

*West Coast District Health Board*  
*Te Poari Hauora a Rohe o Tai Poutini*



**NURSE CO-ORDINATED SLEEP STUDY**

**FINAL PROJECT REPORT**

**16 JANUARY 2009**

Prepared for  
Improving Patient Pathways - Diagnostics Pilot Fund  
Ministry of Health

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# TABLE OF CONTENTS

<b>BACKGROUND</b>	<b>1</b>
<i>Obstructive Sleep Apnoea (OSA)</i>	1
<i>Pre-pilot Sleep Service</i>	1
<b>PROJECT OBJECTIVES</b>	<b>2</b>
<i>Pilot Service Structure</i>	3
<b>PROJECT DELIVERY</b>	<b>4</b>
<i>Collaboration with Christchurch Hospital Sleep Disorders Unit (CHSDU)</i>	4
<i>Consultation With Stakeholders</i>	5
<i>Respiratory Nurse Specialist Education</i>	6
<b>PILOT RESULTS</b>	<b>7</b>
<i>Performance Against Measures</i>	7
<i>Budget</i>	11
<b>ADDITIONAL OUTCOMES AND FINDINGS</b>	<b>12</b>
<i>Referral Trends</i>	12
<i>Patient Group</i>	12
<i>Specialist Nurse Feedback</i>	12
<b>SUMMARY CONCLUSIONS AND RECOMMENDATIONS</b>	<b>13</b>
<i>Funding</i>	13
<i>Opportunities for Other DHBs</i>	13
<i>Future Development</i>	14
<b>APPENDIX 1 – Pilot Service Structure</b>	
<b>APPENDIX 2 – Referral Form</b>	
<b>APPENDIX 3 – Respiratory Nurse Specialist Referral Prioritisation Criteria</b>	
<b>APPENDIX 4 – Example Data Entry Quick Reference Sheet</b>	
<b>APPENDIX 5 – Referral Processing Flow Chart</b>	

## Background

On the West Coast specialist Respiratory and sleep services are provided on a visiting basis by a Respiratory Physician and Sleep Nurse Specialist from Christchurch Hospital. Prior to the Nurse Co-ordinated Sleep Study Pilot visiting one day clinics were held three or four times a year, however there had been periods when clinics were provided only once or twice in 12 months.

West Coast DHB employs two Respiratory Nurse Specialists (RNS) at a combined 1.0 FTE and a casual Respiratory Nurse at 0.2 FTE at Grey Hospital. A Respiratory Nurse also works from Buller Hospital at 0.2 FTE. The RNS provide education, advice, and management to patients admitted to hospital and in the community. Their area of practice encompasses home oxygen, chronic conditions management, acute advice, and liaison with Palliative nursing. Sleep disordered breathing was not included in their service prior to the project.

### ***Obstructive Sleep Apnoea (OSA)***

Obstructive Sleep Apnoea (OSA) is a common cause of daytime sleepiness. It affects 4% of men and 2% of women in the general middle-aged population. In New Zealand, OSA symptoms and risk factors affect over 15% of the adult male population. Based on these statistics there are potentially around 1800 people on the West Coast living with some degree of OSA. Health consequences of unmanaged OSA include:

- Excessive daytime sleepiness
- Impaired neurocognitive functioning
- Cardiovascular disease – hypertension, heart failure, fatal cardiovascular events
- Diabetes independent of obesity
- Increased risk of motor vehicle accidents

Many of the patients referred to West Coast DHB with suspected OSA are employed as drivers or in fields that require use of heavy machinery. Risk of injury is increased dramatically for patients with unmanaged OSA.

Pulse Oximetry has been shown to be a useful screening tool for OSA, and used in conjunction with clinical assessment it can help to determine the severity of OSA. Overnight home oximetry used to exclude OSA is known as a Level 4 Sleep Study.

### ***Pre-pilot Sleep Service***

The Christchurch Hospital Sleep Disorders Unit (CHSDU) provides sleep studies for patients in the Canterbury DHB region, and also the South Canterbury and West Coast DHB regions through IDF arrangements.

An increasing number of West Coast patients requiring assessment for sleep disordered breathing were being referred for Level 4 Sleep Study (the initial diagnostic test used for assessment of sleep disordered breathing) to the CHSDU by GPs and other specialist services on the West Coast. Patients followed an often inconsistent and convoluted pathway before receiving a study as they could be referred through one of three routes, each involving consultant triage before a study could be ordered.

#### **1. Referral to the Christchurch Hospital Sleep Disorders Unit (CHSDU).**

Patients referred to the CHSDU by West Coast GPs were filtered back to Grey Hospital's visiting Respiratory clinic. Referrals that were not forwarded to Grey Hospital remained unknown to the Respiratory service.

