Helping people with dementia get a good night's sleep

What research tells us about non-drug based strategies

February 2011

Cary Brown, PhD
Associate Professor
Department of Occupational Therapy
University of Alberta
cary.brown@ualberta.ca

The research team

- Robyn A. Berry, BA, MScOT student
- Maria C.Tan,BScOT, MLIS student
- Anjelee Koshla,MScOT
- Cary A Brown, PhD

SAFIG
Sleep and Function Interdisciplinary Group

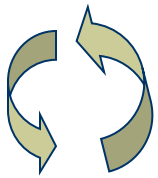
FACULTY OF REHABILITATION MEDICINE
UNIVERSITY OF ALBERTA

With support from the CDKTN

THE CANADIAN DEMENTIA KNOWLEDGE TRANSLATION NETWORK

Objectives

- Understanding sleep and its effect on function
- Why dementia is a risk for poor sleep and poor sleep is a risk for dementia
- What does the evidence tell us?
- Practical, non-drug-based interventions



Why should we care?

- How many activities can you list that are NOT influenced by sleep?

What sleep influences

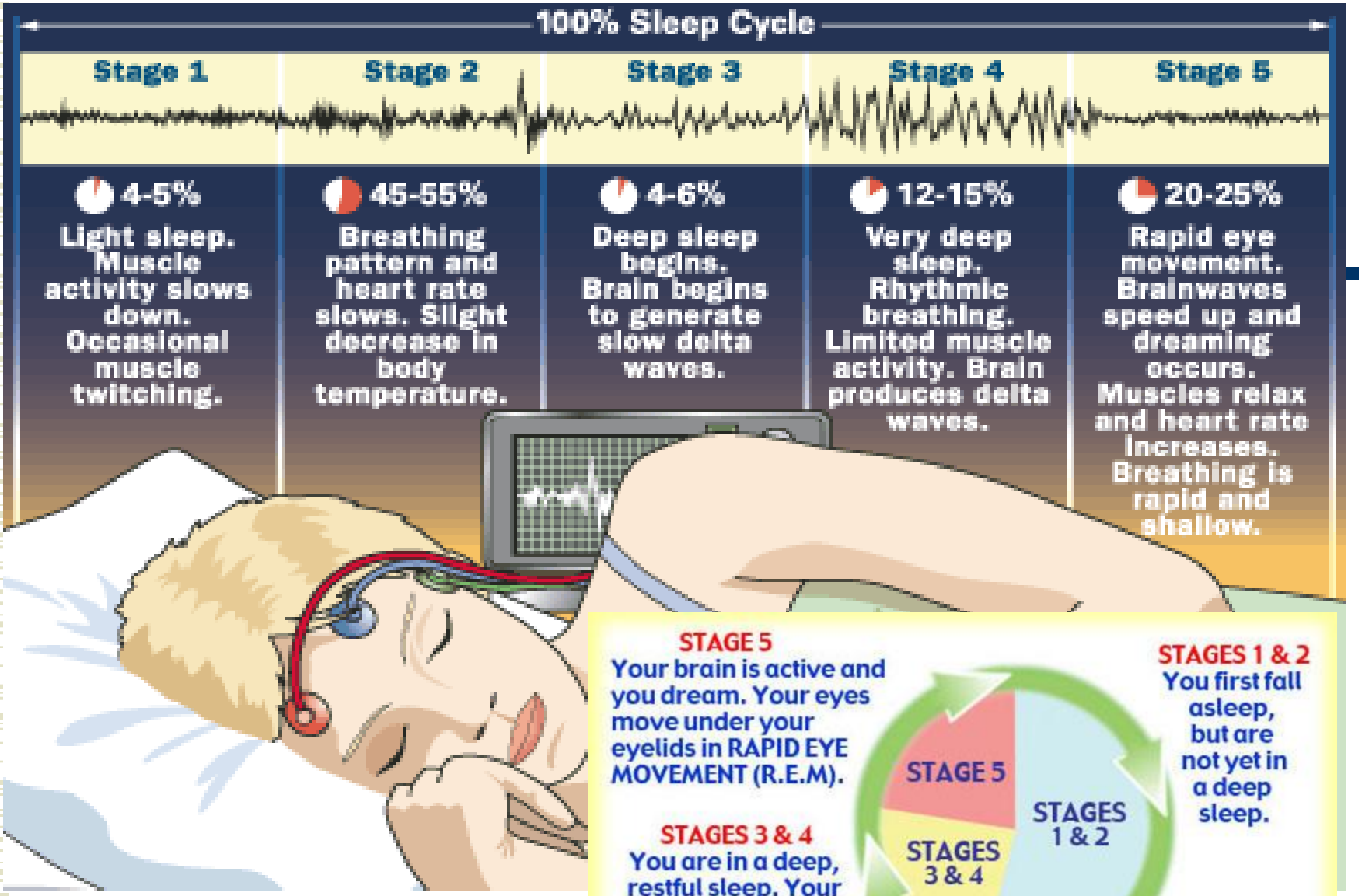
- Physical:
  - Healing
  - Digestion
  - Hormonal activity
    - leptin, adenosine, cortisol, melatonin
  - Central nervous system function
  - Sensation (eg pain)
- Thinking and emotional:
  - Feelings of well-being
  - Concentration
  - Learning and memory
  - Problem-solving
  - Emotions
  - Paranoia
  - Anxiety
  - Aggression

