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National Horizon Scanning Unit
Horizon scanning prioritising summary

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Modified Urine Collection Pad (UCP): For the diagnosis of urinary tract infections in infants.

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PRIORITISING SUMMARY

REGISTER ID: **000133**

NAME OF TECHNOLOGY: **MODIFIED URINE COLLECTION PAD (UCP) METHOD**

PURPOSE AND TARGET GROUP: **URINARY TRACT INFECTION DIAGNOSIS IN INFANTS**

STAGE OF DEVELOPMENT (IN AUSTRALIA):

☒	Yet to emerge	☐	Established
☐	Experimental	☐	Established *but* changed indication or modification of technique
☐	Investigational	☐	Should be taken out of use
☐	Nearly established		

AUSTRALIAN THERAPEUTIC GOODS ADMINISTRATION APPROVAL

☐	Yes	ARTG number	
☐	No	☒	Not applicable

INTERNATIONAL UTILISATION:

COUNTRY	LEVEL OF USE		
	Trials Underway or Completed	Limited Use	Widely Diffused
United Kingdom	✓		

IMPACT SUMMARY:

The diagnosis of urinary tract infections in young children is often delayed due to difficulties in obtaining an uncontaminated urine sample. This summary describes a modified urine collection pad (UCP) method in young children with suspected urinary tract infection (UTI).

BACKGROUND

There are several methods available to collect urine samples for the purpose of diagnosing or excluding a diagnosis of UTI.

Several non-invasive methods exist for the collection of urine samples. The clean catch method requires a sample to be collected mid-stream during urination into a specimen container and are easily obtained from older children but with little success in infants. The most common method of sampling urine is by using sterile adhesive bags, which has several drawbacks: bags may not adhere adequately, causing leakage; the adhesive often causes discomfort, particularly for children with skin disorders; and urine samples are often contaminated. In addition the adhesive bags are costly. The UCP method involves placing a pad inside the infant's nappy and urine is extracted after the pad is removed (Ahmad et al, 1991, Farrell et al 2002).

Previous studies comparing urine collection pad methods to bag samples have found that although the UCP method is easy to employ, it results in high rates of contamination (Macfarlane et al, 2004). A sample contaminated by faecal and perineal flora may hide

infection and may need to be repeated. Clean catch methods may result in less bacterial contamination in urine samples but are not the preferred method for parents to collect samples in young children (Liaw et al 2000). In elderly patients, urine samples are usually collected by catheterisation, which may cause pain and discomfort (Shvartzman and Nasri, 2003).

This summary describes a modification to the use of urine pads for sample collection where UCPs placed inside the nappy of a child are changed every 30 minutes to prevent bacterial contamination. An enuresis alarm is placed inside the nappy to alert staff to the presence of urine.

CLINICAL NEED AND BURDEN OF DISEASE

Urinary tract infection (UTI) is a common clinical problem in the elderly population, infants and young children. In 2002-3 urinary tract infections accounted for 1.2% of problems managed in GP consultations and was one of the 20 most common problems encountered in GP consultations in Australia (AIHW, 2004a).

Urinary tract infections are fairly common in children. About 2% of boys and 8% of girls will have a urinary infection during their childhood. If infections happen often they can cause damage to the kidneys (Child and Youth Health, South Australia, 2004).

In 2002-03 there were 1,743 and 1,270 separations in children aged<1 and 1-4 years respectively for a diagnosis of N39.0 Urinary tract infection (AIHW 2004b).

DIFFUSION

It is likely that this method of urine sample collection in young children could be applied in clinical settings and avoid the problem of contamination and excess time associated with bag and clean catch methods.

COMPARATORS

Apart from the non-invasive methods previously mentioned, other methods available include bladder (transurethral) catheterisation and suprapubic percutaneous bladder aspiration where a needle is through the abdominal wall into the bladder. These methods are commonly used in neonates or babies.

Current practice at the Women's and Children’s Hospital, South Australia for the collection of urine samples in young children in emergency and medical wards is the bag method (personal communication, clinical manager and emergency department triage nurse, Womens and Childrens Hospital).