## **2. Referral to the Grey Hospital visiting Respiratory clinic.**

New referrals to Respiratory are sometimes triaged by General Medicine but most are reviewed in batches by the Respiratory Physician at clinics. The Respiratory Physician could refer the patient to the CHSDU without a clinic appointment, however usual practice was to see the patient at FSA prior to ordering the study.

## **3. Referral to the visiting Otolaryngology (ENT) service**

Visiting ENT clinics are held on a monthly to six weekly basis at Grey Hospital, however the patient would be referred to the CHSDU for studies following ENT FSA.

West Coast patients accepted for Level 4 Sleep Study by the CHSDU would be couriered an oxygen saturation monitor for recording of sleep activity over one night. Data was reported when the monitor was returned to the CHSDU. After reporting results would be reviewed by a specialist and patients would then wait for FSA on the West Coast with the visiting Respiratory Physician.

This process could take many months as there is high demand for overnight oximetry at the CHSDU and limited capacity for Respiratory FSAs within West Coast's visiting service. The visiting Sleep Nurse Specialist only sees patients to co-ordinate trial of Positive Air Pressure (PAP) therapy following sleep study and to provide ongoing management for patients continuing with PAP therapy.

Results of sleep studies are valid for three months and many West Coast patients required repeat studies from the CHSDU before eventually receiving FSA. This duplication created an unnecessary waste of resources already under pressure, and increased delay for patients requiring diagnosis and management. Some patients waited up to two years before receiving a formal diagnosis and management plan. When an outcome was finally reached, many patients did not require specialist intervention and could have been managed in a community or primary setting. GPs often expressed frustration with the lack of information on diagnosis or management for patients waiting for a sleep study, or for FSA with Respiratory Medicine.

The extended waiting times produced by the pre-project service structure led to most sleep patients not being accurately recorded on waiting lists in WCDHB's patient management system in order to maintain ESPI 2 compliance in Respiratory Medicine.

Level 4 Sleep Study is also available from private sleep clinics in Christchurch at the patient's cost. One Greymouth primary practice works with a private Christchurch clinic to provide home oximetry at a cost of \$75, however this does not include clinical assessment or advice for ongoing management. Referral to specialist services is still required for formal diagnosis.

## **Project Objectives**

For some years West Coast GPs had noted frustration with being unable to order Level 4 Sleep Study directly and the extended waiting time for patients requiring studies from the CHSDU. The general aim of the Nurse Co-ordinated Sleep Study pilot is to provide GPs with access to Level 4 Sleep Study in order to exclude OSA or identify other causes of sleep disordered breathing without referring for FSA in the first instance. For patients not requiring specialist intervention, results of studies would need to be accompanied by advice on treatment and ongoing management.

To achieve this aim the following objectives were set for the pilot.

Objective	Performance Measures
1. Establish an evidence based clinical pathway to allow GPs to refer directly to Grey Hospital for sleep studies.	1.1 The quality of referral measured against criteria prior to and at conclusion of Pilot.
2. All patients are triaged effectively by WCDHB Respiratory Nurse Specialists.	2.1 Formal, consistent prioritisation criteria developed for referral triage. 2.2 Recommendations are made to the Respiratory Physician on patients who require specialist treatment. 2.3 Appropriate education and advice is provided to patients and GPs for patients returned to primary care.
3. All patients who receive Level 4 Sleep Study are assessed within three months of the study.	3.1 The length of wait at each point prior to and at conclusion of the Pilot; measures to include: i) date of patient referral; ii) date of study; iii) date of First Specialist Assessment (“FSA”) or RNS assessment; and iv) total waiting time. 3.2 The proportion of patients receiving both a sleep study and an assessment within 3 months, prior to and at conclusion of Pilot. 3.3 The proportion of patients requiring specialist management versus those managed by the GP/RNS pathway.
4. All patients requiring FSA receive it within six months of being added to the Respiratory waiting list.	4.1 The proportion of patients accepted for an FSA receiving it within 6 months prior to and at conclusion of Pilot.
5. All patients are recorded appropriately in the WCDHB patient management system.	5.1 Systems in place for recording nursing and consultant contacts with patients. 5.2 Reports can be produced to identify sleep study referrals and track progress through the system. 5.3 Audits run on data entry to ensure accuracy.

