pharmacist or GP
Medicines to stop on sick days
• ACE inhibitors: medicine names ending in "pril"
eg, lisinopril, perindopril, ramipril
• ARBs: medicine names ending in "sartan"
eg, losartan, candesartan, valsartan
• NSAIDs: anti-inflammatory pain killers
eg, ibuprofen, diclofenac, naproxen
• Diuretics: sometimes called "water pills"
eg, furosemide, spironolactone,
indapamide, bendroflumethiazide
• Metformin & Gliclazide: medicine for diabetes
• SGLT-2: medicines for diabetes ending in "flozin"
• eg, Dapagliflozin, Canagliflozin, Empagliflozin
Produced by Dr Graham Stretch with thanks to NHS Highland

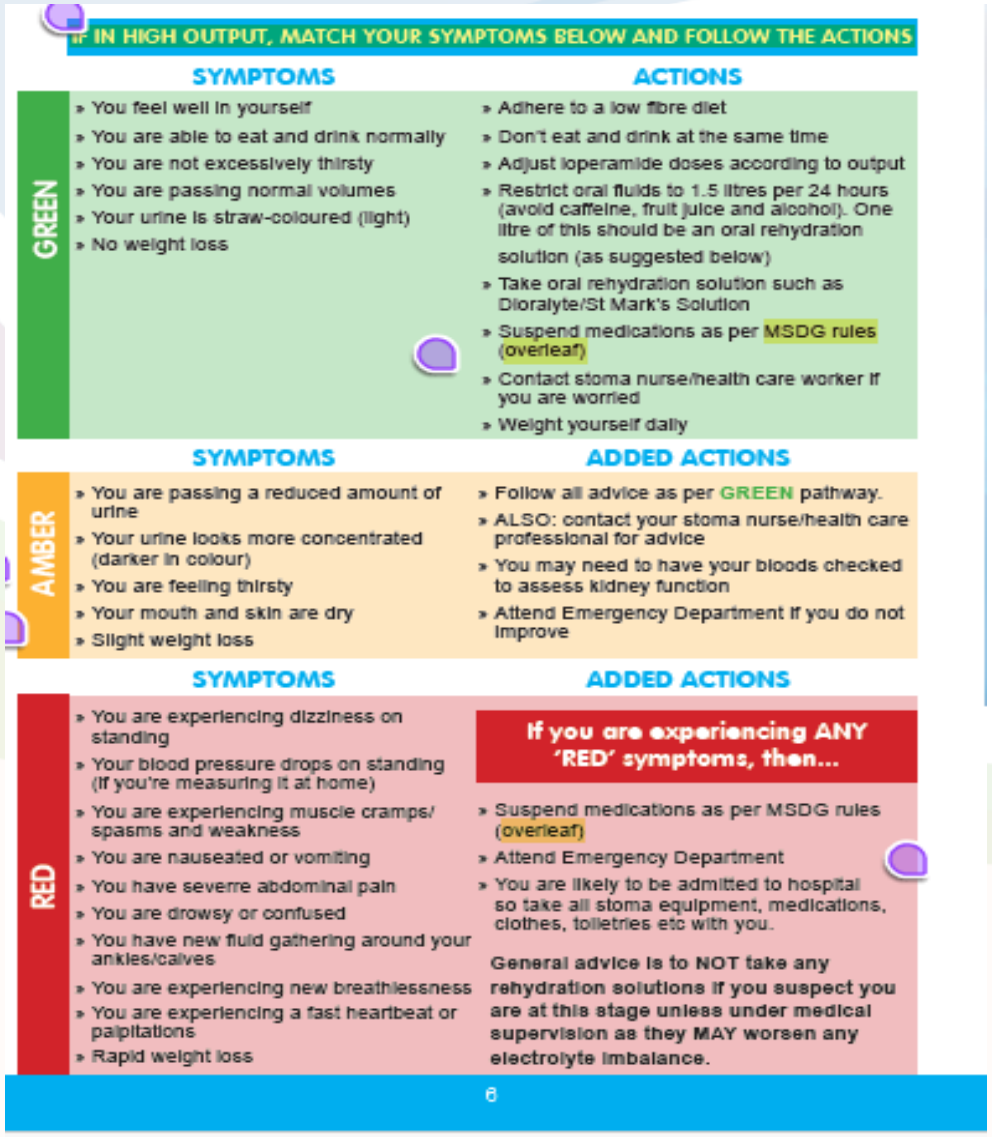
Medicine Sick Day Rules



- **Angiotensin Converting Enzymes Inhibitors** *(ending in 'pril')* – antihypertensive
- **Angiotensin Receptor Blockers** *(ending in 'sartan')* – antihypertensive
- **NSAIDS** – analgesic, *eg ibuprofen, diclofenac, naproxen*
- **Metformin** – diabetic drug
- **SGL2T Inhibitors** *(ending in 'flozin')* used in diabetes, heart failure and CKD
- **Diuretics** ('water tablets') *eg furosemide, Bendroflumethiazide, spironolactone*

