

**BEST PRACTICE EVIDENCE BASED GUIDELINE**

**NOCTURNAL ENURESIS  
" BEDWETTING"**

**2005**



**PAEDIATRIC SOCIETY OF NEW ZEALAND**

**HEALTH OF OUR CHILDREN: WEALTH OF OUR NATION**

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## **STATEMENT OF INTENT**

*Clinical guidelines are produced to assist health professionals and consumers make decisions about health care in specific clinical circumstances. Research has shown that if properly developed, communicated and implemented, guidelines can improve care. While guidelines represent a statement of best practice based on the latest available evidence (at the time of publishing), they are not intended to replace the health professional's judgment in each individual case.*

## **COPYRIGHT AND ADAPTATION OF GUIDELINE**

*The Paediatric Society of New Zealand encourages free exchange and sharing of evidence and guidelines, and the adaptation of the guidelines for local conditions. However, please note that guidelines are subject to copyright.*

*This guideline may be copied but acknowledgement must be given to the Paediatric Society of New Zealand. [psnz@paradise.net.nz](mailto:psnz@paradise.net.nz)*

*Where guidelines are modified for local circumstances, significant departures from these national guidelines must be detailed with reasons for the departure. The Paediatric Society Guidelines group cannot be held responsible for such changes.*

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## ENDORSEMENTS

Endorsements for the guideline were received from:



The Royal New Zealand  
College of General Practitioners

<u>Statement of intent</u> .....	2
<u>Copyright and Adaptation of Guideline</u> .....	2
<u>About the guideline</u> .....	6
<u>Foreword</u> .....	6
<u>Guideline Development Process</u> .....	7
<u>Evidence and recommendation grading system used for this guideline:</u> .....	9
<u>Consultation</u> .....	10
<u>Guideline team</u> .....	11
<u>Declarations of Competing Interests</u> .....	12
<u>Funding:</u> .....	12
<u>Acknowledgments</u> .....	13
<u>Currency</u> .....	13
<u>MONOSYMPTOMATIC NOCTURNAL ENURESIS (MNE) - Bedwetting</u> .....	14
<u>Definitions:</u> .....	14
<u>Abbreviations</u> .....	14
<u>KEY SUMMARY MESSAGES</u> .....	15
<u>TABLE OF RECOMMENDATIONS</u> .....	18
<u>Algorithm Bedwetting</u> .....	19
<u>FULL GUIDELINE</u> .....	20
<u>Prognosis and Impact</u> .....	20
<u>Pathophysiology</u> .....	21
<u>Differential Diagnosis? - What else might it be? <sup>2</sup></u> .....	22
<u>Evaluation</u> .....	22
<u>Goals of Management</u> .....	23
<u>EVIDENCE BASED RECOMMENDATIONS FOR MANAGEMENT</u> .....	24
<u>General issues</u> .....	24
<u>Behavioural Interventions</u> .....	24
<u>Alarm based Interventions</u> .....	26
<u>Pharmaceutical Interventions</u> .....	28
<u>Other Therapies</u> .....	31
<u>Gaps Between Evidence and Current Practice</u> .....	32
<u>Performance Indicators</u> .....	34
<u>Education and Self Management</u> .....	35
<u>Management of Nocturnal Enuresis in the Maori Community</u> .....	36
<u>Management of Nocturnal Enuresis in other Communities</u> .....	36
<u>Ongoing research</u> .....	37
<u>Implementation Strategy for this Guideline</u> .....	37
<u>References</u> .....	38

## **PURPOSE OF THE GUIDELINE**

This guideline addresses the assessment, diagnosis and management of uncomplicated nocturnal enuresis in children over seven years inclusive.

The guideline summarises the latest international literature and combines this with New Zealand expertise. The purpose is to assist informed decision making by parents/caregivers and their health care providers in order to improve the health outcomes for children and young people with enuresis.

Similar principles may apply to adults who are still bedwetting, but the issues for adults are not specifically addressed.

This guideline does not address other forms of incontinence such as daytime wetting or children with organic pathology.

## **ABOUT THE GUIDELINE**

### **FOREWORD**

The Paediatric Society of New Zealand Inc (PSNZ) is a not-for-profit charitable organisation. It was founded in 1947 in recognition of the special developmental and health needs of children. Until 2000 it remained largely a professional support organisation for paediatricians. In 2000 it moved to become a multidisciplinary organisation in recognition of the crucial role played by all groups of child health professionals in achieving its mission. PSNZ is committed to improving the health of children and young people. As a multi-disciplinary Society we are able to develop and influence pathways for improvement.

*“HEALTH OF OUR CHILDREN: WEALTH OF OUR NATION.”*

*The PSNZ is a national organisation working to:*

- be consistent with the UN Convention on the Rights of the Child
- advocate for the health, well-being and social environment of children and young people
- plan for the development of all aspects of health care for children and young people and consider how services inter-link with each other
- promote quality health care and disease prevention initiatives for children and young people
- establish standards, guidelines and position statements
- provide and publish information for health care professionals and the public on matters that concern the health and welfare of children and young people.

## **GUIDELINE DEVELOPMENT PROCESS**

In 2001 the PSNZ received a contract from the Ministry of Health requiring various outputs including the development of evidence based guidelines for common conditions. The Society undertook an internal prioritisation process and the guideline for the management of enuresis was identified as one of the five to be developed.

A multidisciplinary group of professionals and consumers was convened to develop the guideline.

The guideline development team identified the clinical questions and strategies for a systematic search and inclusion criteria for studies relating to the following:

1. diagnosis of nocturnal enuresis
2. education and patient self management
3. non pharmaceutical strategies
4. pharmaceutical therapies

A systematic review of the literature published on nocturnal enuresis was undertaken in 2004 by the New Zealand Health Technology Assessment Group (NZHTA) and by members of the working group. *Recommendations were based on evidence available from randomized controlled trials (RCT) and systematic reviews. Where there was a lack of evidence from the high quality quantitative and qualitative studies, recommendations were based on the best available evidence or expert opinion.*

The guideline group concentrated on contemporary high quality systematic reviews and comparable guidelines, referring to specific studies as required.

The systematic reviews are of high quality but individual trials were usually small and of poor quality. Small numbers, lack of controls, selection bias, and lack of long term follow up was the norm rather than the exception.

Recent high quality comprehensive systematic reviews from the Cochrane Database provided an excellent foundation for evidence based management. These included:

Glazener, C.M.A. Evans JHC Peto RE (last update 2003) Simple behavioural and physical interventions for nocturnal enuresis in children (Cochrane Review). The Cochrane Database of Systematic Reviews. The Cochrane Library volume (1) 2004.

Glazener, C.M.A. Evans JHC Peto RE (last update 2003) Complex behavioural and educational interventions for nocturnal enuresis in children (Cochrane Review). The Cochrane Database of Systematic Reviews. The Cochrane Library volume (1) 2004.

Glazener, C.M.A. Evans JHC Peto RE (last update 2003) Alarm interventions for nocturnal enuresis in children (Cochrane Review). The Cochrane Database of Systematic Reviews. The Cochrane Library volume (1) 2004.

Glazener, C.M.A. Evans JHC Peto RE (last update 2003) Desmopressin for nocturnal enuresis in children (Cochrane Review). The Cochrane Database of Systematic Reviews. The Cochrane Library volume (1) 2004.

Glazener, C.M.A. Evans JHC Peto RE (last update 2003) Tricyclic and related drugs for nocturnal enuresis in children (Cochrane Review). The Cochrane Database of Systematic Reviews. The Cochrane Library volume (1) 2004.

Glazener, C.M.A. Evans JHC Peto RE (last update 2003) Drugs for nocturnal enuresis in children (other than desmopressin and tricyclics)(Cochrane Review). (Cochrane Review). The Cochrane Database of Systematic Reviews. The Cochrane Library volume (1) 2004.

Recent reviews and guidelines were appraised for quality and process using the AGREE instrument. These selected guidelines reviewed literature published between 2001 and 2004.