## **Pilot Service Structure**

West Coast DHB’s two permanent part-time Respiratory Nurse Specialists at Grey Hospital were upskilled to co-ordinate Level 4 Sleep Study for West Coast patients. Referrals would be made directly to the RNS at Grey Hospital instead of referral to the CHSDU. Any referrals for West Coast patients requiring Level 4 Sleep Study made to the CHSDU by GPs or specialist services at either Christchurch or Grey Base Hospitals would be forwarded to the RNS for triage. West Coast DHB purchased two pulse oximeters outside project funding to enable the RNS to conduct studies.

Following referral, the Respiratory Nurse Specialists perform an initial clinical assessment, arrange the study, download and analyse results, then make recommendations to the visiting Respiratory Physician on appropriate management.

In order to ensure that the RNS are able to obtain advice from the Respiratory Physician outside of the visiting clinic schedule a weekly video or teleconference is held with the Respiratory Physician

and CHSDU to discuss the results of studies and assessments. A flow chart for the pilot structure is included in Appendix 1.

## **Project Delivery**

The Nurse Co-ordinated Sleep Study project commenced on 1 May 2008 with pilot service commencement on 1 July 2008.

West Coast DHB's Patient Journey Improvement Co-ordinator was assigned as the Project Co-ordinator for the pilot to manage process and systems redesign, consultation with stakeholders, facilitate development of guidelines, and to manage data collection and audit throughout the pilot. Administration support was made available to assist with the project.

Weekly meetings with the RNS and Project Co-ordinator were held to troubleshoot process changes in the early stages of the pilot. These meetings continued throughout the project on an as required basis to support changes in work practice while the new service was established.

### ***Collaboration with Christchurch Hospital Sleep Disorders Unit (CHSDU)***

Through IDF arrangements, the CHSDU continues to provide specialist sleep services for West Coast DHB including diagnostic tests at a higher level than Level 4 Sleep Study, CPAP/BIPAP trial, supply and maintenance of PAP equipment, and ongoing management of patients on PAP therapy via the visiting Sleep Nurse Specialist.

To enable a functional service on the West Coast, it was essential that the structure of the West Coast pilot service aligned with the CHSDU's service structure, referral guidelines and prioritisation criteria. A collaborative approach between the two services is critical for the ongoing success of the service.

An initial meeting was held in January 2008 with the Christchurch Hospital Respiratory Service Manager, Clinical Head of Department for Respiratory, and visiting Respiratory Physician to discuss potential project activity and obtain buy-in.

Formal Terms of Reference for the project were developed in consultation with the Respiratory Nurse Specialists, West Coast DHB Management, the CHSDU and CDHB Respiratory service managers. Discussions with relevant Christchurch Hospital management and clinical staff continued throughout the project as required.

### **Referral Guidelines**

Local referral and management guidelines for the West Coast sleep service were developed following similar guidelines in place at the CHSDU. The guidelines identify criteria relating to referral for Level 4 Sleep Study and information on sleep disordered breathing in general, with options for management of patients in primary care. The guidelines also provide resources for GPs to give basic advice to patients already being managed for sleep disordered breathing, e.g. patients on PAP therapy (around 60 on the West Coast prior to the pilot).

A referral form was developed for requests for sleep study based on a similar form successfully adopted by the CHSDU. A copy of the referral form is attached in Appendix 2.

### **Prioritisation Criteria**

The visiting Sleep Nurse Specialist assisted West Coast DHB's Respiratory Nurse Specialists in developing prioritisation criteria that was consistent with criteria used at the CHSDU. WCDHB's Nurse Specialist referral prioritisation criteria is included in Appendix 3.

## **Service Arrangements**

Patients assessed as requiring PAP therapy continue to be managed by the CHSDU on a visiting basis as per the pre-pilot service arrangement. Follow-up sleep study for patients started on PAP trial prior to the pilot would be provided by the CHSDU, unless the patient is referred to West Coast DHB in line with local criteria.

Visiting Respiratory and Sleep Nurse Specialist clinics would be held four to five times per year, structured to provide the RNS with continuing education on assessment and management of sleep patients.

## **Consultation With Stakeholders**

### **Primary Care**

The GP Liaison announced the project to all West Coast primary care providers in May 2008.

Draft referral guidelines, referral form, and process documents were forwarded to GPs for feedback at the beginning of June 2008. An education session for GPs and other interested providers on sleep disordered breathing and the pilot service was also conducted in June by the visiting Respiratory Physician, Sleep Nurse Specialist, and Respiratory Nurse Specialists. At the session comment on referral guidelines and the pilot process was provided by GPs and Practice Nurses.

The final copy of referral guidelines and the referral form were released to GPs and other relevant providers one week prior to pilot commencement in hard copy and via email.