- ***If blood pressure is low, please also suspend any other antihypertensives***

Self assessment as per RAG chart



IF IN HIGH OUTPUT, MATCH YOUR SYMPTOMS BELOW AND FOLLOW THE ACTIONS

GREEN

SYMPTOMS	ACTIONS
» You feel well in yourself » You are able to eat and drink normally » You are not excessively thirsty » You are passing normal volumes » Your urine is straw-coloured (light) » No weight loss	» Adhere to a low fibre diet » Don't eat and drink at the same time » Adjust loperamide doses according to output » Restrict oral fluids to 1.5 litres per 24 hours (avoid caffeine, fruit juice and alcohol). One litre of this should be an oral rehydration solution (as suggested below) » Take oral rehydration solution such as Dioralyte/St Mark's Solution » Suspend medications as per MSDG rules (overleaf) » Contact stoma nurse/health care worker if you are worried » Weight yourself daily

AMBER

SYMPTOMS	ADDED ACTIONS
» You are passing a reduced amount of urine » Your urine looks more concentrated (darker in colour) » You are feeling thirsty » Your mouth and skin are dry » Slight weight loss	» Follow all advice as per GREEN pathway. » ALSO: contact your stoma nurse/health care professional for advice » You may need to have your bloods checked to assess kidney function » Attend Emergency Department if you do not improve

RED

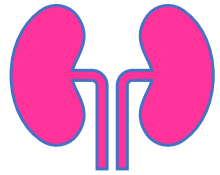
SYMPTOMS	ADDED ACTIONS
» You are experiencing dizziness on standing » Your blood pressure drops on standing (if you're measuring it at home) » You are experiencing muscle cramps/ spasms and weakness » You are nauseated or vomiting » You have severe abdominal pain » You are drowsy or confused » You have new fluid gathering around your ankles/calves » You are experiencing new breathlessness » You are experiencing a fast heartbeat or palpitations » Rapid weight loss	**If you are experiencing ANY 'RED' symptoms, then...** » Suspend medications as per MSDG rules (overleaf) » Attend Emergency Department » You are likely to be admitted to hospital so take all stoma equipment, medications, clothes, toiletries etc with you. **General advice is to NOT take any rehydration solutions if you suspect you are at this stage unless under medical supervision as they MAY worsen any electrolyte imbalance.**

6

For people to determine if they are safe to self-manage at home, or they need to seek advice from colorectal nurse specialists, or present at one of the emergency portals.

Care Colleagues Collaboration Communities

GREEN (mild)



Symptoms

- Patient feels well & not thirsty
- Able to eat and drink normally
- Passing normal volumes of urine
- No weight loss

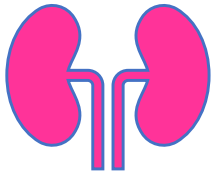
Review

- Follow-up call and reassessment in 48 hours
- Advice if deteriorates

Actions

- Diet – low fibre
- Stagger eating & drinking
- Titrate loperamide –aim for porridge consistency
- Restrict oral fluid intake to 1.5Lin 24hrs
- Oral rehydration such as Dioralyte/St Mark’s solution
- Suspend drugs as per MSDR
- Stool sample if cause unclear

Amber (moderate)



Symptoms:

Passing reduced amounts of concentrated urine

Feeling very thirsty – dry mouth, skin, sunken eyes

Slight weight loss

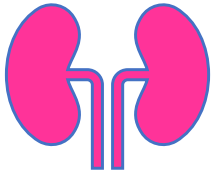
Review:

Bloods review <24 hours. Discuss with surgical reg/renal team if AKI 1-3. Arrange admission if necessary.

Advise to attend emergency portal if patient deteriorates.

- **Added actions:**
- Bloods (U&Es, Mg, Po4, Ca, Bicarb, FBC) within 24 hours.

RED (severe)

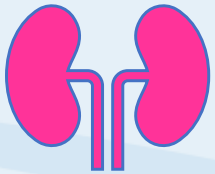


Symptoms:
Severe abdominal pain
Dizziness on standing – BP drop on standing (>10%)
Rapid weight loss
Muscle cramps/spasms/weakness
Vomiting/nausea
Drowsiness or confusion
New fluids around ankles/calves
New breathlessness
Fast heartbeat or palpitations

Added actions:

- Attend emergency unit (A&E, Surgical/medical emergency unit
- Suspend medicines as per MSDR
- Likely to be admitted so advise to bring all stoma equipment, medications, clothes, toiletries etc.

Assessment tool



Structured document which guides colorectal nurses to assess someone with HOI, taking into account risk factors and medicines reconciliation – includes follow-up for safety–netting.

Education sessions from AKI to Colorectal CNS team on AKI, causes and consequences, risk factors and medicines management.

Education sessions from Colorectal to AKI CNS team on high output stoma management.