Hjalmas, K.; Arnould, T.; Bower, W.; Caione, P.; Chiozza, L. M.; von Gontard, A.; Han, S. W.; Husman, D. A.; Kawauchi, A.; Lackgren, G.; Lottmann, H.; Mark, S.; Rittig, S.; Robson, L.; Walle, J. Vande; Yeung, C. K. Nocturnal Enuresis: an international evidence based management strategy [Review Article] *Journal of Urology*, June 2004;171(6, Part 2 of 2): 2545-2561

Fritz G, Rockney R, Bernet W, Arnold V, Beitchman J, Benson RS, Bukstein O, Kinlan J, McClellan J, Rue D, Shaw JA, Stock S, Kroeger Ptakowski K; Work Group on Quality Issues; AACAP. Practice parameter for the assessment and treatment of children and adolescents with enuresis. *J Am Acad Child Adolesc Psychiatry*. 2004 Dec;43(12):1540-50. Review

Glazener, C.M.A. Evans JHC Peto RE Treating nocturnal enuresis in children. *Effective Health Care Bulletin*, University of York. Vol 8 (2) 2003 ISSN: 0965-0288 <http://www.york.ac.uk/inst/crd/ehc82.pdf>

Lyth N, Bosson S Nocturnal enuresis. *Clin Evid* 2004;12:508–517.  
<http://www.clinicalevidence.org/ceweb/conditions/chd/0305/0305.jsp>  
Search date February 2003

Yeung CK Nocturnal enuresis (bedwetting) *Current Opinion in Urology* 2003, 13:337–343

Prodigy guidance on enuresis National Health Service (NHS) UK.  
[http://www.prodigy.nhs.uk/guidance.asp?gt=Enuresis - nocturnal](http://www.prodigy.nhs.uk/guidance.asp?gt=Enuresis%20-%20nocturnal)  
Issued Sep 2004. Last revision August 2002.

Evans JHC Evidence based paediatrics: Evidence based management of nocturnal enuresis. *BMJ* 2001;323:17

## EVIDENCE AND RECOMMENDATION GRADING SYSTEM USED FOR THIS GUIDELINE:

The **Scottish Intercollegiate Guidelines Network (SIGN)**. The SIGN Grading System for Recommendations in Evidence-Based Clinical Guidelines is a revised version of the system developed by the US Agency for Health Care Policy and Research (AHCPR). More information on this grading system can be found at [www.sign.ac.uk](http://www.sign.ac.uk)

### SIGN LEVELS OF EVIDENCE

<b>1++</b>	High quality meta-analyses, systematic reviews of RCTs, or RCTs with a very low risk of bias
<b>1+</b>	Well conducted meta-analyses, systematic reviews of RCTs, or RCTs with a low risk of bias
<b>1 -</b>	Meta-analyses, systematic reviews of RCTs, or RCTs with a high risk of bias
<b>2++</b>	High quality systematic reviews of case-control or cohort Studies High quality case-control or cohort studies with a very low risk of confounding, bias, or chance and a high probability that the relationship is causal
<b>2+</b>	Well conducted case control or cohort studies with a low risk of confounding, bias, or chance and a moderate probability that the relationship is causal
<b>2-</b>	Case control or cohort studies with a high risk of confounding or bias and a significant risk that the relationship is not causal
<b>3</b>	Non-analytic studies, e.g. case reports, case series
<b>4</b>	Expert opinion

### SIGN GRADES OF RECOMMENDATION

<b>A</b>	At least one meta analysis, systematic review, or RCT rated as 1 ++, and directly applicable to the target population; OR A systematic review of RCTs or a body of evidence consisting principally of studies rated as 1+, directly applicable to the target population, and demonstrating overall consistency of results
<b>B</b>	A body of evidence including studies rated as 2++, directly applicable to the target population, and demonstrating overall consistency of results; OR Extrapolated evidence from studies rated as 1++ or 1+
<b>C</b>	A body of evidence including studies rated as 2 +, directly applicable to the target population and demonstrating overall consistency of results; OR Extrapolated evidence from studies rated as 2++
<b>D</b>	Evidence level 3 or 4: or Extrapolated evidence from studies rated at 2+

### GOOD PRACTICE POINTS

<input checked="" type="checkbox"/>	Recommended best Practice based on the clinical experience of the guideline development group
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The authors responsible for drafting each section of the guideline graded the evidence for each individual section. The whole group carefully reviewed the summary of conclusions and recommendations and any disagreements were resolved by consensus. The guideline was collated and edited by the project manager.

## CONSULTATION

A draft guideline was circulated to more than 60 organisations and individuals, and to all members of the Paediatric Society. It was made available on:

[www.paediatrics.org.nz](http://www.paediatrics.org.nz).

Comments were received from:

Beavis Jacqui	Paediatric Pharmacist Standing Committee
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CEO Paediatric Society

## **DECLARATIONS OF COMPETING INTERESTS**

Karen Lane                      Member of KEEA Committee

Shirley Reid                      Reimbursement for attending a symposium including travel support and sponsorship Presentation of KEEA at NZCA Education day Nov 2002. Reimbursement of travel and accommodation costs.

Funding for research. August 2003 received \$500.00 Nerf Grant (Nursing Education Research Grant) to set up a database of where the bed alarms are around New Zealand.

Funding for publication. Answered questions on health page for Little Treasures and "about kids" magazines. Small payment for these.

Rex Brown                      Bedwetting Solutions Shareholder/Director  
Drop Stop Alarms: design and construction of alarms for treatment of nocturnal enuresis

Kristina Dickens                      Bedwetting Solutions Self employed  
Bedwetting Solutions Shareholder

## **FUNDING:**

This guideline was developed by the Paediatric Society of New Zealand and funded through its contract with the Ministry of Health. We are grateful to Ferring Pharmaceuticals for their financial support for expenses related to the guideline development. In provision of this support Ferring Pharmaceuticals took no part in meetings, were not privy to any information in the process of the development of the guideline and received no minutes or drafts of the guideline. The guideline group was at all times independent of any influence of Ferring Pharmaceuticals. The guideline remains editorially unbiased.

## **ACKNOWLEDGMENTS.**

We are very grateful to all members of the Guideline Development Team for their contributions.

The guideline team thanks Susan Bidwell of NZHTA for her work and advice. Thanks also to Catherine Marshall and Rowena Cave of NZGG for their support and advice in developing this guideline

This guideline is dedicated to the memory of Shirley Reid. The contribution and support she gave to the development of this guideline and her advocacy for children and families is greatly appreciated.

## **CURRENCY**

**This Guideline has a currency of 5 years from date of publication unless superseded.**

It is intended that this guideline should be reviewed in 2010. Interim modifications will be made to the on-line version of the guideline when needed. The process for review will be the standard NZGG process: a guideline review group will be convened to conduct a brief literature review to evaluate the validity of the content. Following the review, a recommendation will be made which will be either:

- to set a further review date, if the contents are found to be still current; or
- to update the guideline – that is to modify some details (such as medication details) to bring the contents up to date with minor changes in practice; or
- to fully revise the guideline – if major changes in practice or guideline structure are identified that need to be incorporated or improved.

The process for updating or revision will be in accordance with NZGG policy and practice at that time, as detailed on the web site at [www.nzgg.org.nz](http://www.nzgg.org.nz) or contact [info@nzgg.org.nz](mailto:info@nzgg.org.nz)

As this guideline was developed by the Paediatric Society under contract with the Ministry of Health the review of the guideline remains the responsibility of the Ministry of Health.

## **MONOSYMPOMATIC NOCTURNAL ENURESIS (MNE) - BEDWETTING**

### **DEFINITIONS:**

Terminology used is in accordance with guidelines from International Children's Continence Society (ICCS)<sup>1</sup>

<b>Enuresis</b>	Involuntary loss of urine by day or night or both, in a child aged five years or older, in the absence of congenital or acquired defects of the nervous system or urinary tract.
<b>Nocturnal enuresis (NE) or bedwetting</b>	Passing of urine while asleep. A child five to six years old should have two or more bed-wetting episodes per month, and a child >6 should have one or more episodes per month.
<b>Diurnal enuresis or daytime wetting or incontinence</b>	Leakage of urine during the day
<b>Primary nocturnal enuresis (PNE)</b>	Bedwetting in a child who has never been dry
<b>Secondary nocturnal enuresis (SNE)</b>	Bedwetting in a child who has had at least 6 months of night time dryness. Almost all children with enuresis have dry nights from time to time
<b>Monosymptomatic or uncomplicated nocturnal enuresis (MNE)</b>	Normal voiding occurring during sleep in the absence of other symptoms referable to the urogenital or gastrointestinal tract
<b>Polysymptomatic or complicated nocturnal enuresis</b>	Bed-wetting associated with symptoms suggestive of lower urinary tract dysfunction e.g. overactive bladder (OAB) or organic pathology - daytime incontinence, urgency, frequency, urinary tract infection (UTI), chronic constipation, faecal soiling.

### **ABBREVIATIONS**

ADH:	Antidiuretic Hormone
ADHD:	Attention deficit disorder
CI:	Confidence interval
DHB:	District Health Board
OAB:	Overactive Bladder
PIL:	Patient Information Leaflet
RCT:	Randomised Controlled Trial
UTI:	Urinary Tract Infection

## KEY SUMMARY MESSAGES

Nocturnal Enuresis is a common condition with a spontaneous cure rate of about 15% per annum.

It is a heterogeneous disorder that requires careful evaluation.