What are sleep disorders?

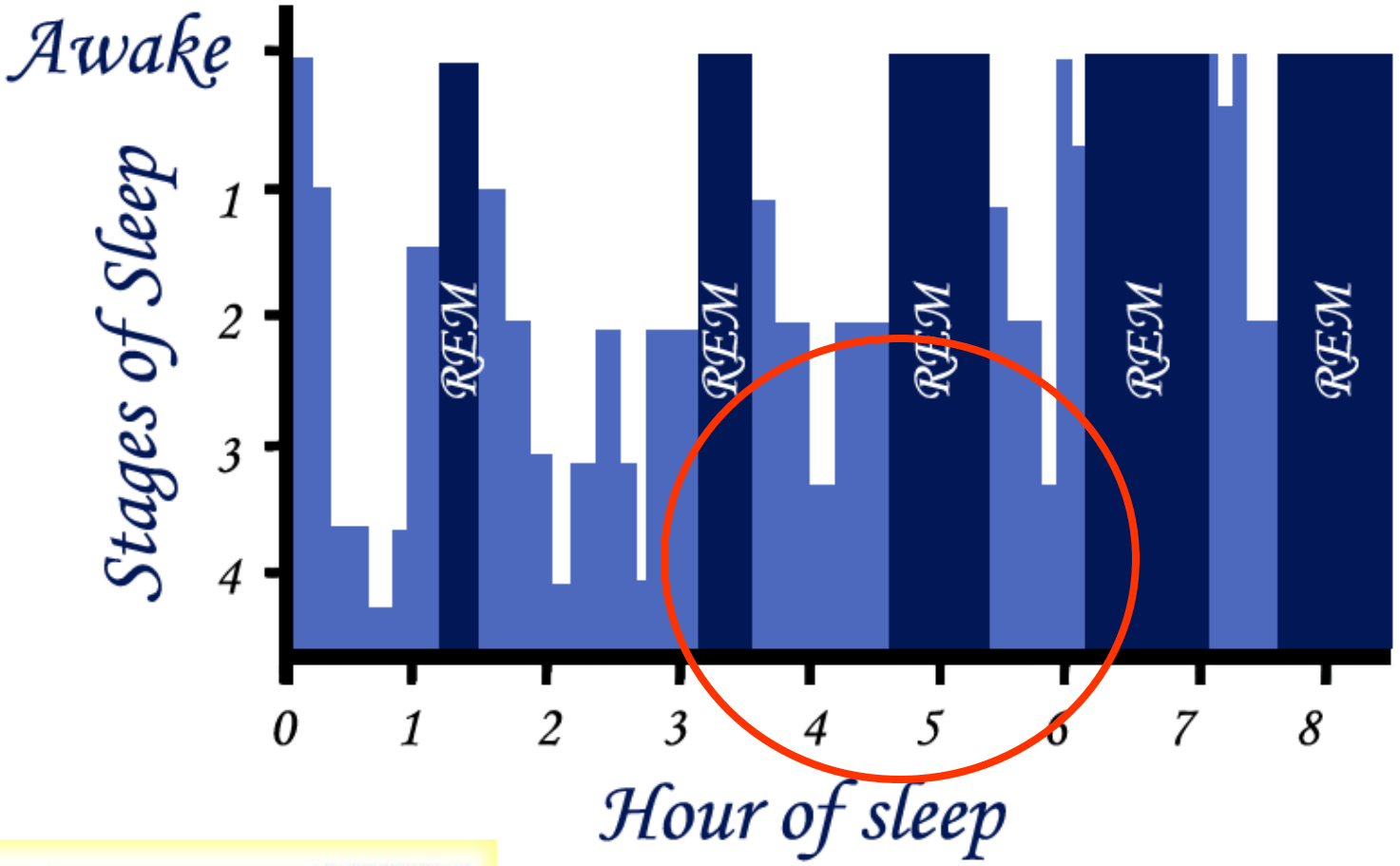
- Parasomnia
  - Abnormal behaviours or physiological events (eg sleep walking)
- Hypersomnia
  - Excessive sleepiness
- Insomnia
  - Most common problem
  - Often linked to depression
  - Insufficient, disturbed or non-restorative sleep