Development of **triaging pathway** for patient management using traffic light system.

Development of **escalation pathway** using surgical SDEC department for at risk patients.

AKI telephone assessment for patients with high output ileostomies

Acute Kidney Injury (AKI) is the acute deterioration in renal function that occurs over hours or days and is associated with high morbidity and mortality rates. Having an ileostomy is a risk factor for the development of AKI due to potential dehydration if output is high (>1.2 litres in 24 hours)

This tool is a GUIDE only and does NOT replace clinical judgment.

Patient information

Patient Name		
Hospital Number		
Patient Age		
Relevant history eg: Diabetes Heart failure Chronic kidney disease Liver failure Cognitive/motor issues Enlarged prostate/pelvic masses		
Approx length of time with an ileostomy		
No. of times pouch emptied in 24 hours (full/half)		
Consistency of effluent	Watery	Sloppy
Length of time with high output		
Any recent changes to diet/drugs		
Recent chemo/immunotherapy:		
On loperamide normally? Dose:		
On codeine/octreotide normally? Dose:		
Likely cause of high output		

Causes of high output ileostomy:

Newly formed stoma

Bowel affected by disease or inflammation (eg chemo, IBD, gastroenteritis)

Short gut syndrome

Partial bowel obstruction

Non-compliancy with diet and medications eg loperamide

Consequences of high output ileostomy:

Dehydration – low BP – Poor renal perfusion – AKI

Malabsorption of medications

Under nourishment/weight loss

Electrolyte imbalance -cardiac arrythmias.

Triaging a patient with high ileostomy output

Stage 1 – Assessing risk factors for AKI

- ☐ Diabetes
- ☐ Chronic Kidney Disease
- ☐ Known heart failure
- ☐ Known liver failure
- ☐ 65 years or older
- ☐ Cognitive/motor issues
- ☐ Known enlarged prostate
- ☐ Current/previous pelvic cancer
- ☐ Previous AKI
- ☐ On nephro-sensitive medications

The more risk factors a patient has, the more likely they are to develop AKI. Patients with heart failure are especially vulnerable, and they should be advised to seek medical help early.

Stage 2 – Medicine Sick Day Rules

a) Advise to suspend nephro-sensitive medications **temporarily**.
b) Advise patient on **diuretics** to suspend temporarily (eg frusemide, spironolactone, epleronone, Bendroflumethiazide)
c) Advise patient on other antihypertensives to suspend **temporarily** (eg amlodipine, doxazosin, bisoprolol)
d) Advise to **restart** medications 24-48 hours after symptoms subside and the patient is eating and drinking normally again.

Nephro-sensitive medications:

ACE inhibitors (antihypertensive drug, ends in 'pril. Eg ramipril, lisinopril, enalopril

ARB (antihypertensive drug, ends in 'sartan. Eg, losartan, candesartan

NSAIDS (anti-inflammatory. Eg. Ibuprofen, diclofenac, naproxen, mefanamic acid)

Metformin (diabetic drug)

SGL2Ti -used in heart failure, CKD, diabetes, ends in 'flozin. Eg, empagloflozin, dapagloflozin

Stage 3 – Assess symptoms according to RAG chart (circle)

	GREEN	AMBER	RED
General wellness	Well	Mildly unwell	Moderately/severely unwell
Diet and fluid intake	Normal	Mildly reduced	Reduced
Urine output	Normal	Mildly reduced	Moderately/severely reduced
Thirsty	No	Mild	Moderate/severe
Dry mouth/skin	No	Mild	Moderate/severe
Abdominal pain/cramping	No	Mild	Moderate/severe
Dizziness/BP drop on standing	No	No	Yes
Muscle cramps/spasms/weakness	No	No	Yes
Vomiting/nausea	No	No	Yes
Drowsiness or confusion	No	No	Yes
New fluid around ankles	No	No	Yes
New breathlessness	No	No	Yes
Palpitations	No	No	Yes

Actions:

	Actions	Review
Green	Low fibre diet Titrate loperamide +/- Add codeine Oral rehydration eg St Marks/ Dioralyte Suspend drugs as per Stage 2	Follow-up call within 24-48 hours and re-assess. Advise to call back/attend emergency portal if patient deteriorates.
Amber	As per Green actions **PLUS** bloods within 24 hours (U&Es, FBC, CRP, Bone profile, Phosphate, Magnesium. Suspend drugs as per Stage 2	Review bloods once back. Discuss with AKI CNS team (Bleep 1812/1815) or surgical registrar on call if AKI 1-3. Advise to attend emergency portal if patient deteriorates.
Red	Advise to attend emergency portal (ED/surgical SDEC) Suspend drugs as per Stage 2	Likely to be admitted so advise to bring stoma equipment, medications, clothes, toiletries etc.