There may be a significant impact on child and family and they may not be aware that there is effective treatment. It is usually possible to help the child achieve dryness even if previous attempts have failed.

The child and the parents/caregivers need simple practical advice and a management plan adapted to their needs and circumstances including coping strategies for embarrassment, stress, anxiety, and guilt in the child and the parents.

<b>Recommendation</b>	<b>Grade</b>
<b>Daytime symptoms should be actively sought and managed before addressing nocturnal enuresis</b>	<b>C</b>
<b>No active treatment may be appropriate where child and parents do not find the symptoms bothersome, or the child is under 7 years.</b>	<input checked="" type="checkbox"/>
<b>Supportive approaches should always include education and demystification, ensuring that parents do not punish the child for enuretic episodes.</b>	<b>B</b>

## SIMPLE INTERVENTIONS

<b>Simple behavioural methods rewarding desired behaviours should be tried before alarms or drugs.</b>	<b>B</b>
<b>Journal keeping with simple reinforcement schedules with rewards should be tried</b>	<b>B</b>
<b>A scheduled waking programme may be used</b>	<b>B</b>
<b>Lifting should be replaced by scheduled waking.</b>	<b>C</b>
<b>Retention control training (RCT) is NOT recommended as initial treatment</b>	<b>B</b>
<b>Caffeinated drinks and alcohol should be avoided before retiring</b>	<b>B</b>
<b>Dry Bed Training (DBT) is NOT recommended as initial treatment</b>	<b>B</b>
<b>Constipation should be actively sought and managed</b>	<b>B</b>

## ALARM BASED INTERVENTIONS

Supported enuresis alarm programme is recommended for the treatment of nocturnal enuresis	A
Children should be encouraged to drink extra fluid (overlearning) when dryness has been achieved for 14 nights.	B
Supported enuresis alarm programme should be offered promptly to children who relapse	A

## MEDICATIONS

Desmopressin is recommended as a temporary measure for nights spent away from home (e.g. school trips) Anticipatory use may be needed for planned nights away.	A
The lowest effective dose of desmopressin should be used	B
Risk of water intoxication should be minimised by restricting evening fluid intake on the nights that desmopressin is used.	B
Desmopressin is recommended as adjunct to alarm therapy if required to assist family coping	C
Long term desmopressin should be considered for children who failed to respond to the alarm programme or find it unacceptable.	A
Specialist review is recommended for children considering long term desmopressin	<input checked="" type="checkbox"/>
Tricyclic antidepressants should NOT be used in nocturnal enuresis	A
Drugs other than desmopressin are NOT recommended as initial therapy	B
Oxybutynin may be considered in patients with bladder instability or in desmopressin non-responders	B

## OTHER THERAPIES

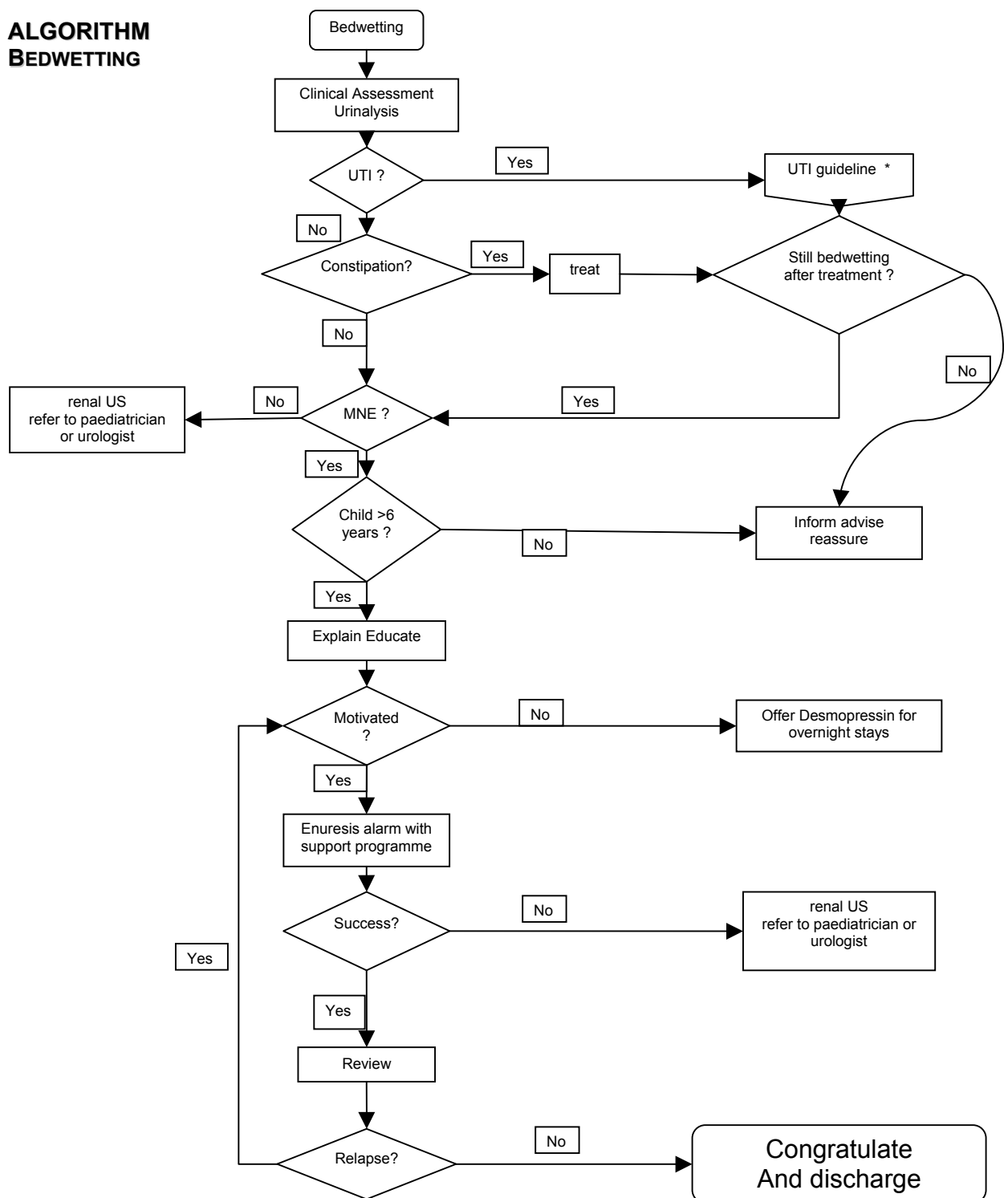
<b>Psychotherapy is indicated for a specific psychological issue</b>	<b>B</b>
<b>Surgical remediation of upper airway obstruction may cure nocturnal enuresis</b>	<b>C</b>
<b>Children over 7 years may benefit from autosuggestion</b>	<b>B</b>
<b>A trial of a low calcium diet is recommended for Non responders with a high urinary calcium: creatinine ratio.</b>	<b>B</b>
<b>If available, ultrasound treatment may benefit non responders</b>	<b>C</b>
<b>If available, Laser acupuncture is a treatment option for children with nocturnal enuresis.</b>	<b>B</b>

## TABLE OF RECOMMENDATIONS

Management	Recommended	May be considered	Not recommended	Contraindicated
Enuresis alarm program as initial management	✓			
Enuresis alarm program for relapse	✓			
Overlearning with Enuresis alarm program	✓			
Desmopressin for overnight stays	✓			
Exclude caffeine and alcohol in evenings	✓			
Address Upper airway obstruction	✓			
Address Constipation	✓			
Long term desmopressin for alarm failure		✓		
Oxybutynin for overactive bladder symptoms		✓		
Scheduled wakening		✓		
Reward schedules		✓		
Psychotherapy for specific issues		✓		
Auto suggestion		✓		
Low calcium diet for hypercalciuric non responders		✓		
Trial of ultrasound for non responders		Unknown availability		
Laser acupuncture for non responders		Unknown availability		
Desmopressin as adjunct to alarm program			✓	
Lifting			✓	
Retention control training			✓	
Dry bed training			✓	
Other drugs			✓	
Tricyclic antidepressant				✓

## Algorithm - Bedwetting

### ALGORITHM BEDWETTING



\* **Diagnosing urinary tract infection (UTI) in the under fives**  
 Conducted by: CRD, the Centre for Health Economics and the Department of  
 Health Sciences at the University of York Commissioned by: NICE EHC Bulletin  
 v.8(6) <http://www.york.ac.uk/inst/crd/ehc86.pdf>

## MONOSYMPOMATIC NOCTURNAL ENURESIS (MNE) - BEDWETTING

### Full guideline

#### EPIDEMIOLOGY

##### PREVALENCE OF NE - HOW COMMON IS IT?<sup>2</sup>

- **Bedwetting** is common but reduces with age: It affects approximately...
  - 15% of 5-year-olds
  - 5% of 10-year-olds
  - 2% of 15-year-olds
  - 1% of adults

New Zealand cohort studies revealed comparable prevalence.<sup>3</sup> Therefore most management strategies are aimed at children 7 years or older.

