

Empirical treatment of Bacterial Urinary Tract Infections (adults) Clinical Guideline

Version No.: 1.0
Approval date: 10 October 2017

INFORMAL COPY WHEN PRINTED



Disclaimer

This guideline provides advice of a general nature. This statewide guideline has been prepared to promote and facilitate standardisation and consistency of practice, using a multidisciplinary approach. The guideline is based on a review of published evidence and expert opinion.

Information in this statewide guideline is current at the time of publication.

SA Health does not accept responsibility for the quality or accuracy of material on websites linked from this site and does not sponsor, approve or endorse materials on such links

Health practitioners in the South Australian public health sector are expected to review specific details of each patient and professionally assess the applicability of the relevant guideline to that clinical situation.

If for good clinical reasons, a decision is made to depart from the guideline, the responsible clinician must document in the patient's medical record, the decision made, by whom and detailed reasons for the departure from the guideline.

This statewide guideline does not address all the elements of clinical practice and assumes that the individual clinicians are responsible for:

- discussing care with consumers in an environment that is culturally appropriate and which enables respectful confidential discussion. This includes the use of interpreter services where necessary,
- advising consumers of their choice and ensure informed consent is obtained.
- providing care within scope of practice, meeting all legislative requirements and maintaining standards of professional conduct and
- documenting all care in accordance with mandatory and local requirements.

Contents

Introduction	4
Background.....	4
Definitions	4
Standards	4
Principles of the standards.....	5
General.....	5
Diagnosis of urinary tract infection.....	5
Criteria for defining urinary tract infection	5
Special considerations	8
Asymptomatic bacteriuria	8
Pregnancy.....	8
Recurrent infection	8
Patients with indwelling catheter, catheter-associated urinary tract infection (CA-UTI)	8
Renal impairment	9
References	9
Appendix 1 – Evaluation of suspected UTI for older adults in residential & community care	10
Document Owner & History.....	11

INFORMAL COPY WHEN PRINTED

Introduction

Urinary Tract Infections (UTI) are common in the community and hospital setting. Women have a one in three lifetime risk of developing a UTI [1]. Symptomatic UTIs usually require antibiotic therapy whereas asymptomatic bacteriuria does not require treatment except in pregnant women and in patients undergoing urological procedures.

Background

This guideline has been developed by the SA expert Advisory Group on Antimicrobial Resistance (SAAGAR) to assist prescribers to identify and initiate empirical antimicrobial therapy for urinary tract infections in adult patients.

Considerations for selection of empiric therapy for UTI include:

- > Most likely pathogen/s and susceptibilities based on site-specific resistance data;
- > Rate of *Escherichia coli* resistance in the community (consider local antibiograms);
- > **Recent overseas travel** (past 6 months) to a region with **high rates of antibiotic resistance** (e.g. Southeast Asia/South Asia);
- > **Recent use of antimicrobials** e.g. trimethoprim+sulfamethoxazole (and trimethoprim). Prior use is a risk factor for resistance to these agents;
- > Recurrent UTIs: previous pathogens and treatment.

Definitions

CA-UTI	Catheter-associated urinary tract infection
CrCl	Creatinine clearance
CFU	Colony forming unit (viable microbial cell)
Cystitis	An infection of the lower urinary tract
eGFR	Estimated glomerular filtration rate
MSU	'Mid-stream' urine – procedure for obtaining a urine sample which aims to minimise the risk of contamination with skin or urethral bacteria [2]
Pyelonephritis	An infection of the upper urinary tract
SAAGAR	Acronym for the South Australian expert Advisory Group on Antimicrobial Resistance
UTI	Urinary Tract Infection

Standards

The following National Safety and Quality Health Service Standard (NSQHSS) standards apply:

Standard 3 – Preventing & Controlling Healthcare Associated Infections

- > Criterion 3.14 – Developing, implementing and regularly reviewing the effectiveness of the antimicrobial stewardship system.