KDIGO Classification of AKI:

	Creatinine level
Stage 1 (mild AKI)	1.5-1.9 times base level
Stage 2 (moderate AKI)	2-2.9 times base level
Stage 3 (severe AKI)	>3 times base level/Creatinine>354

To determine base creatinine, look at creatinine level 3 months prior to onset of symptoms. The laboratory will indicate if the patient has an AKI 1-3.

In-patient management:

IV fluids/ oral fluid restriction (1.5 litres in 24 hours)/ stool sample/ loperamide (30 mins before meals)/ possible codeine/octreotide/ low fibre diet/ balance electrolytes/ medication review.

Aims of inpatient management of high output



- Establish a cause for HOS and treat
- Re-establish effective bowel function
- Prevent poor skin integrity due to appliance leakage
- Restore circulating volume/rehydrate
- Maintain adequate BP for kidney blood flow
- Review medications
- Balance electrolytes
- Educate and support patients and their families

Care Colleagues Collaboration Communities

Improving in-patient care of HOI

(Adaptation of AKI, acute medical and ASCN guidelines – governance pathways)

On admission	Ward care	On discharge
• Full set of bloods inc. electrolytes & VBG • Give IV bicarb if acidotic (& K >4.0) • 12 lead ECG • IV electrolyte management (no Lokelma) • Lying & standing BP • IV fluid resuscitate +/- inotropes • Stool sample (MC&S) • Examine stoma for retraction, prolapse, ischaemia, bleeding, hernia	• Continue IV fluids until euvolaemic • Orally fluid restrict to 1.5L/24 hours (inc. 1L St Mark's solution) • Suspend nephro-sensitive meds/antihypertensives/diuretic if dry/AKI/low BP • Urinary sodium • Faecal calprotectin if IBD • Renal dose meds • Titrate loperamide (melts) (up to 96mg/24rs) • Consider codeine if loperamide optimised. • Low fibre diet- dietician review • PPI once electrolytes corrected • Stop IV fluids 48 hrs before d/c – assess renal function	• Discharge with St Mark's/loperamide if still needed (oro-dispersible) • Restart suspended medications as appropriate • Contact local Colorectal CNS/AKI CNS team to arrange for follow-up review • Follow-up bloods in 2 weeks to check renal function and electrolyte levels • Include AKI on e-discharge.

All in-patients are reviewed, provided with support and education, a management plan and post-discharge follow-up – a collaborative approach.

Clinical staff are also supported and educated about care of this patient group.

Outcome measures

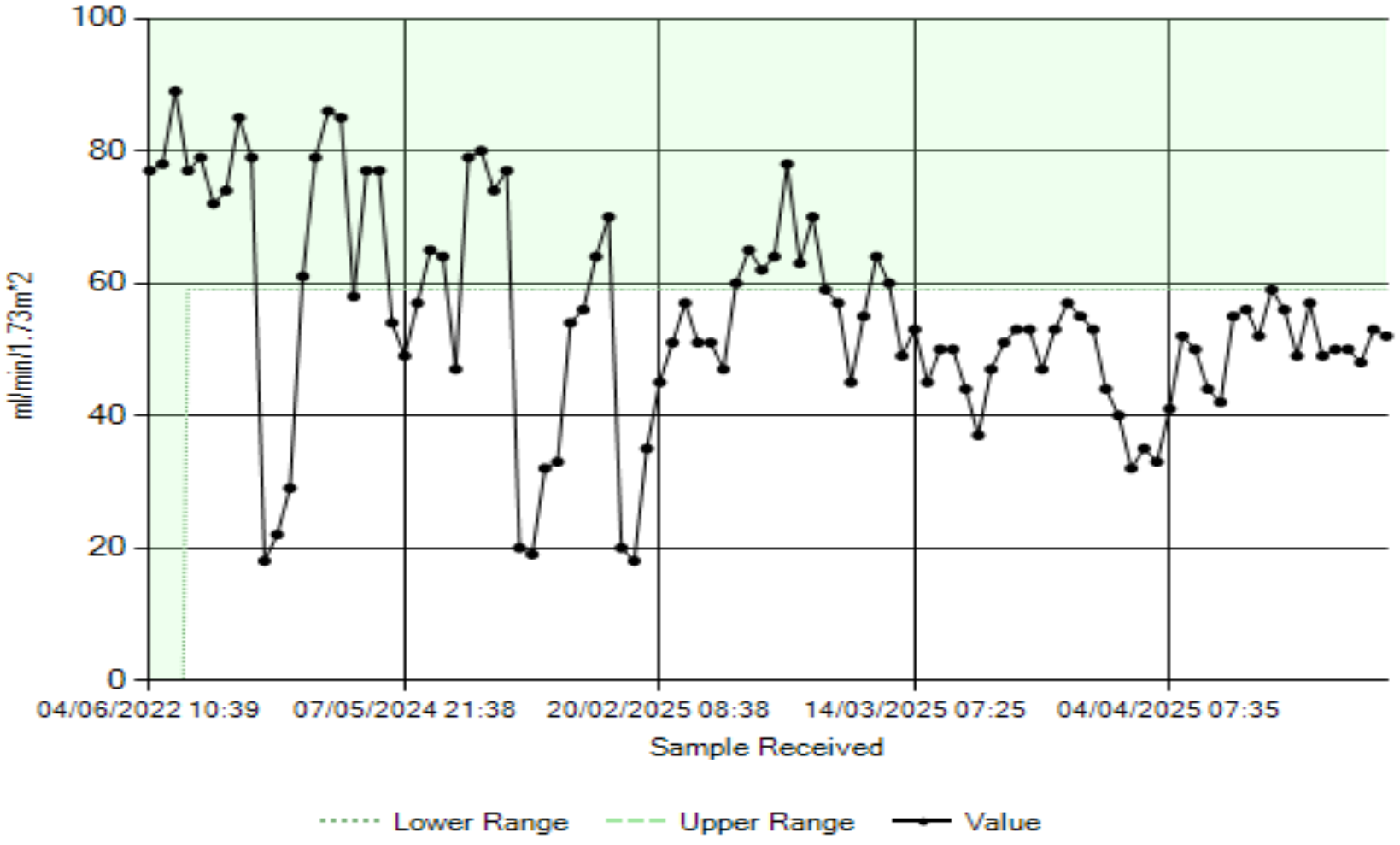
2024 data (n=59)