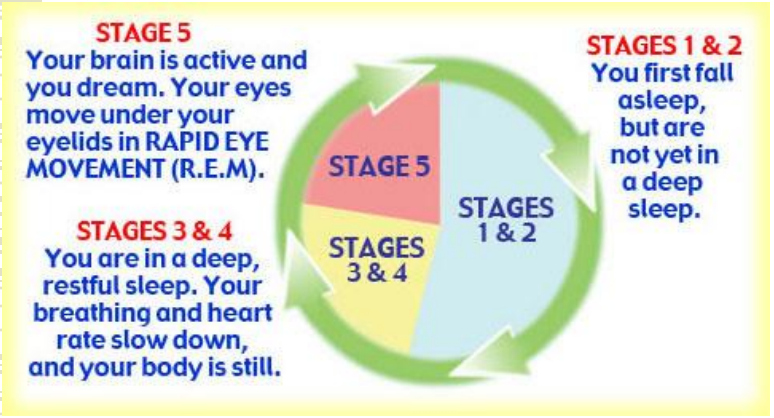
Circadian (body clock) Disturbances

- Alterations of the sleep-wake cycle
- Day and night get reversed

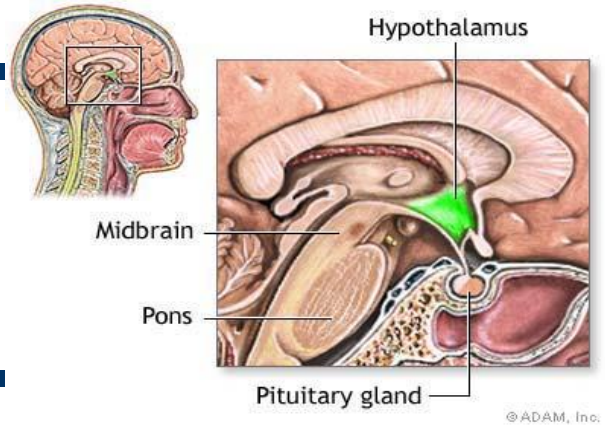


1 Cycle = aprox. 90 minutes


Awake
Stages of Sleep
1
2
3
4
REM
REM
REM
REM
REM
0
1
2
3
4
5
6
7
8
Hour of sleep


STAGE 5
Your brain is active and you dream. Your eyes move under your eyelids in RAPID EYE MOVEMENT (R.E.M).
STAGES 3 & 4
You are in a deep, restful sleep. Your breathing and heart rate slow down, and your body is still.
STAGES 1 & 2
You first fall asleep, but are not yet in a deep sleep.
STAGE 5
STAGES 1 & 2
STAGES 3 & 4

What happens in the brain?