Throughout the project regular newsletters have been circulated to advise stakeholders of project progress. The West Coast DHB website and intranet have also been updated with a page dedicated to the project, including copies of the referral form and guidelines.

Satisfaction surveys will be sent to all West Coast GPs to provide comment on success of the service from their perspective. Patients who have received sleep studies during the pilot will also be sent satisfaction and feedback surveys on the service. Survey results will be available in March/April 2009.

### **West Coast DHB Internal Stakeholders**

The project was announced to all West Coast DHB staff in May 2008. West Coast DHB's resident senior medical staff and visiting ENT consultants were consulted on referral guidelines for the new service.

A flow chart was created to represent general process steps for the new service. Consultation with the IT department and Grey Hospital's Central Booking Unit for specialist services was undertaken to identify internal administrative and IT activities required to support the new process and manage impact on existing processes.

An internal procedure document with detailed information on each process step from receipt of referral through to case discussion (including data entry requirements) was released for comment to key internal stakeholders and then sent for Chief Medical Advisor and Quality Manager approval. The procedure document was finalised in June 2008 and revised in September 2008 to better reflect use of the procedure following implementation.

Quick reference data entry sheets were created for the Respiratory Nurse Specialists and any other West Coast DHB staff involved with the service to ensure all information is entered accurately in WCDHB's patient management system.

## **Respiratory Nurse Specialist Education**

A key requirement for providing Level 4 Sleep Study to GPs on the West Coast was not only provision of resource to perform the test, but resource to provide advice on indications for referral, results, and ongoing management following studies. The pre-pilot service lacked this structure, leaving GPs with results of sleep study without information on what to do next. Education of West Coast DHB's Respiratory Nurse Specialists encompassing all aspects of sleep medicine was important to successfully delivering this aspect of the service.

Education would take two forms, through visits to and ongoing support from the CHSDU and formal education through a tertiary institution.

### **CHSDU Training**

The Respiratory Nurse Specialists visited the CHSDU for initial training in June 2008. During their visit they reviewed case studies, observed and participated in pre-study assessments, and learned how to read and assess results of studies.

WCDHB purchased (outside pilot funding) the same brand of software and model of oximeter used by the CHSDU to conduct Level 4 Sleep Study. During their visit the RNS learned how to use this equipment, including download and editing of studies electronically.

Education continued with the visiting Respiratory Physician and Sleep Nurse Specialist via the visiting Respiratory and Sleep Nurse Specialist clinics at Grey Hospital and weekly case discussion schedule. Case discussions also provide specialist and technical supervision and support to the RNS while they are learning.

### **Formal Training**

The project originally included funding for tuition fees for one nurse to undertake a Postgraduate Diploma in Sleep Technology through the University of Otago. After project commencement, the Respiratory Physician suggested that the University of Sydney's annual Sleep Medicine and Technology Course may be more effective in providing a greater breadth of knowledge for both nurses.

This change was agreed with the Ministry of Health and both nurses attended the course in November 2008. A brief report and presentation on learnings from the course is being prepared by the Respiratory Nurse Specialists for health professionals and providers on the West Coast to assist in sharing of knowledge in the area of sleep medicine. One of the Respiratory Nurse Specialists provided some initial feedback following the course...

*"We covered many aspects of sleep such as fundamentals of normal sleep, Circadian rhythms and Insomnias, Polysomnography and central sleep apnoea to name just a few. What was made clear to me was that a good night's sleep is paramount to our good health and wellbeing, but sleep doesn't have the same coverage and press that healthy eating and exercise has in our society.*

*The Australians at the course felt New Zealand was leading the way in sleep study testing. In Australia every patient needing to be assessed for sleep apnoea gets the full monty and are assessed in a sleep laboratory, because polysomnography is paid very well there. This is a very costly service and their waiting lists are huge. We felt and vocalised that patients should be screened with Level 4 and 3 tests first, as we are doing on the West Coast, and only the severe should be considered for polysomnography. In general those involved in the course agreed that our model was better."*

## Pilot Results

### *Performance Against Measures*

#### **The quality of referral measured against criteria prior to and at conclusion of Pilot.**

Of the 41 referrals received between 1 June 2008 and 31 December 2008, 7 were returned to the referrer for further information. This equates to an 83% completion rate in line with referral guidelines and criteria.

Any referral received with insufficient information for triage is returned to the referrer highlighting the information absent from their referral. Referrals containing insufficient information made via a letter rather than the referral form are returned with a copy of the form to remind the referrer for future use.

#### **Formal, consistent prioritisation criteria developed for referral triage.**

Prioritisation criteria was developed in the early stages of the project. At the beginning of the pilot an access threshold of Priority 2 (semi-urgent) and above was put in place. Only five referrals have been triaged at Priority 3 (routine) and rejected throughout the project.