- Reduction in incidence of AKI by **16.1%**
- Length of stay reduced by **4.55%**
- Readmission rates with AKI <90 days post discharge reduced by **4.6%**
- Improvement in renal recovery by 90 days post AKI **6.4%**
- Financial benefits and improves bed capacity and patient flow.

Uncalculated:

- The number of patients avoiding admission due to better education or advice.
- Improvement in patient experience, confidence and patient journey.

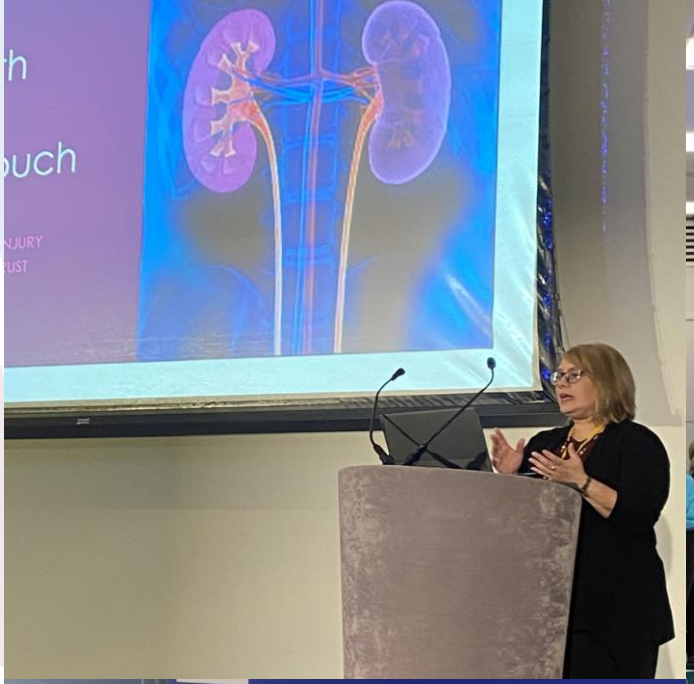
Effect of multiple AKIs on eGFR over time