EFFECTIVENESS AND SAFETY ISSUES

In the study conducted by Rao et al (level II evidence) children with fever under 2 years of age who were candidates for a diagnosis of UTI were randomised to two urine collection methods: single UCP, (where children wore UCP with alarm) or UCP and alarm with replacement of the UCP every 30 minutes (Rao et al, 2003). Of the eighty children recruited to the study a total of 37 samples were collected in the single UCP method and 31 by the replaced UCP method. Urine collection failed in 15% (12) children mainly due to faecal soiling of the pad. UTI occurred in three (4%) of the 68 samples.

This study found that replacing UCPs every 30 minutes reduced the rate of urine sample contamination compared to leaving a single UCP in place. Heavy mixed growth (>105 mixed growth organisms/ml) was significantly higher in the single UCP group (10/35, 29%) than in the replaced UCP group ((1/30, 3%), p =0 0.008). In the replacement UCP group, the number of pads used ranged between 1 and 7 (median 2).

COST IMPACT

No information was available regarding the possible cost impact of the UCP method compared to other urine sample collection methods. Although the above study was conducted in a young population, the UCP methods could also be applied to the elderly incontinent population, which may result in less time allocated to the collection of urine samples.

ETHICAL, CULTURAL OR RELIGIOUS CONSIDERATIONS

No issues were identified/raised in the sources examined.

CONCLUSION:

There is limited, although high quality, level of evidence (level II) currently available for the use of single and replacement UCP method and the potential for the easy adoption of the urine collection method in different clinical settings.

HEALTHPACT ACTION:

The UCP will not impact significantly in terms of policy or cost burden on the Australian health system it is therefore recommended that this technology be archived.

SOURCES OF FURTHER INFORMATION:

Ahmad, T., Vickers, D. et al (1991). 'Urine collection from disposable nappies', *Lancet*, 338 (8768), 674-676.

AIHW 2004a *Australia's Health 2004* [Internet] Australian Institute of Health and Welfare. Available from: http://www.aihw.gov.au/publications/aus/ah04/ah04.pdf [Accessed 12th October, 2004]

AIHW 2004b *National Hospital Morbidity Database* [Internet]. Australian Institute of Health and Welfare. Available from: http://www.aihw.gov.au [Accessed 12th October, 2004]

Child and Youth Health 2004 *Urinary Tract Infection* [Internet] Available from: http://www.cyh.com/cyh/parentopics/usr_index0.stm?topic_id=314 [Accessed 12th October, 2004]

Cohen, H. A., Woloch, B. et al (1997). 'Urine samples from disposable diapers: an accurate method for urine cultures', *J Fam Pract*, 44 (3), 290-292.

Farrell, M., Devine, K. et al (2002). 'A method comparison study to assess the reliability of urine collection pads as a means of obtaining urine specimens from non-toilet-trained children for microbiological examination', *J Adv Nurs*, 37 (4), 387-393.

Liaw, L. C., Nayar, D. M. et al (2000). 'Home collection of urine for culture from infants by three methods: survey of parents' preferences and bacterial contamination rates', *BMJ*, 320 (7245), 1312-1313.

Macfarlane, P. I., Houghton, C. & Hughes, C. (1999). 'Pad urine collection for early childhood urinary-tract infection', *Lancet*, 354 (9178), 571.

Rao, S., Bhatt, J. et al (2004). 'An improved urine collection pad method: a randomised clinical trial', *Arch Dis Child*, 89 (8), 773-775.

Rao, S., Houghton, C. & Macfarlane, P. I. (2003). 'A new urine collection method; pad and moisture sensitive alarm', *Arch Dis Child*, 88 (9), 836.

Shvartzman, P. & Nasri, Y. (2004). 'Urine culture collected from gel-based diapers: developing a novel experimental laboratory method', *J Am Board Fam Pract*, 17 (2), 91-95.

SEARCH CRITERIA TO BE USED:

Bacteriuria/microbiology
*Diapers, Infant
Infant

Specimen Handling/*methods
Urinary Tract Infections/complications/diagnosis/*microbiology
*Urine
*Disposable Equipment
Escherichia coli/isolation & purification