- To keep our body systems in balance (homeostasis) chemicals are produced in the brain to send different messages.

- For example
  - Your body need to produce **Adenosine** to tell you to wake up.
  - Your body also needs to produce **Melatonin** to tell you to go to sleep.

- The production of these chemicals (hormones) is tied to natural daylight (particularly the blue light spectrum). Our eyes carry light messages to the brain telling it to produce different hormones so we sleep or wake up. The **hypothalamus** in the brain is very important for this.

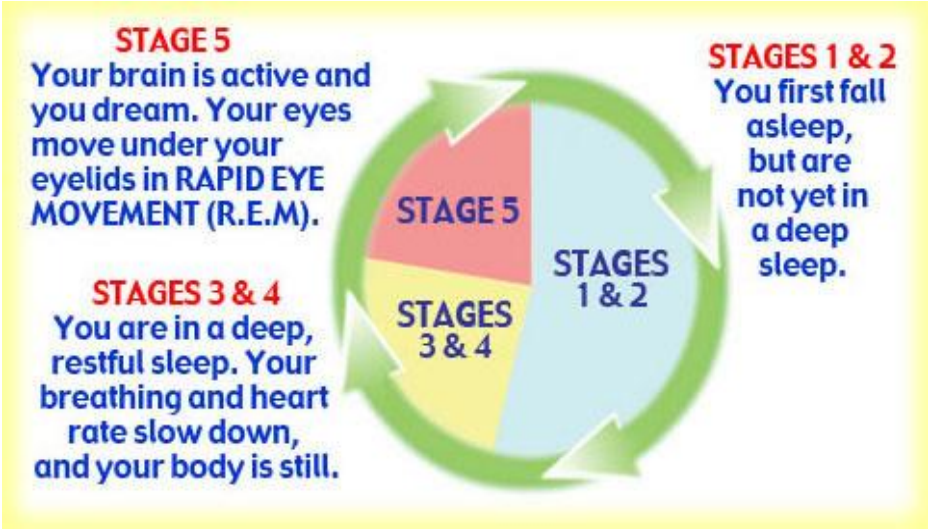
If you hypothalamus gets mixed messages then you have an unhealthy tug-of-war in your body

How do we get mixed messages?

- Mostly through light and temperature
  - Artificial light at night
  - TV, alarm clock, computer, street lights
  - Not enough light in the daytime
  - Bedrooms that keep our body temperature too warm

Sleep Disorders in Older Adults (Cooke & Ancoli-Israel 2006)

- Not inevitable but increased likelihood (co-morbidity increases)
- More time in bed, less sleep achieved, more awakening and delayed onset.
- Stage 1 & 2 increase
- REM decreases
- (associated with memory)
- Stage 3 & 4 decreases
- (Associated with healing)



Sleep changes as we age

- Our need to sleep remains the same but our ability changes (aprox. decline of 30 min/decade after 50 years of age).
- Consequences of insufficient sleep
  - Falls
  - Quality of life
  - Balance & ambulation
  - Cognitive function
  - Reaction time
  - Wound healing

Types of sleep problems

Insomnia

- Only 7% not related to other existing health problem
  - Depression
  - Arthritis
  - Chronic pain
  - COPD
  - Life events, loss, stress
  - Medication (beta-blockers, decongestants, cardiac drugs)

- Dementia does not cure insomnia!

Sleep disorder breathing

- Snoring and sleep apnea (insufficient oxygen) = fragmented sleep, disturbed cycles
  - Research shows sleep disordered breathing is a high risk with:
    - progressive dementias and other cognitive impairment (for example after a stroke)
    - use of sedative medication
    - insomnia
    - cardiovascular diseases
  - Other associated factors are medications, alcohol, smoking, and weight

Sleep disturbance in persons with dementia (PWD)

- 19 to 44% of community dwelling PWD has sleep problems
- PWD living in institutions have even higher rates of sleep problems
- One study found PWD living in long-term care facilities had no single hour of complete awake or asleep (Ancoli-Israel 1989)

What does the research tell us are the consequences when PWD have sleep problems?