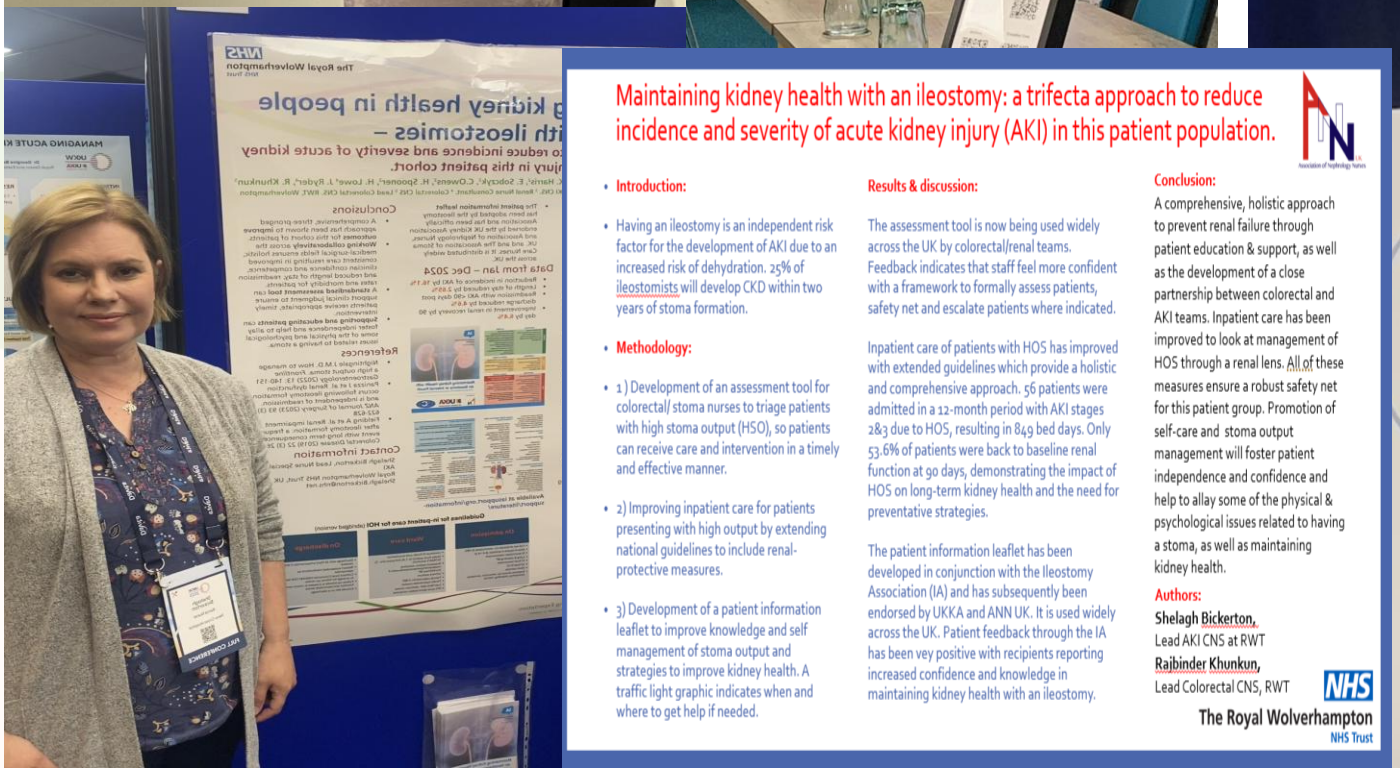
Care Colleagues Collaboration Communities

Dissemination of work, regionally, nationally and internationally.

Targeting renal, colorectal and patient groups.







Maintaining kidney health with an ileostomy: a trifecta approach to reduce incidence and severity of acute kidney injury (AKI) in this patient population.

- **Introduction:**
- Having an ileostomy is an independent risk factor for the development of AKI due to an increased risk of dehydration. 25% of ileostomists will develop CKD within two years of stoma formation.
- **Methodology:**
- 1) Development of an assessment tool for colorectal/ stoma nurses to triage patients with high stoma output (HSO), so patients can receive care and intervention in a timely and effective manner.
- 2) Improving inpatient care for patients presenting with high output by extending national guidelines to include renal-protective measures.
- 3) Development of a patient information leaflet to improve knowledge and self management of stoma output and strategies to improve kidney health. A traffic light graphic indicates when and where to get help if needed.

Results & discussion:

The assessment tool is now being used widely across the UK by colorectal/renal teams. Feedback indicates that staff feel more confident with a framework to formally assess patients, safety net and escalate patients where indicated.

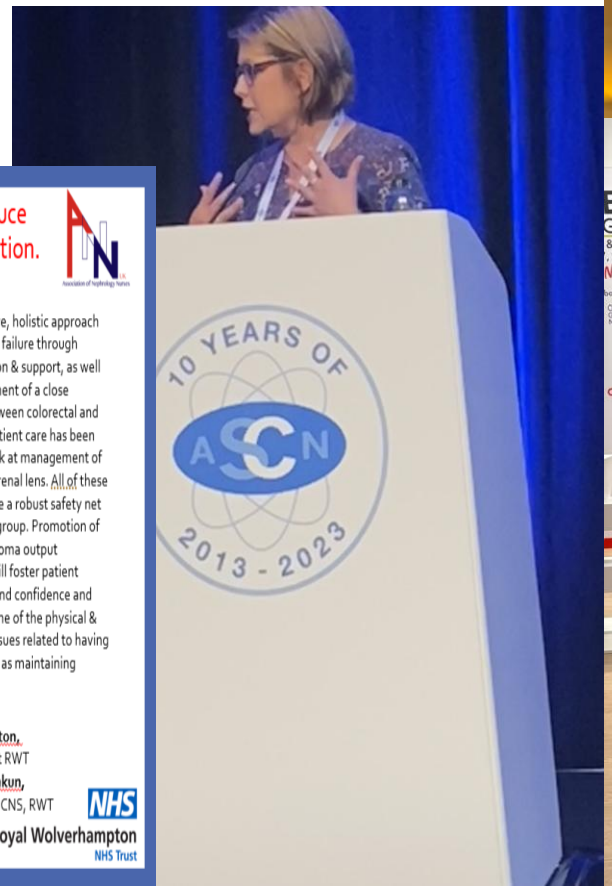
Inpatient care of patients with HOS has improved with extended guidelines which provide a holistic and comprehensive approach. 56 patients were admitted in a 12-month period with AKI stages 2&3 due to HOS, resulting in 849 bed days. Only 53.6% of patients were back to baseline renal function at 90 days, demonstrating the impact of HOS on long-term kidney health and the need for preventative strategies.