Standard 4 – Medication Safety

- > Criterion 4.1 – Developing and implementing governance arrangements and organisational policies, procedures and/or protocols for medication safety, which are consistent with national and jurisdictional legislative requirements, policies and guidelines.

Principles of the standards

Standard 3 aims to prevent patients from acquiring preventable healthcare associated infections and effectively manage infections when they occur by using evidence-based strategies that are based on the risk to both patients and staff.

Standard 4 aims to ensure competent clinicians safely prescribe, dispense and administer appropriate medicines to informed patients and carers.

General

Diagnosis of urinary tract infection

Urinary tract infection (UTI) can be classified as either uncomplicated or complicated.

Uncomplicated UTI is most common in non-pregnant women who do not have underlying genitourinary anatomical or functional abnormalities [3]. **Complicated UTI** is associated with factors that increase the risk of serious complications or treatment failure. These factors include anatomical or functional abnormalities of the genitourinary tract (e.g. nephrolithiasis, neurogenic bladder), comorbidities (diabetes), and being of the male sex. A wider range of pathogens are associated with complicated UTIs.

Criteria for defining urinary tract infection

Asymptomatic bacteriuria

Asymptomatic bacteriuria is the presence of a positive urine culture (midstream urine (MSU) specimen bacteria count of $\geq 10^5$ cfu/mL with or without pyuria) but with no signs or symptoms of infection. Asymptomatic bacteriuria does not require treatment except in special circumstances (see under *Special Considerations* below). Asymptomatic bacteriuria is common in the elderly however there is no evidence to support routine screening and treatment [1, 4]. Refer to appendix 1 for a flowchart for the evaluation of suspected UTI in aged-care facility residents. For further information on differential diagnosis and appropriate prescribing in the elderly, refer to the National Prescribing Service Guidelines.

Cystitis

Cystitis is the presence of a positive urine culture with an organism known to cause urinary tract infections and at least one urinary symptom (e.g. frequency, painful urination, suprapubic pain, non-specific lower back pain) [1]. Note: there is no specific defined threshold concentration (cfu/mL) for diagnosis)

- > Uncomplicated – symptomatic infection in a structurally and functionally normal urinary tract in women;
- > Complicated – symptomatic infection in men OR a urinary tract in which there is a structural or functional abnormality (e.g. urinary tract obstruction, chronic kidney disease, poorly-controlled type 2 diabetes, immunosuppression, urinary catheter in situ, neurogenic bladder, post-menopausal women, history of recurrent UTIs, nephrolithiasis).

Pyelonephritis

Pyelonephritis is the presence of a positive urine culture with an organism known to cause urinary tract infections and with systemic symptoms.

- > Mild (suitable for oral therapy/discharge) – mild systemic symptoms (low-grade fever, no nausea or vomiting), loin pain
- > Severe (suitable for IV therapy/admission) – systemic symptoms (fever, nausea, vomiting, severe pain), acute renal injury

Catheter-associated UTI (CAUTI)

CAUTI is a symptomatic infection occurring in a patient who is (or has been in the past 48 hours) catheterised, with no other identified source of infection and an appropriately collected urine specimen with bacterial count $\geq 10^3$ CFU/mL. The need for the catheter should be reviewed. To reduce the risk of sample contamination, either remove the catheter and obtain an MSU, or collect a sample via a new catheter if ongoing catheterisation is required. If the catheter cannot be removed or replaced, collect the urine sample from the port in the drainage system, not from the drainage bag [3].