- Increased chance of institutionalization
- Reset body clock for daytime sleep and nighttime wakening
- Decreased physical function (eg. balance, falls, fractures, appetite, digestion, self-care, strength, wound healing, diabetes etc).
- Irritability and aggression
- Anxiety, depression, and decreased cognition
- Impact on family caregiver's sleep, health and well-being

What to do?

- Seek help- disrupted sleep can be helped
- Assess the situation- what might be the problem and some simple solutions
  - Bendigo Health Dementia Management Strategy for an example of problem solving steps where the whole family can be involved

Non-drug strategies

- Sleep medication is recommended as a short-term strategy only to reduce side effects and complications with other medication
- Non-drug strategies with research support
  - Sleep hygiene
  - Bright light exposure
  - Increased daytime activity
  - Passive body warming

Structured review of the methodological quality of evidence for NPSI

Table 1:

Clinically relevant evidence for non-pharmacological sleep interventions for persons with dementia

Conclusive Evidence	Inconclusive Evidence	Insufficient Evidence
Bright Light Interventions		
▪ Multi-dimensional intervention including bright light exposure (27)	▪ Morning Bright Light therapy (28-33) ▪ Bright light and melatonin (34, 35) ▪ High intensity ambient lighting (34-36)	▪ Social interaction in combination with bright light therapy (37) ▪ Lunchtime Bright Light therapy(38) ▪ Dawn Dusk Simulation (39) ▪ Prolonged exposure to ambient blue high-intensity light (40)
Non-Light Interventions		
▪ Individualized (social) activities (41, 42) ▪ Respite Care (negative outcome for person with dementia and positive outcome for caregiver) (43)	▪ Sleep Hygiene and education (44-46) ▪ Passive Body Heating (47)	▪ Music (48) ▪ Exercise program (49) ▪ Transcutaneous electrical nerve stimulation (TENS) (50) ▪ Therapeutic biking (51) ▪ Outdoor Activity program (52) ▪ Indoor gardening (53) Environmental modification (54)

References available on request or see full report www.sleep-dementia-resources.ualberta.ca

1. Sleep hygiene

- Keep the bedroom for sleep
- Encourage exercise in the daytime
- Get lots of natural daylight
- Avoid napping
- Eliminate light (from TV, alarm clock, street light etc)
- Reduce noise and run a fan to block background noise
- Establish a routine
- Light snack before bed (no sugar or caffeine)
- Avoid stimulation (like TV and exercise) later in the evening

More information about Sleep Hygiene

- Canadian Sleep Society (sleep and aging)
- Alzheimer Association (Treatment for sleep changes)
- Alzheimer Association Australia (Sleep changes)

2. Bright light exposure

- The sleep / wake cycle is strongly influenced by the hormone called **melatonin.**
- Melatonin is produced in the brain and it signals the body when it is time to go to sleep.
- The amount of bright light we are exposed to determines the message the brain receives to produce or stop producing melatonin.
- In other words, bright light in the daytime is good because it sends the brain a message to stay alert and turn off the melatonin production. However, bright light at night sends the same message to stay awake- and that's not good.
- Researchers have found that exposure to daytime bright light can help improve sleep for many people with dementia.