- **The spontaneous cure rate** for nocturnal enuresis is about 15% per annum and is independent of age.
- **Under 13 years of age** about twice as many boys as girls have nocturnal enuresis. Above 13 years it is more frequent in girls.
- **Less than half of parents with a bedwetting child** consult a doctor about the problem.
- **Cultural and social differences** Prevalence is probably comparable in all cultural groups however threshold at which professional help is sought differs and children from deprived areas are less likely to be brought to medical attention.

#### PROGNOSIS AND IMPACT

- **PROGNOSIS**
- **Spontaneous remission** (without treatment) occurs in about 15% of children each year.
- **Relapse rate** after all forms of treatment (overall) is 10-20%.
- **Impact**
- **Child:** The distress and disability of bedwetting increases as the child gets older. Repercussions include humiliation, bewilderment, loss of self esteem, avoidance or embarrassment at sleepovers or school camps and bedroom smell. Scholastic underachievement and later sexual activity may also be affected.<sup>4</sup>

**Parent/caregiver:** The work and cost of extra laundry and the additional stress of caring for a child with enuresis can cause parent and caregiver anxiety and guilt. Greatest maternal concerns were emotional impact, social relationships, smell, laundry and financial aspects. Reported rates of punishment are 20-30% with increased risk of physical abuse.<sup>4</sup>

**CAUSATIVE FACTORS AND ASSOCIATIONS**

**Genetic:** Nocturnal enuresis is a common but heterogeneous disorder. Autosomal dominant transmission with high penetrance (90%) occurs in just under half of affected families while 1/3 are sporadic. Linkage studies in nocturnal enuresis have identified gene loci on chromosomes 8q, 12q (ENUR2), 13q(ENUR1), 22q11 and existence of others is presumed. There is no specific association between loci and subtype of enuresis. The most likely candidate genes have been excluded eg arginine vasopressin, aquaporin 2 water channel and TRH degrading enzyme, GUCY1B2 (β 2 subunit of human guanyl cyclase), exons of GNAZ (G protein, α-z polypeptide) (chromosome 22),

About 70% of bedwetting children have a sibling or parent who was late in becoming dry. Offspring have a 44% and 77% risk of MNE if they have one or two parents who had enuresis respectively. <sup>5</sup>

**Stressful life events:** Birth of a younger sibling, hospital admission with separation from the mother, discord in the family, starting a new school, bullying, moving house, and (rarely) sexual abuse are associated with bedwetting. However, the older the child, the more likely it is that bedwetting itself is the cause of distress.

**Diuretic drinks:** bedwetting may be associated with alcohol or food and drinks containing methylxanthines, e.g. tea, coffee, cola, chocolate, etc. <sup>6</sup>

**Constipation:** faecal loading with or without soiling reduces functional bladder capacity and leads to bladder overactivity (OAB) resulting in more frequent voiding. Appropriate treatment cures associated enuresis in 60% (level of evidence 2+ grade of recommendation B) <sup>7</sup>

<b>Constipation should be actively sought and managed</b>	<b>B</b>
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**Urinary tract infection** may cause secondary nocturnal enuresis or daytime wetting.

**Upper airway obstruction:** sleep apnoea is a rare cause of bedwetting. Surgical remediation may cure nocturnal enuresis. <sup>8 9</sup> (level of evidence 2- grade of recommendation C)

<b>Surgical remediation of upper airway obstruction may cure nocturnal enuresis</b>	<b>C</b>
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**Organic pathology:** NE is rarely due to other organic disease. In contrast, daytime wetting has a stronger association with organic pathology.

**PATHOPHYSIOLOGY**

**Bladder function and capacity:** Small functional bladder capacity and unstable detrusor contractions may be responsible in a significant minority of children with NE. This may be isolated to night time or be associated with symptoms of Overactive Bladder (OAB) during the day.

**Arousal:** Although there is no empirical evidence of abnormal sleep, poor arousal to a full bladder is a prerequisite for NE. There is speculation that arousal to bladder

distension and nocturnal ADH releases are connected, as the locus coeruleus in the brain stem plays a role in both. <sup>10 11</sup>

**Delayed physiological maturation:** Bladder control is associated with developmental progress but there is conflicting evidence on the association of uncomplicated MNE with developmental delay.

**High nocturnal urine production:** As toddlers develop continence, nocturnal ADH secretion increases and low volumes of urine are produced at night. The circadian rhythm may not be seen in some children with NE who therefore produce relatively large amounts of urine at night.

Another subset of MNE with polyuria has nocturnal absorptive hypercalciuria and aquaporin 2 (AQP2) dysfunction. They may be non responsive to treatment but may respond to low calcium diet. <sup>12 13</sup> (level of evidence 2+, grade of recommendation B)

<b>A trial of a low calcium diet is recommended for Non responders with a high urinary calcium: creatinine ratio.</b>	<b>B</b>
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**Behavioural problems:** MNE is the cause rather than the result of low self esteem and psychological distress, these resolve with successful management. Behavioural problems are more common in girls and in children with complicated NE who wet both day and night. There is a non-specific association between attention deficit disorder with hyperactivity (ADHD) and both night/day wetting. <sup>14</sup>

**Toilet training practice:** there is no evidence that early potty training prevents bedwetting. <sup>15</sup>

## **DIFFERENTIAL DIAGNOSIS? - WHAT ELSE MIGHT IT BE? <sup>2</sup>**

**Urinary tract infection and other acute illness** can cause short periods of bedwetting in someone who has previously been dry.

**Diabetes mellitus, diabetes insipidus, renal failure** - usually other symptoms e.g. polyuria, excessive thirst etc.

**Chronic constipation** may result in bladder instability. Careful history is required and a plain AP radiograph of the abdomen may assist in convincing the family and child of the need to treat.

**Bladder instability** or other cause of daytime incontinence with a nocturnal component. Daytime symptoms should be treated first. <sup>16</sup> (level of evidence 2- grade of recommendation C)

<b>Daytime symptoms should be actively sought and managed before addressing nocturnal enuresis</b>	<b>C</b>
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**Congenital abnormality of the urinary tract**, e.g. an ectopic ureter (girls) or posterior urethral valves (boys).

**Neurological disorder** e.g. spina bifida occulta.

## **Evaluation**

Diagnosis of Monosymptomatic nocturnal enuresis and exclusion of organic pathology is usually made on careful history and examination.

The following information will help establish the diagnosis, rule out other conditions and determine urgency of management:

### History

- Bedwetting and/or daytime wetting? Number of dry nights in past week/month? Waking after wetting?
- Never has been dry? Or enuresis after being dry for a significant period (after the age of 3 years)?
- Self-care abilities? Conscious of need to urinate? Able to 'hold on'? Able to empty bladder? Able to hold a reasonable amount of fluid in the bladder? Able to sit on toilet?
- Fears associated with toilet? Restricted access to toilet? Fear of dark?
- Pattern of micturition (strong stream, no hesitation or dribbling, urgency, abnormal frequency, (<4 or >7 voids per day) dysuria)?
- Fluid intake (theophylline for asthma, caffeinated drinks or alcohol)?
- Soiling, constipation?
- Snoring or sleep apnoea?
- Family history?
- Developmental history?
- Stresses in the home?
- Impact of bedwetting on child and on family? Attitudes of parents/caregivers? Domestic violence?
- Past medical history, including previous urinary tract infections?
- Treatment strategies already tried (including punishments and rewards)?

### Examination

Examination is normal in nocturnal enuresis. Screen abdomen, perineum, spine and lower limb neurology for obvious signs of other possible conditions. Embarrassing elements of the examination may be delayed until rapport is established.

### INVESTIGATIONS

**Urine dipstick and urine culture** (exclude infection, diabetes mellitus).

**Ultrasound examination of the kidneys and urinary tract:** consider in children who wet during the day, after UTI or NE unresponsive to treatment.<sup>2</sup>

### Goals of Management

- To attain sustained night-time dryness (so-called 'complete success').
- To avoid anxiety and emotional stress in children and their parents caused by nocturnal enuresis or associated management.