INFORMAL COPY WHEN PRINTED

Definite or probable URINARY TRACT INFECTION

(Obtain mid-stream urine specimen and send for culture)

	Acute cystitis	Pyelonephritis – mild/moderate	Pyelonephritis – severe
Adults (≥18 years)	<p style="text-align: center;">Uncomplicated</p> <ol style="list-style-type: none"> 1) Trimethoprim 300mg PO daily (at night) for 3 days; or 2) Cefalexin 500mg PO twice daily for 5 days; or 3) Nitrofurantoin 100mg PO twice daily for 5 days; or 4) Amoxicillin 500mg + clavulanic acid 125mg twice daily for 5 days 	<ol style="list-style-type: none"> 1) Amoxicillin 875mg + clavulanic acid 125mg PO twice daily for 10 days; or 2) Cefalexin 500mg PO SIX hourly for 10 days; or 3) Trimethoprim 300mg PO daily (night) for 10 days <p>(Do not use if CrCL ≤ 10mL/min)</p> <p>If proven resistance or intolerance to other agents, or <i>Pseudomonas aeruginosa</i>:</p> <ol style="list-style-type: none"> 1) Ciprofloxacin 500mg PO BD for 7 days; or 2) Norfloxacin 400mg PO BD for 7 days 	<p>Gentamicin IV 4-5mg/kg (7mg/kg for severe sepsis) ideal body weight STAT, then according to aminoglycoside dosing and monitoring guidelines. (If pregnant, see below)</p> <p>PLUS</p> <p>Amoxicillin 2g IV SIX hourly</p> <p>For patients with penicillin allergy, use gentamicin alone</p> <p>If CrCL ≤ 40mL/min or if gentamicin contraindicated, use as a single agent: Ceftriaxone 1g IV daily</p> <p>Patients with high risk penicillin allergy AND CrCL ≤ 40mL/min, consult ID for advice.</p> <p>Modify based on micro and clinical response. Switch to oral when clinically appropriate</p>
	<p style="text-align: center;">Complicated</p> <ol style="list-style-type: none"> 1) Trimethoprim 300mg PO daily (at night) for 7 days; or 2) Cefalexin 500mg PO twice daily for 7 days; or 3) Nitrofurantoin 100mg PO twice daily for 7 days; or 4) Amoxicillin 500mg + clavulanic acid 125mg twice daily for 7 days <p>If proven resistance to above agents: Norfloxacin 400mg PO twice daily for 3 days</p>		
Pregnancy	<p>Obtain culture and sensitivities for all pregnant women (even if asymptomatic) Duration of treatment: 5 days (or 7 days if recurrent)</p> <ol style="list-style-type: none"> 1) Cefalexin 500mg PO twice daily; or Nitrofurantoin 100mg PO twice daily; or Trimethoprim 300mg PO daily (avoid in 1st trimester or if established folate deficiency) 2) Amoxicillin 500mg + clavulanic acid 125mg PO twice daily (contraindicated in premature rupture of amniotic membranes) 	<ol style="list-style-type: none"> 1) Cefalexin 500mg PO SIX hourly for 10 days; or 2) Trimethoprim 300mg PO daily for 10 days (avoid in 1st trimester and if established folate deficiency); or 3) Amoxicillin 500mg + clavulanic acid 125mg PO twice daily for 10 days (contraindicated in premature rupture of amniotic membranes) 	<ol style="list-style-type: none"> 1) Gentamicin 5mg/kg IV (max 480mg) as a single daily dose <p>PLUS</p> <p>Amoxicillin 2g IV SIX hourly</p> <ol style="list-style-type: none"> 2) Ceftriaxone 1g IV daily <p>Modify based on micro and clinical response. Switch to oral when clinically appropriate.</p>

Additional information

IN ALL CASES: Tailor treatment based on microbiology and sensitivities according to clinical response using agent with narrowest spectrum of activity and switch to oral therapy as soon clinically appropriate ([see IV to oral switch guidelines](#)).

Contact an Infectious Diseases Consultant or Clinical Microbiologist for advice if: recent travel overseas, recurrent UTIs and documented resistance or presence of ureteric stents.

Criteria for defining UTI

Asymptomatic bacteriuria

No signs or symptoms with bacteriuria ≥10⁵ cfu/mL.