How to get bright light exposure

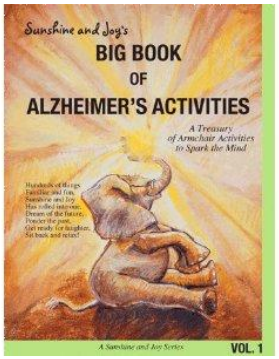
- The best source of bright light is natural daylight- walking outside, sitting (awake!) by the window, going for car rides- all help people get more bright light exposure.
- When getting outside is not possible there are special lamps that provide the right type of bright light (called blue spectrum light). These special lamps are sold in drug stores.
- Don't get too much light exposure or use a special bright light lamp after 4 pm.
- After the evening meal room lights should be dimmer so the brain receives the message to produce more melatonin and start to get ready for sleep.
- Avoid bright lights at night-time in the bedroom. This includes televisions, LED alarm clocks and light coming from streetlights outside. These light sources will signal the body to wake up. A restful sleep requires the room to be as dark as possible.
- If safety is a concern it might work to place the room lights on a motion detector so they only come on as needed.

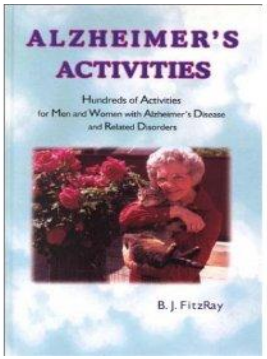
3. Increased daytime activity

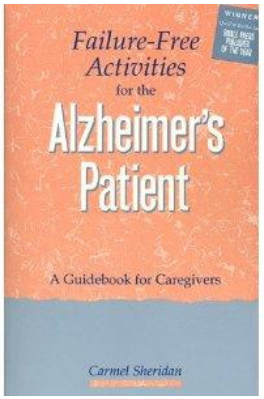
- Keeping active in the daytime will make sure you are ready to sleep at night.
  - Activity increases oxygen, circulation, and digestion. These all help promote better sleep
- Car rides, walks outside, and other activities help keep you from napping. Naps should only be for 15-20 minutes and not encouraged all day.

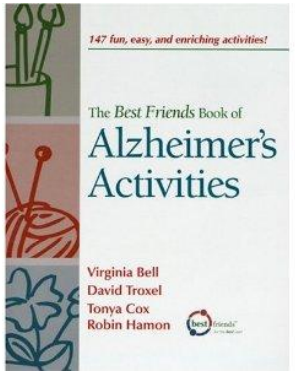
Where to get more information on daytime activity

- National Institute on Aging (US)
- Alzheimer Society Canada
- Alzheimer Society UK
- Talk to your occupational or physical therapist, contact the local YMCA and Seniors' centre to see if they have special programs
- Books









Passive body warming

- **A warm bath or sitting under a warm blanket for ½ hour before going to bed can help raise the body's temperature.**

- ***How does it work?*** **When we sleep our body temperature drops slightly. Being too warm keeps us from going to sleep. If you raise your body temperature slightly for a short period of time while awake, as you cool off you will feel more sleepy. That's why a warm bath before bed helps us sleep- the bath raises our body temperature for a short period and as we cool off after the bath we feel sleepy.**

When should passive body warming be used?

- **Warm baths or warm blankets within an hour of going to bed help.**
- **If your family member does not like to take a bath at night- try using a warm electric blanket around his shoulders or a hot water bottle in his lap for about 20 minutes before bed instead. Remember the warmth should be comfortable, not hot and unpleasant.**
- **More research information? (Mishima et al., Am J Geriatr Psychiatry. 2005 May;13(5):369-76).**

Gathering information to help you speak to a healthcare provider about sleep

- Sleep diaries
  - Example 1

    http://sleep.buffalo.edu/sleepdiary.pdf
  - Example 2

    http://www.sleepeducation.com/pdf/sleepdiary.pdf

  - Remember- there are strategies that can help
- Check out our new Sleep and Dementia website at www.sleep-dementia-resources.ualberta.ca (After April 2011)

- Preview the Sleep and Dementia website

This presentation is based on a critical review research project carried out by the Sleep and Function Interdisciplinary Group (SAFIG), Faculty of Rehabilitation Medicine, University of Alberta c/o Dr Cary Brown (cary.brown@ualberta.ca) Funding support provided by the Canadian Dementia Knowledge Translation Network (CDKTN). Any information included in this presentation and /or opinions expressed there in do not necessarily reflect views of the CDKTN but remain solely those of the authors. Feb 12 2011

Thank you!