### OUTCOME MEASURES<sup>17</sup>

- **Initial success:** 14 consecutive dry nights within a 16-week treatment period
- **Lack of success:** failure to achieve 'initial success' - excludes withdrawals

- **Withdrawals:** children who fail to attend two consecutive appointments without notice, or who discontinue treatment
- **Relapse:** more than two wet nights in a 2-week period
- **Continued success:** no relapse for 6 months following initial success
- **Complete success:** no relapse for 2 years following initial success

## EVIDENCE BASED RECOMMENDATIONS FOR MANAGEMENT

### GENERAL ISSUES

- The child and the parents/caregivers need a management plan adapted to their needs and circumstances.
- **Provide information** to reassure, encourage, and support child and parents. (PIL Bedwetting - Nocturnal enuresis - What can we do?)
- **Explain** that it is usually possible to help the child achieve dryness even if previous attempts have failed.
- **Information** about the strong family tendency, high prevalence, and spontaneous cure rate provides child and family with hope: they are not alone and the child will get better.
- **Severity of impact determines urgency and intensity of treatment.**
- **No active treatment** may be appropriate where child and parents do not find the symptoms bothersome, or the child is under 7 years.
- **Children over 10 years should be given priority** as bedwetting after the age of 10 is associated with small but significant increases in behavioural problems.
- **Provide coping strategies** for embarrassment, stress, anxiety, and guilt in the child and the parents.
- **Simple practical advice** from common sense includes:
  - Empty the bladder at bedtime.
  - improve the child's access to the toilet (e.g. child to sleep in the lower bed of a bunk bed; leave a light on at night; have a torch within reach; or have a potty under the bed)
  - involve the child in cleaning up after wetting so they can share responsibility (not to be punished)
  - use waterproof covers for mattress and duvet; use absorbent quilted sheets
  - thoroughly wash child before dressing, including hair if very wet
  - use simple emollients to protect from chafing
  - rinse bedding and night clothes in cold water or mild bleach
  - use room deodorizers

### BEHAVIOURAL INTERVENTIONS

<b>Simple behavioural interventions should be tried before alarms or drugs.</b>	<b>B</b>
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<b>Supportive approaches should always include education and demystification, ensuring that parents do not punish the child for enuretic episodes.</b>	<b>B</b>
<b>Journal keeping with simple reinforcement schedules with rewards should be tried</b>	<b>B</b>

Simple behavioural methods are frequently used and more effective than no treatment for some children. Further trials are needed in comparison with treatments known to be effective.<sup>18</sup> (level of evidence 1- grade of recommendation B)

Behavioural interventions assume that the ability to remain dry at night is a learned response achievable by psychological conditioning techniques. These include fluid restriction, lifting, waking and reward systems (e.g. star charts).

Supportive approaches should always include education, demystification, and ensuring that parents do not punish the child for enuretic episodes. Teaching families to reward dry nights, avoid punishment for wet nights and waking the child to void after going to sleep appears to be significantly better than doing nothing or giving therapy that is not related to the enuresis.

### **Star charts and other reward systems**

These use positive reinforcement to encourage a desired behaviour. If remaining dry is too ambitious, an intermediate goal may be going to the toilet. These schemes should be negotiated with the child and family. The aim is to positively reinforce dry nights and to reduce the negative emphasis on wet beds. Unless used with care, a child may feel a failure if reward is not attained. (PIL Using Rewards)<sup>18 2</sup>

### **Fluid restriction**

<b>Caffeinated drinks and alcohol should be avoided before retiring</b>	<b>B</b>
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General fluid restriction is frequently used by parents but may aggravate a low functional bladder capacity. It is advisable to restrict drinks with diuretic properties such as caffeinated drinks and alcohol before bedtime.<sup>19</sup> (level of evidence 2+ grade of recommendation B)

### **Scheduled waking and Lifting**

<b>A scheduled waking programme may be used</b>	<b>B</b>
<b>Lifting should be replaced by scheduled waking.</b>	<b>C</b>

**Scheduled waking** involves waking the child to allow them to get up and urinate. A scheduled waking programme may be used with the child being woken progressively earlier after dry nights until the interval between going to bed and scheduled waking is one hour. Older individuals may use an alarm clock to wake themselves.<sup>20</sup> (level of evidence 1- grade of recommendation B)

**Lifting.** In 'lifting', carers pick up the child, while still asleep, from the bed to allow them to urinate in an appropriate place. It is effective in some children but may be counterproductive as child is denied opportunity to learn sensation of a full bladder and is encouraged to urinate without waking, sometimes conditioned to void on carer's approach. Lifting should be replaced by scheduled waking.<sup>18</sup>

## Psychotherapy

<b>Psychotherapy is indicated when a specific psychological issue is associated with secondary enuresis or enuresis is maintained by a control struggle between parent and child.</b>	<b>B</b>
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Enuresis itself does not constitute an indication for psychotherapy beyond supportive counselling and psychosocial problems directly contributory to enuresis (as opposed to co-occurring with or resulting from bedwetting) are rare. Psychotherapy is indicated when a specific psychological issue is associated with secondary enuresis or enuresis is maintained by a control struggle between parent and child. Individual psychotherapy, crisis intervention, or family therapy may be effective treatment where there are underlying psychological problems, family disorganization or neglect.

Typical disorders associated with enuresis that may be amenable to psychotherapy include a situational reaction with prolonged regressive symptoms, a posttraumatic stress response, a separation-individuation conflict between the parent and child in which the wet bed is the focus, and certain impulse disorders of adolescents.<sup>14</sup>

## Retention control training (RCT)

<b>Retention control training is onerous and NOT recommended as initial treatment.</b>	<b>B</b>
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Aims to increase functional bladder capacity by using exercises during the day such as delaying urination for extended periods of time often with increased fluid intake and stream interruption exercises. What little evidence there is suggests this is less effective than dry bed training or alarms. RCT is onerous for many children and not recommended as initial treatment.<sup>21</sup> (Level of evidence 1- grade of recommendation B) Holding exercises may be detrimental in dysfunctional voiding.

## Dry Bed Training (DBT)

<b>Dry Bed Training (DBT) is NOT recommended as initial management</b>	<b>B</b>
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Dry bed training was initially developed by Azrin in the 1970s for use with adults with learning disabilities. The original schedule involved an intensive training night, during which the patient was woken every hour and taken to the toilet. If an accident occurred, reprimands consisting of 45 minutes of 'cleanliness training' (changing the bed) and 'positive practice' (patient practices getting up and going to the toilet about nine times) were implemented. On subsequent nights, the individual was woken once and taken to the toilet, this nightly 'waking' occurring progressively earlier. Modified DBT forgo the reprimands and positive practice elements.

Evidence supporting DBT without an alarm was inconclusive. Studies suggest alarm rather than DBT is important. Combination of DBT plus alarm might be better than alarm on its own, suggesting that DBT may have an additive effect although the data came from only two small trials. Families found DBT onerous. DBT is not recommended as initial treatment.<sup>21</sup> (level of evidence 1- grade of recommendation B)

## ALARM BASED INTERVENTIONS

<b>Enuresis alarm programs are the treatment of choice in motivated</b>	<b>A</b>
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<b>children over 7 years</b>	
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Enuresis alarms are the treatment of choice in motivated children over 7 years, <sup>22</sup> (level of evidence 1+ grade of recommendation A).

### **Effectiveness**

Initial success rate of alarms alone is 65-80%. A child given an alarm programme is 13.3 times more likely to achieve 14 dry nights. Efficacy is better than behavioural treatments alone and relapse rate is lower than pharmacological treatments.

Effectiveness was increased by attendant support and rewards but reduced by penalties. Retention control training may be detrimental.

Alarms are usually needed for 3-5 months. Simultaneous support from health professional (e.g. public health nurse, GP, practice nurse, health visitor, enuresis clinic, enuresis advisor,) is needed over this time. Alarm may be discontinued when there have been 14 consecutive dry nights.

### **Overlearning**

<b>Children should be encouraged to drink extra fluid (overlearning) when dryness has been achieved for 14 nights.</b>	<b>B</b>
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'Overlearning' reduces rate of relapse (from 49% to 25%). When dryness has been achieved for 14 consecutive nights the child is encouraged to drink extra fluid to 'over-condition' the bladder. This is continued until there have been 7 to 14 consecutive dry nights. There is a risk that breakthrough bedwetting may lead to a loss in confidence. <sup>22</sup> (Level of evidence 2+ grade of recommendation B).

Supplementing alarms with desmopressin decreased the initial number of wet nights in two trials, but success rates while on treatment or afterwards were not significantly different compared to an alarm alone. There was insufficient information about supplementing alarms with tricyclics. <sup>22</sup>

### **Relapse**

<b>Supported enuresis alarm programme should be offered promptly to children who relapse</b>	<b>A</b>
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Relapse rates are between 30 and 50% and less with adequate support.

Retreatment after relapse has a success rate similar to that of initial treatment with an alarm. <sup>22</sup> (Level of evidence 1+ grade of recommendation A).