- Common in the elderly
- Treatment generally NOT required (see exceptions below)
- Requires treatment in **all** pregnant women and patients undergoing urological procedures

Cystitis

Presence of positive urine culture with an organism known to cause UTIs and at least one urinary symptom (e.g. frequency, painful urination, suprapubic pain, non-specific back pain)

• Uncomplicated

Symptomatic infection in women with a structurally and functionally normal urinary tract

• Complicated

Symptomatic infection in **men** OR a urinary tract in which there is a structural or functional abnormality:

- Urinary tract obstruction
- Chronic kidney disease
- Poorly-controlled type 2 diabetes
- Immunosuppression
- Urinary catheter in situ
- Neurogenic bladder
- Post-menopausal women
- History of recurrent UTIs (≥2/6 months or ≥3/year)
- Nephrolithiasis

Pyelonephritis

Presence of positive urine culture with an organism known to cause UTIs and systemic symptoms.

• Mild (suitable for oral therapy/discharge)

- Mild systemic symptoms (low grade fever, no nausea or vomiting)
- Loin pain

• Severe (suitable for IV therapy/admission)

- Systemic symptoms (fever, nausea, vomiting, severe pain)

Catheter-associated (men and women)

Bacteriuria and pyuria are common; Routine screening & treating catheterised patients with bacteria is not recommended in the absence of symptoms - see *Special Considerations* (Page 8).

- Symptomatic UTI: Urine specimen ≥ 10³ cfu/mL with at least one sign or symptom referable to the urinary tract, with no other identifiable source of infection.

Special considerations

Asymptomatic bacteriuria

Screening for, and treating, asymptomatic bacteriuria is not recommended, except in pregnant women (see below) and in patients undergoing urological procedures [1]. For further information on decisions and the management of asymptomatic bacteriuria, refer to the [NPS guidelines](#). There is some evidence that antibiotic treatment reduces the risk of pyelonephritis in pregnancy and the risk of low birth weight or preterm birth [5].

Pregnancy

Obtain urine samples for culture and sensitivities in **all** pregnant women. Trimethoprim should be avoided in 1st trimester and in pregnant women with established folate deficiency. For more information, refer to the [Australian Therapeutic Guidelines - Antibiotic](#) [3].

Recurrent infection

Recurrent infection can be a relapse (same organism) or re-infection (different organism). Treat relapsed UTI as for pyelonephritis (10-14 days) and investigate for urological abnormalities. If re-infection, treat as for acute cystitis or pyelonephritis, as appropriate [3].

Patients with indwelling catheter, catheter-associated urinary tract infection (CA-UTI)

Routine screening and treating catheterised patients with bacteriuria is not recommended in the absence of symptoms [1].

Do not rely on classical clinical symptoms or signs for predicting the likelihood of symptomatic UTI in catheterised patients. Pyuria alone is not diagnostic of catheter-associated infection [1]. Pyuria and bacteriuria are common in catheterised patients and are not indicators for antibiotic treatment unless the patient is symptomatic [6]. In the absence of symptoms, treatment of bacteriuria in this population may contribute to inappropriate antimicrobial use and increased resistance pressure. For further information on catheter-associated asymptomatic bacteriuria, refer to [NPS guidelines](#).

In catheterised patients who present with fever, exclude other potential sources of infection. Look for associated localising (loin or supra-pubic tenderness) or other systemic features such as rigors, chills, vomiting or confusion. Where treatment is indicated, change the catheter prior to commencing antibiotic treatment for symptomatic UTI. Treat according to culture and sensitivities for seven days, or 10-14 days if response is delayed [1]. Permanent removal of the catheter is preferred.