Referral Prioritisation									
	Pre-pilot	Jun 08	Jul 08	Aug 08	Sep 08	Oct 08	Nov 08	Dec 08	Overall
<b>Priority 1</b>	2	1	1	1	0	0	0	3	8
<b>Priority 2</b>	6	5	6	9	4	4	2	2	38
<b>Priority 3</b>	3	0	2	0	0	0	0	0	5

An audit of referral triage vs prioritisation criteria has showed that the Respiratory Nurse Specialists are using the criteria effectively and appropriately.

#### **Recommendations are made to the Respiratory Physician on patients who require specialist treatment.**

Following Nurse Specialist assessment and sleep study each patient's case is discussed with the Respiratory Physician, Sleep Nurse Specialist and Sleep Technician from the CHSDU. To date all patients who have received a study have been discussed, or are scheduled for case discussion.

Patients Treated							
	Jul 08	Aug 08	Sep 08	Oct 08	Nov 08	Dec 08	Overall
<b>Assessments</b>	8	10	12	3	4	3	<b>40*</b>
<b>Studies</b>	8	8	12	4	3	3	<b>38</b>
<b>Cases Discussed</b>	7	6	13	6	0	5	<b>37</b>

\*Two patients were referred with results of studies obtained privately, and the decision was made to provide an assessment and case discussion for these patients only.

**Appropriate education and advice is provided to patients and GPs for patients returned to primary care.**

Depending on the outcome of case discussion the Nurse Specialists or Respiratory Physician provide advice to the patient’s GP or referrer on the outcome of the patient’s assessment and suggested future management. The Nurse Specialists may also see the patient in outpatient clinic to provide further education or advice if appropriate.

**The length of wait at each point prior to and at conclusion of the Pilot; measures to include:**

- i) date of patient referral;**
- ii) date of study;**
- iii) date of First Specialist Assessment (“FSA”) or RNS assessment; and**
- iv) total waiting time.**

***Pre-Pilot Waiting Times***

Prior to pilot commencement a list of patients already referred for assessment of sleep disordered breathing was collated. The service had been relatively non-existent before the project and referrals were located in a number of places at Grey Hospital and the CHSDU with most patients not entered into WCDHB’s patient management system.

Of the 48 referrals outstanding prior to the project, 23 had previously had a Level 4 Sleep Study either privately or through the CHSDU, however all of these studies had been performed more than six months prior to the pilot. Following Nurse Specialist and Respiratory Physician triage of all outstanding referrals, 14 patients were placed on the booking list for a study during the pilot. The initial date of referral was unclear for most of these historic referrals as original documentation relating to the referral was missing. As a result the historic referrals added to the pilot booking list were entered with a referral date of 1 July 2008, date of pilot commencement.

From the information available on historic referrals the oldest referral dated to 2003 and the most recent in early 2008. From the information available an estimated average waiting time for all historic referrals was around 600 days (almost two years).

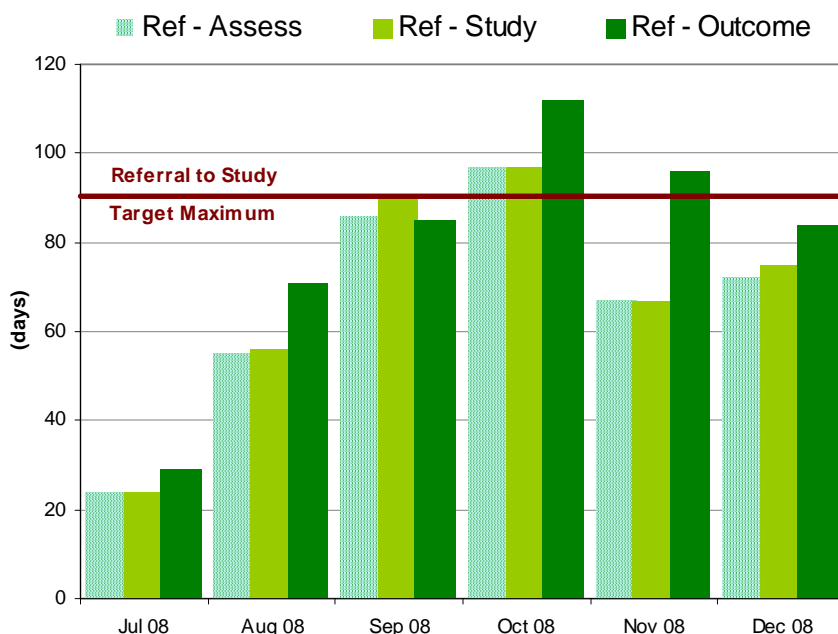
***Pilot Waiting Times***

The following graphs detail the maximum and average waiting times from referral to Nurse Specialist assessment (Ref – Assess), from referral to sleep study (Ref – Study), and from referral to case discussion providing an outcome for future management, e.g. GP management or Respiratory FSA (Ref – Outcome).