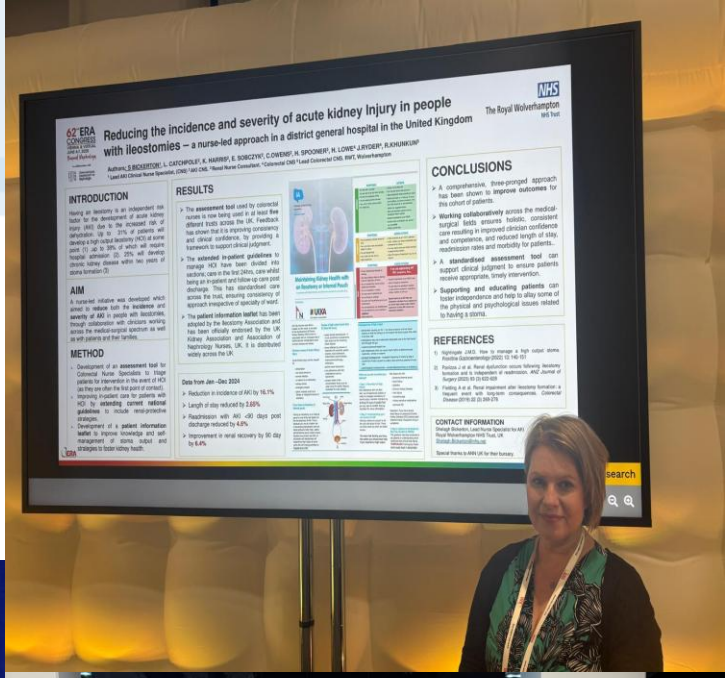
The patient information leaflet has been developed in conjunction with the Ileostomy Association (IA) and has subsequently been endorsed by UKKA and ANN UK. It is used widely across the UK. Patient feedback through the IA has been vey positive with recipients reporting increased confidence and knowledge in maintaining kidney health with an ileostomy.

Conclusion:

A comprehensive, holistic approach to prevent renal failure through patient education & support, as well as the development of a close partnership between colorectal and AKI teams. Inpatient care has been improved to look at management of HOS through a renal lens. All of these measures ensure a robust safety net for this patient group. Promotion of self-care and stoma output management will foster patient independence and confidence and help to allay some of the physical & psychological issues related to having a stoma, as well as maintaining kidney health.

Authors:
Shelagh Bickerton,
Lead AKI CNS at RWT
Rajbinder Khunkun,
Lead Colorectal CNS, RWT
NHS
The Royal Wolverhampton
NHS Trust







Dissemination

- **Patient information leaflet** has been officially endorsed and is actively marketed through the:
  - Ileostomy Association UK
  - UK Kidney Association
  - Association of Stoma Care Nurses
  - Association of Nephrology Nurses UK
  - Plan to disseminate through Royal College of General Practitioners
- Member of **advisory committee** for Ileostomy Association
- Member of **advisory committee** for ASCN – directly influencing national guidelines.
- **Triaging assessment tool** now used at least 5 different trusts across the UK. Mentorship provided to help implementation.
- Shortlisted for **Nursing Times Awards** 2025.

Care Colleagues
Collaboration Communities

Next steps

Incorporating renal/electrolyte and vitamin monitoring into Enhanced Recovery After Surgery (ERAS) Programme in the first year following stoma formation.