Renal impairment

Table 1: Dose adjustment in renal impairment [7]

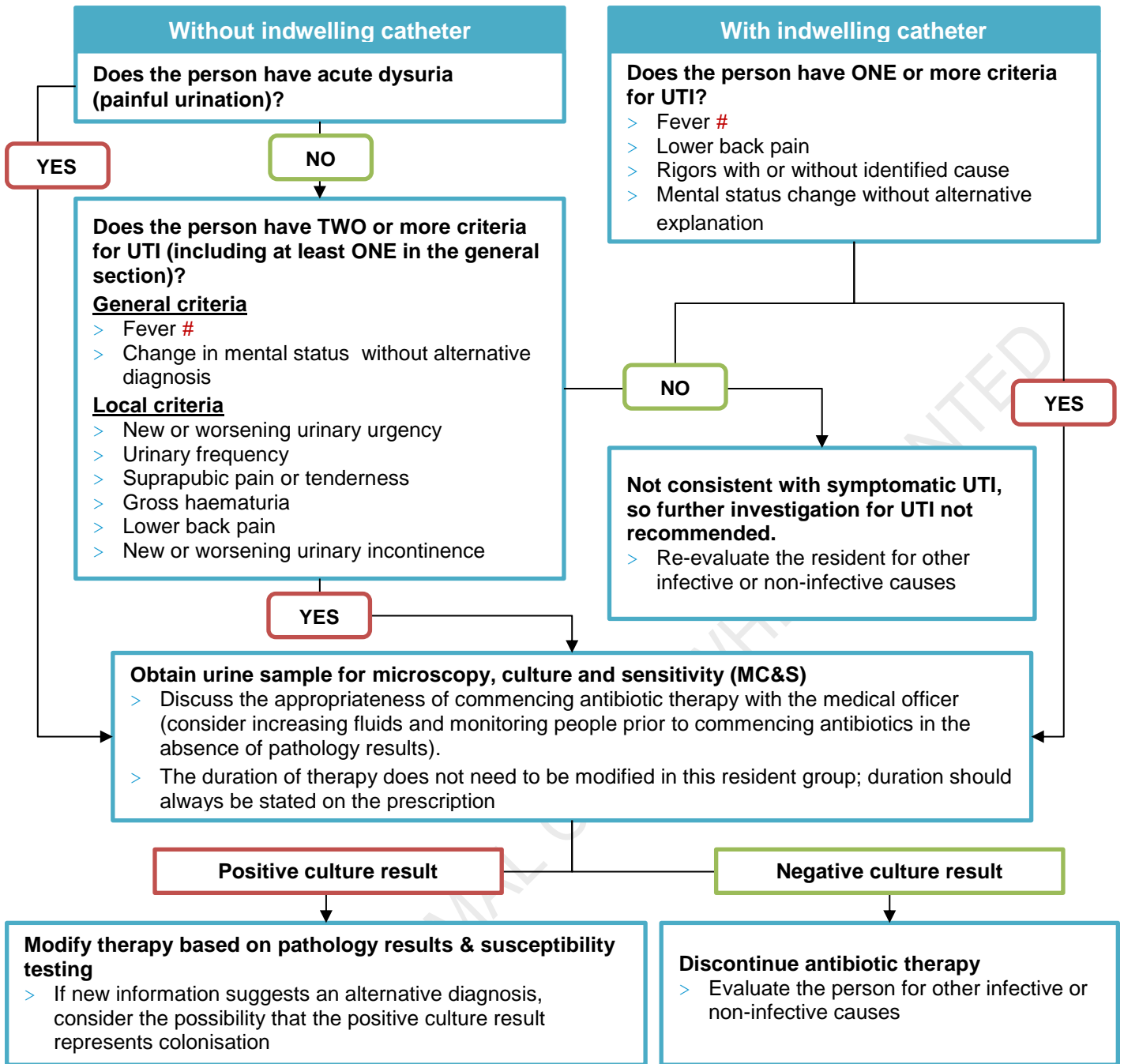
Drug	Adjustment
Amoxicillin/Clavulanic acid	CrCl <30mL/min: 500/125mg every 12 hours
Ciprofloxacin	CrCl < 30mL/min: 500mg daily
Nitrofurantoin	eGFR 30-60mL/min: limit duration to 5-7 days for multi-drug resistant patients; Monitor for adverse effects. eGFR < 30mL/min: Do not use – may be ineffective due to low urinary concentrations. Increased risk of adverse effects.
Norfloxacin	CrCl <30mL/min: 400mg daily
Trimethoprim	CrCl 15-30mL/min: 300mg daily for 3 days, then reduce to 150mg daily CrCl 10-15mL/min: 150mg daily CrCl <10mL/min: do not use