All but two patients received a study within three months, and all but four patients received a final diagnosis or management outcome within three months of referral.

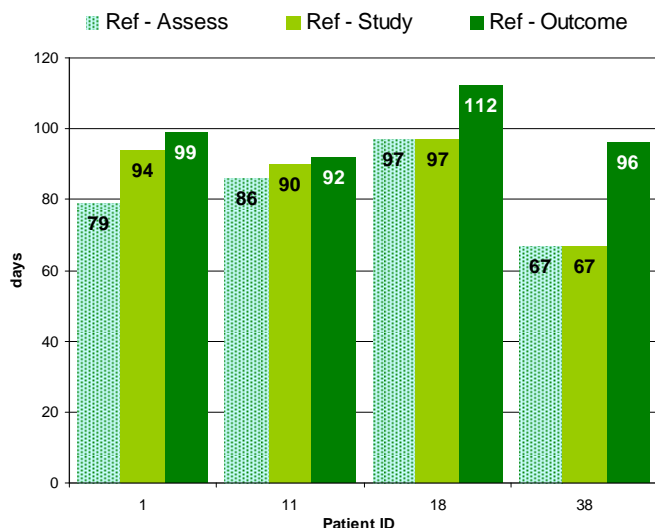
**Nurse Co-ordinated Sleep Study  
Maximum Waiting Time**

By Month of Study At 31 December 2008



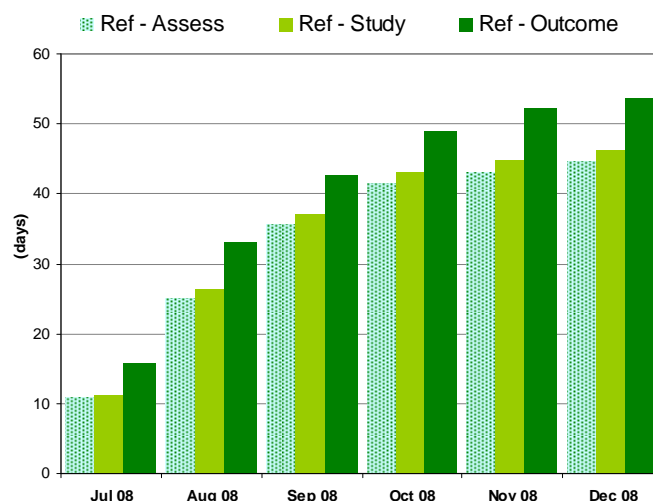
The longest wait for a study during the pilot was 97 days, one week outside the target maximum waiting time. The longest wait for a final outcome following case discussion was 112 days, two weeks outside the 90 day target. At 31 December 2008 the cumulative average waiting time from referral to study was 46 days and from referral to case discussion, 54 days.

### Nurse Co-ordinated Sleep Study Patients Treated Over 90 Days



### Nurse Co-ordinated Sleep Study Average Waiting Time

Cumulative by month of study at 31 December 2008

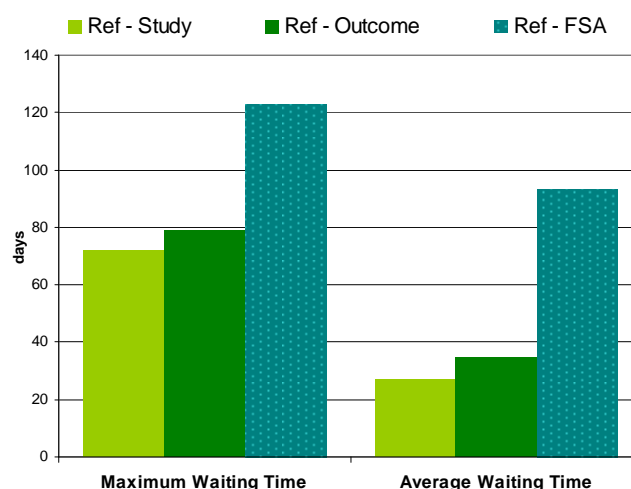


Of the patients referred for Respiratory FSA following case discussion the longest waiting time from first referral for sleep study to FSA was 123 days, around four months. The average waiting time from first referral for sleep study and FSA was 93 days.