Treat relapses promptly. Relapse after initial success is a great disappointment to children. They need to be warned about this possibility before it occurs and encouraged with information about success rates with retreatment.

Enuresis alarms have a lower relapse rate compared with drugs although alarms are slower to take effect. Relapse is about 10 times more likely after desmopressin than after alarm programme. (95% CI 1-50 times).

### **Acceptability**

Withdrawal rates range from 0-30%. Acceptability of alarms is increased by a health visitor support programme in the UK and should generalise to visiting health professionals in NZ context. Families need to be aware of time needed to attain success and initial disruption. Parental intolerance, behavioural problems or child's negative self image are predictors of dropout. These may be useful for identifying which treatment is most likely to succeed, or where the chances of success may be increased by giving the family extra attention.

Alarms can be borrowed from the local public health nurse or enuresis advisor, or alternatively hired or purchased privately (PIL Enuresis alarms available in NZ)

Several types of alarm are available: pad and bell (where the sensor pad is positioned under the child in the bed); body-worn alarm (where the tiny sensor is attached to the child's pants and the alarm is worn on the pyjamas or placed remotely); or vibrating alarm. There is no evidence that one type is more effective, but children or parents may have a particular preference.

### **Harms**

Adverse events limited to minor inconvenience due to alarm malfunction or disturbance to the family. In contrast, side effects with drugs may have more serious implications. Alarms which delivered electric shocks to the skin on wetting were unacceptable, frightening the children and causing burns and ulceration.

### **Costs**

Cost to consumer varies around NZ depending on supply of alarms in the public sector and availability of private providers. Staff must be trained and resourced to teach the children and parents how to use the alarms and ensure equipment in working order and provide support during treatment. Alarms not returned to clinics require follow up. (PIL How to use a bed alarm)

## **PHARMACEUTICAL INTERVENTIONS**

**Drugs are quicker acting** than alarm systems, but relapse rate is the norm after discontinuation.

The role of drug treatment is predominantly as a short-term treatment to allow the child to recover confidence, or as a temporary measure to tide over nights spent away from home (e.g. school trips).

Drug treatments may also be useful as an adjunct to alarm treatment, as a way of easing the initial week of alarm treatment. They do not increase the efficacy of alarms.

### **Desmopressin <sup>23</sup>**

<b>Desmopressin should be offered as a temporary measure for nights spent away from home (e.g. school trips).</b>	<b>A</b>
<b>The lowest effective dose of desmopressin should be used</b>	<b>C</b>

<b>Desmopressin should only be offered as adjunct to alarm therapy if required to assist family coping.</b>	<b>C</b>
<b>Long term desmopressin should be considered for children who failed to respond to the alarm programme or find it unacceptable.</b>	<b>A</b>
<b>Specialist review is recommended for children considering long term desmopressin.</b>	<input checked="" type="checkbox"/>

**Desmopressin** is an antidiuretic. Used at night it should reduce nocturnal urine output to less than the functional bladder capacity. But this action is not sufficient to explain its action in nocturnal enuresis, since restriction of fluid alone does not appear to help and not all children with nocturnal enuresis respond to desmopressin. In most trials 60-70%.of children respond to desmopressin with 50% or greater reduction in number of wet nights.

Desmopressin reduces bed-wetting by approximately one to two wet nights per week, compared to placebo. In addition, desmopressin is almost twice as likely as placebo to achieve at least 14 consecutive dry nights. However, this improvement is not sustained after treatment stops, thus long term continence after desmopressin is discontinued is no better than placebo.

Desmopressin should be offered as a temporary measure for nights spent away from home (e.g. school trips).<sup>23</sup> (Level of evidence for desmopressin 1+ grade of recommendation A) However there were no studies to demonstrate that desmopressin is effective on the first night; anticipatory use may therefore be needed for planned nights away.

#### **Dose of desmopressin and route of administration**

Usual dose of desmopressin is 20-40 microgram intranasal or 200-400 microgram orally at bedtime. Oral and intranasal preparations are available but there is insufficient data to compare the efficacy of the two dosage forms.

There were insufficient data to reliably assess whether a higher dose of desmopressin was more effective than a lower dose. To minimise side effects and costs, the lowest effective dose should be used.<sup>23</sup> (level of evidence 2- grade of recommendation C)

Allergic rhinitis, nasal congestion, or upper respiratory tract infection will reduce intranasal drug absorption.

Presence of food may reduce oral absorption.

There is a move towards combining alarm and drug interventions. The rationale is that the rapid onset of action of drugs will augment the more gradual treatment effect of alarms. Using low doses of desmopressin as an adjunct to alarm treatment might minimise changes of bedding. The alternative argument, however, is that by using a drug to reduce the wetting, the child has fewer chances to learn behavioural control with the alarm. Desmopressin as an adjunct to alarm treatment may ease the initial weeks of alarm treatment or for giving families a break, but it is uncertain whether this helps in the long term. Desmopressin should only be offered as adjunct to alarm therapy if required to assist family coping.<sup>23</sup> (Level of evidence 2- grade of recommendation C)

Long term desmopressin should be considered for children who failed to respond to the alarm programme or find it unacceptable. It also has a place when families are failing to cope adequately with the problem especially where parental aggression is evident or likely.<sup>23</sup> (Level of evidence 1+ grade of recommendation A). Specialist

review would be appropriate. A 1-3 week interruption is recommended every 3 months to see if the problem has disappeared. Structured withdrawal strategies with positive reinforcement of increasing numbers of dry nights without medication may be more successful. Large multicentre studies are underway to assess issues related to duration of treatment and withdrawal strategy.

### Harms

<b>Risk of water intoxication should be minimised by restricting evening fluid intake on the nights that desmopressin is used.</b>	<b>B</b>
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Patients and families need to be warned about potential adverse effects associated with desmopressin. Also some may not respond.

Adverse effects include hyponatraemia with cerebral oedema and convulsions. The risk of water intoxication should be minimised by restricting evening fluid intake on the nights that desmopressin is used (PIL Desmopressin Medicines Information)

Common adverse effects with the nasal preparation are related to the delivery and include epistaxis, nasal congestion, and rhinitis.

Long-term safety (up to 1 year) was confirmed in the Swedish Enuresis Trial. It can be used in children over 5 years of age, but waiting before starting treatment until the child is over the age of 7 years is preferred.<sup>23</sup>

### Cost

- Intranasal spray is available on specialist recommendation.
- The oral formulation is not funded.

### Tricyclic antidepressants (TCAs)

<b>TCAs should NOT be used in the treatment of nocturnal enuresis.</b>	<b>A</b>
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TCAs no longer have a place in the treatment of nocturnal enuresis. (Level of evidence 1+, grade of recommendation A). Although effective the risk/benefit ratio is unfavourable.<sup>24</sup> Medsafe NZ has required removal of NE as an indication and advises TCAs are contraindicated for use in children for treatment of nocturnal enuresis. Datasheets are being updated.<sup>25</sup>

TCAs are consistently associated with increases in blood pressure, heart rate, and ECG abnormalities at normal therapeutic doses in children and adolescents. Sudden cardiac deaths associated with TCA in children have rarely been reported and are possibly idiosyncratic events. Overdose of a tricyclic antidepressant can be fatal. Adverse effects also include anorexia, anxiety, constipation, depression, diarrhoea, difficulty with micturition, convulsions and haematological reactions

Tricyclics and related drugs have similar efficacy to desmopressin in reducing the number of wet nights while on treatment. About a fifth of the children became dry while on treatment but relapse after stopping. Long-term efficacy is not known. Effective drugs include Imipramine, amitriptyline, viloxazine, clomipramine and desipramine but not mianserin. Their mode of action is unclear, although it is thought to be the anticholinergic effects or effects on arousal and not their antidepressant action.<sup>24</sup>

### OTHER MEDICATIONS

<b>Indomethacin, diclofenac and diazepam are not recommended as initial therapy for children with NE</b>	<b>B</b>
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<b>Oxybutynin should be considered in patients with bladder instability or in desmopressin non-responders</b>	<b>C</b>
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Oxybutynin in uncomplicated nocturnal enuresis is not supported by clinical trials. It may be useful in patients with daytime wetting suggestive of bladder instability or in desmopressin non-responders. <sup>26</sup> (Level of evidence 2- Grade of recommendation C)

Trial results for only three other drugs were better than placebo during treatment (indomethacin, diclofenac and diazepam), both in terms of fewer wet nights and more children cured, but there was no information about what happened after treatment stopped. None performed better than desmopressin or alarms. None are recommended as initial therapy. (Level of evidence 2+ Grade of recommendation B)