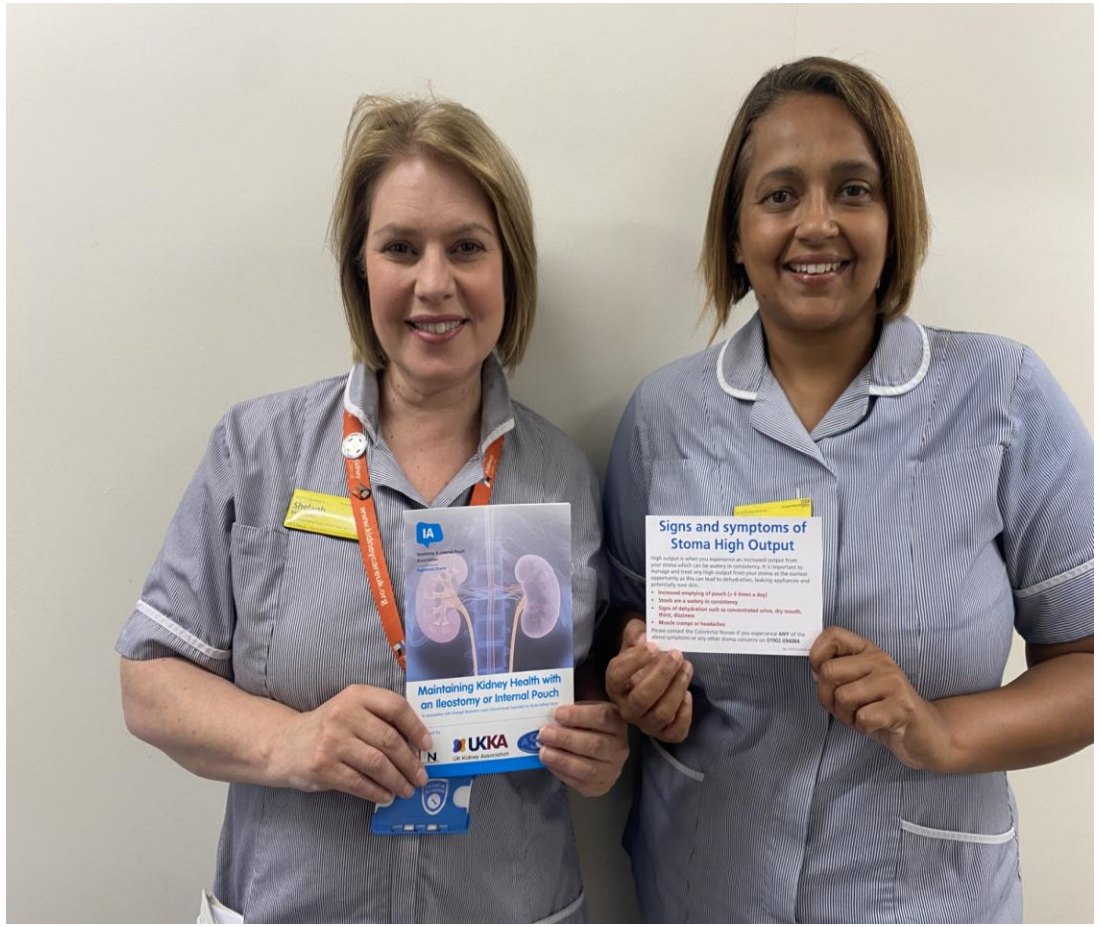
Steps:

- Getting surgical buy-in.
- Involved colorectal CNS team.
- Retrospective audit of ileostomy patients looking at renal, electrolyte and Vitamin A, D and B12, PTH, folate & ferritin over a set period – to measure activity and outcomes on long term kidney health.
- Pilot study to measure the above and action appropriately.
- Development of ERAS follow-up protocol for renal monitoring.

Care Colleagues Collaboration Communities

To conclude……

- **Rewarding** project showcasing the benefits of **integrated, collaborative** working.
- Improved **morbidity/mortality** rates as well as **patient experience.**
- **Highly replicable** across national and international organisations



- *“I have had an ileostomy for a few years and have had repeated admissions to hospital with high output and kidney problems. It made me lose my confidence and also made me feel very unwell. I hated having a stoma. Now, with all the support received through this project I feel much more able to look after myself and manage my symptoms better. I know exactly what I need to do to get help if I need it and keep my kidneys safe. I feel like I have got my life back at last.”*

- **Margaret, age 64, Wolverhampton**

Care Colleagues Collaboration Communities

References

- 1) Nightingale, J. M. D. (2021) How to manage a high-output stoma, *Frontline Gastroenterology*, **13**(2), p. flgastro-2018-101108.
- 2) Panizza, J., Swee, Y. J. S., Edmundson, A. and Clark, D. (2023) Renal dysfunction occurs following ileostomy formation and is independent of readmission, *ANZ Journal of Surgery*, **93**(3), pp. 622–628.
- 3) Liu, C., Bhat, S., Sharma, P., Yuan, L., O'Grady, G. and Bissett, I. (2021) Risk factors for readmission with dehydration after ileostomy formation: a systematic review and meta-analysis, *Colorectal Disease*, **23**(5).
- 4) Fielding, A., Woods, R., Moosvi, S. R., Wharton, R. Q., Speakman, C. T. M., Kapur, S., Shaikh, I., Hernon, J. M., Lines, S. W. and Stearns, A. T. (2019) Renal impairment after ileostomy formation: a frequent event with long-term consequences, *Colorectal Disease*, **22**(3), pp. 269–278.
- 5) Matsushita K, Ballew SH., Wang AY., Kalyesubula R. Schaeffner E.,(2022) Epidemiology and risk of cardiovascular disease in populations with chronic kidney disease,Natures Review Nephrology **18** (11): 696-707
- 6) Thompson S., James M., Wiebe N., Hemmelgarn B., Manns B., Klarenbach S., Tonelli M,. (2015) Cause of death in patients with reduced kidney function, Journal of Soc Nephrology, **26** (10): 2504-2511

Care Colleagues Collaboration Communities