At 31 December 2008 two patients were still waiting for Respiratory FSA with the maximum waiting time being 120 days, still within the six month requirement.

### Nurse Co-ordinated Sleep Study Total Waiting Time

Sleep Study Referral to Respiratory FSA



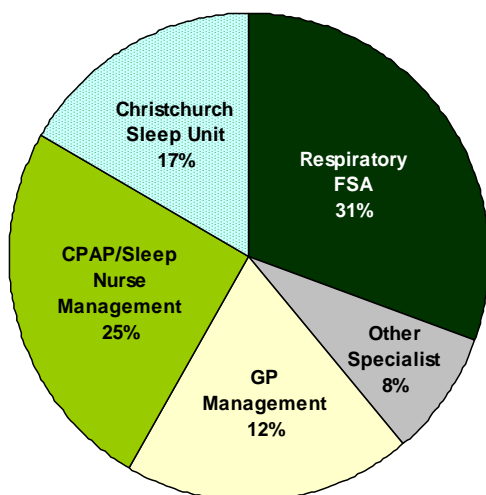
The proportion of patients receiving both a sleep study and an assessment within 3 months, prior to and at conclusion of Pilot.

Patients Treated Within Three Months of Referral	No.	%
From Referral to Nurse Specialist Assessment	34	97.1
From Referral to Study	33	94.3
<b>From Referral to Case Discussion (management outcome)</b>	<b>31</b>	<b>88.6</b>

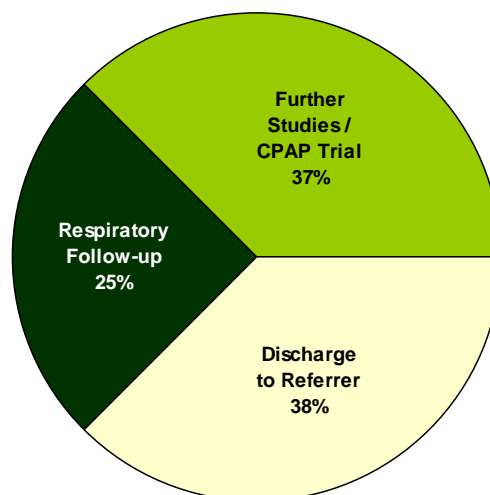
**The proportion of patients requiring specialist management versus those managed by the GP/RNS pathway.**

Approximately 40% of patients were referred to the Sleep Nurse Specialist or returned to primary care for ongoing management. The remaining patients were referred to Respiratory Medicine, the CHSDU, or other specialists for further investigations or management. Following Respiratory FSA approximately 40% of patients were discharged to the original referrer, in most cases primary care.

**Nurse Co-ordinated Sleep Study  
Case Discussion Outcomes**  
at 31 December 2008



**Nurse Co-ordinated Sleep Study  
Respiratory FSA Outcomes**  
at 31 December 2008



As the service becomes established and the Respiratory Nurse Specialists become more proficient in sleep medicine, it is possible that more patients will be referred to their ongoing care.

**The proportion of patients accepted for an FSA receiving it within 6 months prior to and at conclusion of Pilot.**

Over the course of the pilot 11 patients were referred for Respiratory FSA and at 31 December 2008 eight patients had been seen for FSA. All these patients received FSA within six months of being added to the booking list for FSA and from first referral for sleep study.

**Systems in place for recording nursing and consultant contacts with patients.**

New data and contract codes have been created in WCDHB's patient management system to identify patients being treated through Nurse Co-ordinated Sleep Study. All staff with data entry responsibility for the service have been advised of which codes to use.

Quick reference data entry sheets were created for the Nurse Specialists and administration supporting data entry during pilot. An example of one of these data sheets is provided in Appendix 4. A referral processing flow chart was also created and is included in Appendix 5.

During the initial planning stage and throughout the project Grey Hospital's Central Booking Unit (CBU), has been consulted on the process for referral to Respiratory Medicine by the Nurse Specialists. Provision was made for formal written referral to specialist services in line with CBU requirements in standard forms and documents for the project. Documentation and processes have been satisfactory to date.

**Reports can be produced to identify sleep study referrals and track progress through the system.**

A new booking list has been created for sleep studies to ensure that all patients are recorded appropriately and accurately in the patient management system. A spreadsheet is also being maintained to track patient progress throughout the pilot and to provide additional data for reporting.

Reports from the patient management system can be run at any time with specified date parameters providing information on referrals and patient contacts.

**Audits run on data entry to ensure accuracy.**

Audits for accuracy and appropriate using of coding are written and in use.