**OTHER THERAPIES**

**Hypnosis**

<b>Children over 7 years may benefit from autosuggestion.</b>	<b>B</b>
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In a case comparison trial imipramine was compared to hypnotic suggestions with imagery used for management of nocturnal enuresis. Enuretic children, ranging from 5 to 16 years, underwent 3 months of therapy with imipramine (N = 25) or hypnosis (N = 25). Self-hypnosis continued daily for another 6 months in hypnosis group. Patients treated with imipramine had 76% positive response (all dry beds); for patients treated with hypnotic strategies, 72% responded positively. At 9-month follow-up, 68% of patients in the hypnosis group maintained a positive response compared to only 24% of imipramine group. Hypnosis and self-hypnosis strategies were less effective in children under 7. Older children may benefit from visualising themselves going to toilet and returning to a warm dry bed. <sup>27 24</sup> (level of evidence 2++ grade of recommendation B)

**Ultrasound**

<b>If available, ultrasound treatment could be offered to children with MNE unresponsive to alarms programs.</b>	<b>C</b>
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One small controlled trial (n=35 PNE, aged 6–14 years) comparing ultrasound (27 children) vs control (8 children treated without the apparatus being switched on). Ultrasound treatment was applied daily to lumbosacral skin for 10 sessions. The trial found that ultrasound vs control reduced the number of wet nights per week at 1 week, 3 months, 6 months, and 12 months after treatment (P<0.05 at all times) 59.3% (16/35) responded with 90% reduction in wet nights while a further 22% (6/35) responded partially with 50% reduction in wet nights. The study did not find any adverse effects. Non responders may benefit from a trial of ultrasound treatment. <sup>28</sup> (level of evidence 2- grade of recommendation C)

**Laser Acupuncture**

<b>If available, Laser acupuncture may be considered as a treatment option.</b>	<b>B</b>
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One small RCT found no significant difference between laser acupuncture and intranasal desmopressin (20–40 microgram for 3 months) in reduction of wet nights in children (n=40) over 5 years of age with PNE. Laser acupuncture was applied to seven predefined acupuncture areas for 30 seconds per

session for 10–15 sessions. Complete response was defined as a reduction in the number of wet nights of at least 90%. At 6 months the RCT found no significant difference between laser acupuncture and intranasal desmopressin in reduction in wet nights (complete responders: 65% with laser acupuncture v 75% while on desmopressin). The RCT did not find any adverse effects with either laser acupuncture or intranasal desmopressin. Laser acupuncture treatment should be considered as a treatment option but may not be widely available. <sup>29</sup> (Level of evidence 1+ Grade of recommendation B)

## **GAPS BETWEEN EVIDENCE AND CURRENT PRACTICE**

Nocturnal enuresis is given a low priority as it is not seen as life threatening. However there is significant morbidity associated with the impact of a disorder that is embarrassing and therefore hidden. High profile child abuse cases in New Zealand were recently associated with toileting issues.

Families and schools may not be aware of normal development or that there is effective therapy available for nocturnal enuresis. Blame and punishment increase morbidity. Patient information leaflets are part of this guideline.

A major gap is the lack of capacity of publicly funded alarm programs. Most but not all District Health Boards (DHB) have the facility to provide some services but there is a shortage of alarms and staff to support the program in the public sector resulting in reluctance to advertise an enuresis service. Body worn alarms can be purchased through the retail pharmacies but success is limited by lack of a support program. Isolated and disadvantaged families are therefore less likely to be aware of or have access to available services in their area.

Surgical or other hospital equipment is usually funded from hospital capital budget but traditionally alarm purchase relies on charitable donations or charge to families. Community nurses from public health, district nursing and paediatric nursing are involved in different parts of the country but other duties often leave nocturnal enuresis a low priority maintained by a sole interested staff member. Hospital incontinence services usually do not have a paediatric component. Private enuresis advisers are available in some cities at a significant cost to the consumer. No PHO or Iwi Health providers currently operate a service.

In 2004 during the course of developing this guideline the PSNZ carried out a survey of bed wetting alarm availability across all DHBs. Publicly funded alarms were available in all regions. The availability of alarms varied from 1: 871 children and young people under 18 years of age to 1 : 22140. Two DHBs had worse than 1:5000 children. Over the whole country there were 530 alarms giving a mean national availability or 1:2002 children. Nine DHBs had better than 1:1500 children. The mean waiting time ranged from 0-6.5 months (no waiting time data from 2 DHBs). No attempt was made to assess quality of alarm programs or the extent to which services are publicised. A part charge was required by some DHBs. A substantial gap exists in some areas between alarm availability and need. The precise number of alarms needed to serve a community is not clear, PSNZ proposes 1 alarm per 1200 children under 18 in the population.

Desmopressin is available on specialist's recommendation. Many prescriptions in primary care are being endorsed over the phone after receiving an adequate history. This guideline aims to provide appropriate information easily given to patient and family concerning indication, dose, administration and precautions to minimise side effects.

Tricyclic antidepressants are no longer indicated in therapy but still prescribed. Change of indications and contraindications advised by Medsafe should rectify this, datasheets should be edited shortly.

Thus some aspects of current practice are not supported by our review of the evidence.

### **HOW MUCH EFFORT WILL IT TAKE TO CLOSE THE GAP?**

Education of health professionals will encourage appropriate, evidence-based treatment and management of Nocturnal enuresis.

Information on available services within the practitioners' area of practice must also be provided.

In conjunction, there should be a campaign targeted at informing consumers of available management facilities within their region.

The major challenge is funding public services, and staffing enuresis services with trained, interested and committed staff.

**IS THERE A REASONABLE LIKELIHOOD THAT THE RECOMMENDED CHANGES COULD BE IMPLEMENTED?**

Once consumers are adequately informed, the demand for alarm services will increase.

District Health Boards need to consider how to justly and consistently meet this demand.

Adequate access to alarms and in urban areas a service protected from other pressing priorities would be required.

A feasibility study of setting up protected enuresis/paediatric incontinence services should be commissioned by the Ministry of Health.

**PERFORMANCE INDICATORS**

Key performance indicators that should be in place to monitor improvements in outcomes:<sup>30</sup>

- Number of referrals
- Waiting time for alarm programme
- Capacity of publicly available alarm programmes
- Changes in prescribing patterns
- Consumer satisfaction surveys
- Uptake of alarm programs

## **EDUCATION AND SELF MANAGEMENT**

### **Consumer support groups and available resources :**

- Kiwi Enuresis Encopresis Association (KEEA) NZ [www.keea.org.nz](http://www.keea.org.nz)  
0800 KEEA NZ (0800 533 269) Has database for bed alarm service by region
- The New Zealand Continence Association (NZCA) [www.continence.org.nz](http://www.continence.org.nz)  
0800 650 659 Has database for bed alarm service by region
- Children's Health Camps NZ [www.healthcamps.org.nz](http://www.healthcamps.org.nz)
- Parent to Parent NZ [www.parent2parent.org.nz](http://www.parent2parent.org.nz)

### **Websites on childhood continence :**

- Kiwi Enuresis Encopresis Association NZ: [www.keea.org.nz](http://www.keea.org.nz)
- Education and Resources for Improving Childhood Continence: [www.eric.org.uk](http://www.eric.org.uk)
- The International Continence Society: [www.continet.org](http://www.continet.org)
- The Continence Foundation of Australia: [www.continence.org.au](http://www.continence.org.au)
- The International Children's Continence Society: [www.i-c-c-s.org](http://www.i-c-c-s.org)
- The National Continence Management Strategy (includes downloadable fact sheets in several languages): [www.continence.health.gov.au/](http://www.continence.health.gov.au/)
- Cochrane Database of Systematic Reviews (series on nocturnal enuresis): [www.thecochranelibrary.com](http://www.thecochranelibrary.com)

### **Patient information leaflets (PIL) proposed:**

- Enuresis Assessment and referral form
- Bedwetting: Screening History
- Bedwetting: information for parents
- Bedwetting: information for teachers
- Bedwetting: a Maori perspective
- Bedwetting: Using rewards
- Bedwetting: Scheduled waking
- Bedwetting: How to use a bed alarm
- Bedwetting: Enuresis alarms available in NZ
- Bedwetting: Medicines information

### **MANAGEMENT OF NOCTURNAL ENURESIS IN THE MAORI COMMUNITY.**

Maori whanau are familiar with tamariki with bedwetting problems and probably have rates of MNE common to all groups. Bedwetting is seen as a developmental problem which children outgrow.

There may be less awareness of available treatment options. Any issue concerning the private parts or toileting may be tapu in some families and shame may stop some families from seeking help although this is lessening. Guidance and support is sought primarily from relatives, Kuia and Kaumatua. Families are more likely to approach community nurses than their family doctor.

Environmental factors such as Marae based overnight stays and siblings sharing the bed may complicate bedwetting and its management.