References

1. National Prescribing Service (NPS), *Urinary Tract Infections: Clinical information for health professionals*. . 2016: Canberra [Available at: <http://www.nps.org.au/conditions/urine-bladder-and-kidney-problems/bladder-disorders/urinary-tract-infections>]. Accessed Dec 2016.
2. Lab Tests Online - AU, *Urine Culture*, Australasian Association of Clinical Biochemists, Editor. 2013: <http://www.labtestsonline.org.au/learning/test-index/urine-culture> [Accessed 1 Feb 2017].
3. Therapeutic Guidelines: Antibiotic, *Urinary Tract Infections* 2014: Melbourne [Available at: www.tg.org.au]. Accessed March 2015.
4. Jarvis, T., L. Chan, and T. Gottlieb, *Assessment and management of lower urinary tract infection in adults*. . Aust Prescr., 2014. **37**: p. 7-9.
5. Smaill, F.M. and J.C. Vazquez, *Antibiotics for asymptomatic bacteriuria in pregnancy*. Cochrane Database of Systematic Reviews, 2015(8): p. CD000490.
6. Hooton, T.M., et al., *Diagnosis, prevention, and treatment of catheter-associated urinary tract infection in adults: 2009 International Clinical Practice Guidelines from the Infectious Diseases Society of America*. Clinical Infectious Diseases, 2010. **50**(5): p. 625-63.
7. Rossi, S., (Ed),, *Australian Medicines Handbook. Chapter 5: Anti-infectives*. 2015, Adelaide [Available at: <https://amhonline.amh.net.au/>]. Accessed Jan 2016.

Appendix 1 – Evaluation of suspected UTI for older adults in residential & community care

Suspected urinary tract infection (UTI)



Notes:

- Do not investigate or treat cloudy or malodourous urine in older adults in residential & community care who do not have other symptoms or signs of UTI.
- Consider whether an alternative diagnosis is likely. Consider both infective (e.g. pneumonia) and non-infective causes (e.g. medication-related adverse events).
- Establish whether an advanced care plan is in place that may influence assessment and management (e.g. whether investigations are performed or antibiotics given).
- Do not routinely conduct a post-antibiotic urinalysis. If symptoms of UTI persist then discuss with medical officer.

Fever is defined as a single oral temperature $> 37.8^{\circ}\text{C}$; repeated oral temperatures $> 37.5^{\circ}\text{C}$; rectal temperature $> 37.5^{\circ}\text{C}$ or an increase of more than 1.1°C above baseline temperature. (*McGeer Criteria, 2012*)

Adapted with permission from Antibiotic Expert Groups. Initial assessment and management of aged-care facility residents with suspected urinary tract infection (figure 2.9). (published November 2014. Amended October 2015). In: eTG complete (internet). Melbourne: Therapeutic Guidelines limited 2016 March.

Document Owner & History

Document developed by: South Australian expert Advisory Group on Antimicrobial Resistance (SAAGAR)

File / Objective No.: 2017-10287 | eA987690

Next review due: 10/10/2022

Policy history: Is this a new policy (V1)? **Y**
Does this policy amend or update an existing policy? **N**
If so, which version?
Does this policy replace another policy with a different title? **N**
If so, which policy (title)?

Approval Date	Version	Who approved New/Revised Version	Reason for Change
10/10/17	V1	Safety & Quality Strategic Governance Committee	Original approved version.

INFORMAL COPY WHEN PRINTED