There are no particular Maori treatment protocols for enuresis but fluid restriction is commonly practiced and children are encouraged to retire to bed happy.<sup>31</sup>

### **MANAGEMENT OF NOCTURNAL ENURESIS IN OTHER COMMUNITIES**

Prevalence is probably comparable in all cultural groups however the threshold at which professional help is sought differs and children from deprived areas are less likely to be brought to medical attention.

Research into prevalence perception and impact of nocturnal enuresis in different cultures would assist in management.

Educational and promotional material appropriate to different cultures should be made available.

## **ONGOING RESEARCH**

There is a need for good quality research to determine:

- Efficacy of desmopressin on the first night.
- Impact of diapers on course of bedwetting.
- Prevalence perception and impact of bedwetting in NZ school age children. Although high quality longitudinal cohort studies exist, there is little data on prevalence and perception of enuresis in the current ethnic mix.
- Best approaches to improving the care and treatment of condition in the Maori community.
- Best approaches to improving the care and treatment of condition in minority cultures.

## **IMPLEMENTATION STRATEGY FOR THIS GUIDELINE**

The implementation strategy that will lead to best practice, based on the evidence will include:

- ◆ Production of printed and electronic summaries of the guidelines for different audiences – e.g. primary care, specialists, Maori providers
- ◆ Development of tools such as consumer resources, posters, electronic decision aids accessible on the internet.
- ◆ Education Programmes for funders and planners, providers and consumers.
- ◆ Built in audit and performance evaluation of funded programs

## REFERENCES

- <sup>1</sup> Norgaard et al Standardisation and definitions in lower urinary tract dysfunction in children. *BJU Int*, suppl., 81:1, 1998
- <sup>2</sup> Blackwell, C.L. (1995) A guide to enuresis: a guide to the treatment of enuresis for professionals. 2<sup>nd</sup> edn. Bristol: Enuresis Resource and Information Centre
- <sup>3</sup> Fergusson DM, Horwood LJ, Shannon FT. Factors related to the age of attainment of nocturnal bladder control: an 8-year longitudinal study. *Pediatrics*. 1986 Nov;78(5):884-90.
- <sup>4</sup> Redsell SA Collier J Bedwetting, behaviour and self esteem: a review of the literature. *Child Care Health Dev*, 2001; 27: 149
- <sup>5</sup> Von Gotard A. Shaumburg H. et al the genetics of enuresis; a review. *J of Urology* 2001:166:2438-43
- <sup>6</sup> Edelstein B et al Effects of caffeine withdrawal on nocturnal enuresis insomnia and behaviour restraints. *Journal of consulting and clinical psychology* 84;52:(5):857-862
- <sup>7</sup> Loening-Baucke, V.: Urinary incontinence and urinary tract infection and their resolution with treatment of chronic constipation of childhood. *Pediatrics*,100: 228, 1997
- <sup>8</sup> Cinar, U Vural C, Akir B, Topuz E Karaman MI, Turgut S Nocturnal enuresis and upper airway obstruction. *International Journal of Pediatric Otorhinolaryngology* 59 (2001) 115–118
- <sup>9</sup> Brooks LJ, Topol HI. Enuresis in children with sleep apnea. *J Pediatr* 2003; 142: 515-518.
- <sup>10</sup> Page ME Alaoka H et Aston-Jones G Valentino RJ. Bladder distension activates non adrenergic locus coeruleus neurones by an excitatory amino acid mechanism. *Neuroscience* 1992;51:555-63
- <sup>11</sup> Hiroki Watanabe and Akihiro Kawauchi. Locus Coeruleus Function in Enuresis. *Scand J Urol Nephrol Suppl* 202: 14–17, 1999
- <sup>12</sup> Valenti, G Laera, A. Gouraud, S Pace, G. Aceto, G. Penza, R. Selvaggi, FP Svelto, M. Low-calcium diet in hypercalciuric enuretic children restores AQP2 excretion and improves clinical symptoms. *Am J Physiol Renal Physiol* 283: F895–F903, 2002.
- <sup>13</sup> Pace, G. Aceto, G. Cormio, L. Traficante, A. Tempesta, A. Lospalluti, M. L. Selvaggi, F. P. Penza, R. Nocturnal Enuresis can be Caused by Absorptive Hypercalciuria *Scand J Urol Nephrol* 33: 111–114, 1999
- <sup>14</sup> Fritz G, Rockney R, Bernet W, Arnold V, Beitchman J, Benson RS, Bukstein O, Kinlan J, McClellan J, Rue D, Shaw JA, Stock S, Kroeger Ptakowski K; Work Group on Quality Issues; AACAP. Practice parameter for the assessment and treatment of children and adolescents with enuresis. *J Am Acad Child Adolesc Psychiatry*. 2004 Dec;43(12):1540-50. Review
- <sup>15</sup> Hjalmas, K.; Arnold, T.; Bower, W.; Caione, P.; Chiozza, L. M.; von Gontard, A.; Han, S. W.; Husman, D. A.; Kawauchi, A.; Lackgren, G.; Lottmann, H.; Mark, S.; Rittig, S.; Robson, L.; Walle, J. Vande; Yeung, C. K. Nocturnal Enuresis: an international evidence based management strategy [Review Article] *Journal of Urology*, June 2004;171(6, Part 2 of 2): 2545-2561
- <sup>16</sup> Kruse, S., Hellstrom, A. L. and Hjalmas, K.: Daytime bladder dysfunction in therapy-resistant nocturnal enuresis. A pilot study in urotherapy. *Scand J Urol Nephrol*, 33: 49, 1999
- <sup>17</sup> Butler, R.J. (1991) Establishment of working definitions in nocturnal enuresis. *Archives of Disease in Childhood* 66, 267-271
- <sup>18</sup> Glazener, C.M.A. Evans JHC Peto RE (last update 2003) Simple behavioural and physical interventions for nocturnal enuresis in children (Cochrane Review). *The Cochrane Database of Systematic Reviews*. The Cochrane Library volume (1) 2004
- <sup>19</sup> Edelstein B et al Effects of caffeine withdrawal on nocturnal enuresis insomnia and behaviour restraints. *Journal of consulting and clinical psychology* 84;52:(5):857-862
- <sup>20</sup> Lyth N, Bosson S Nocturnal enuresis. *Clin Evid* 2004;12:508–517
- <sup>21</sup> Glazener, C.M.A. Evans JHC Peto RE (last update 2003) Complex behavioural and educational interventions for nocturnal enuresis in children (Cochrane Review). *The Cochrane Database of Systematic Reviews*. The Cochrane Library volume (1) 2004

- 
- <sup>22</sup> Glazener, C.M.A. Evans JHC Peto RE (last update 2003) Alarm interventions for nocturnal enuresis in children (Cochrane Review). The Cochrane Database of Systematic Reviews. The Cochrane Library volume (1) 2004
- <sup>23</sup> Glazener, C.M.A. Evans JHC Peto RE (last update 2003) Desmopressin for nocturnal enuresis in children (Cochrane Review). The Cochrane Database of Systematic Reviews. The Cochrane Library volume (1) 2004
- <sup>24</sup> Glazener, C.M.A. Evans JHC Peto RE (last update 2003) Tricyclic and related drugs for nocturnal enuresis in children (Cochrane Review). The Cochrane Database of Systematic Reviews. The Cochrane Library volume (1) 2004
- <sup>25</sup> Jessamine S Updated information and advice about the use of antidepressant medicines  
<http://www.medsafe.govt.nz/downloads/HPLtrAntidepressantMed.pdf>
- <sup>26</sup> Glazener, C.M.A. Evans JHC Peto RE (last update 2003) Drugs for nocturnal enuresis in children (other than desmopressin and tricyclics)(Cochrane Review). (Cochrane Review). The Cochrane Database of Systematic Reviews. The Cochrane Library volume (1) 2004
- <sup>27</sup> Banerjee S, Srivastav A, Palan BM.Hypnosis and self-hypnosis in the management of nocturnal enuresis: a comparative study with imipramine therapy. *Am J Clin Hypn.* 1993 Oct;36(2):113-9.
- <sup>28</sup> Kosar A, Akkus S, Savas S, et al. Effect of ultrasound in the treatment of primary nocturnal enuresis. *Scand J Urol Nephrol* 2000;34:361–365.
- <sup>29</sup> Radmayr C, Schlager A, Studen M, et al.Prospective randomised trial using laser acupuncture versus desmopressin in the treatment of nocturnal enuresis. *Eur Urol* 2001;40:201–205.
- <sup>30</sup> Morgan, R Guidelines on minimum standards of practice in treatment of enuresis
- <sup>31</sup> Personal communication Mr George Taipari, Kahui Te Puna Whaiora, Children’s Health Camps