## ***Budget***

A number of alterations have been made to the allocation of funds in the original budget plan as per discussions with the project's Ministry of Health contact.

### **Primary Care Re-assessments**

GP re-assessments were requested by the Respiratory Nurses for some patients referred for Level 4 Sleep Study more than six months prior to pilot commencement. At the time of pilot completion no invoices have been received for re-assessment and GPs report the patients concerned did not require re-assessment.

### **Additional RNS Hours**

Winter is an especially busy season for Respiratory. The addition of sleep to the RNS practice during this peak winter period placed additional pressure on their workload. Extra nursing hours were funded by the project to ensure project targets were met and the nurses were supported through this peak.

### **Budget Reconciliation**

A preliminary reconciliation shows the project budget to be underspent by \$4,307.90

	<b>Budget</b>	<b>Actual</b>	<b>Variance</b>
Staff costs (nursing, consultant and admin)	12,400.00	6,856.04	5,543.97
Training and consultation	3,400.00	3,788.23	-388.23
Travel expenses	4,900.00	5,444.52	-544.52
<b>Total</b>	<b>20,700.00</b>	<b>16,392.11</b>	<b>4,307.90</b>

## Additional Outcomes and Findings

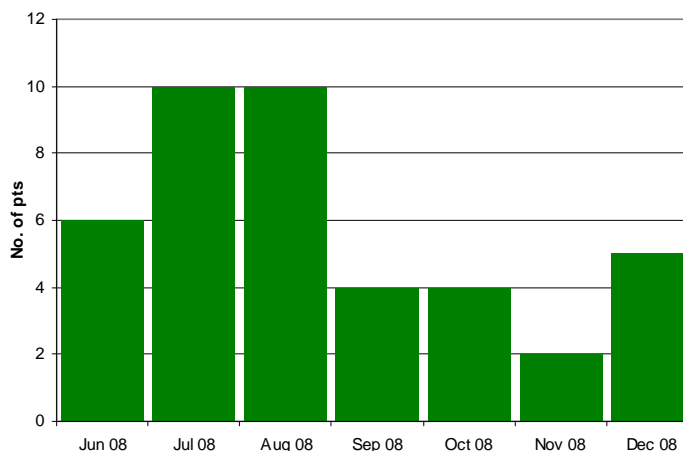
### Referral Trends

An initial influx of referrals was predicted at the beginning of the project and this did occur with 38 new referrals received by the end of August 2008.

This stabilised in September with between one and five referrals received each month to date.

Further monitoring of referrals over the coming year will be required in order to predict referral trends.

**Nurse Co-ordinated Sleep Study Referrals Received**



### Patient Group

Approximately half of the patients referred work in occupations that require use of heavy machinery or driving. These patients are at a higher risk of injury with untreated OSA.

77% of patients referred were male under the age of 65. The average age of all patients referred was 52.

Of all the patients referred, 60% had a Body Mass Index (BMI) greater than 30. Lifestyle changes, including weight loss, can provide improvements for patients with sleep disordered breathing.

Although many patients had a smoking history, only 3 were current smokers. Of all the patients referred 95% were non-smokers.

### Specialist Nurse Feedback

Co-ordinating the service whilst managing existing workload is manageable within current RNS FTE provided seasonal peaks and troughs in demand for RNS input for general respiratory patients is planned for and managed.

The Respiratory Nurse Specialists and visiting Sleep Nurse Specialist have communicated positive feedback on the new service.

### Rae Smith, Respiratory Nurse Specialist - WCDHB

*"I have been working with Respiratory patients for 10 years now and this is the first structured project I have undertaken. For the last five years I have seen an increase in the number of referrals for patients to be assessed for sleep apnoea. At that time patients were assessed by the CDHB and they were followed up in a random fashion in the Respiratory clinic. There was no one on the Coast involved in sleep medicine and some patients were still waiting to be seen after four years.*

*With this project I have enjoyed having a proper referral service and timelines for which assessments and follow-ups are completed, as well as support from a physician dedicated to sleep studies. This is something we already have in our general Respiratory service. It is also refreshing to have outcomes and treatment completed for these patients when they are discharged from the service.*

*Our working relationships with CDHB have become a lot stronger and we value their support and expertise. We have weekly meetings via teleconference to discuss patients and I believe this model could be utilised a lot more to involve specialists from other areas."*

### **Sally Powell, Sleep Nurse Specialist - CHSDU**

*"It has been a fantastic project, which has been a huge improvement to the people of the Coast, and credited to the team of CNS's on the Coast. I believe that Rae and Wendy have taken to the sleep world incredibly well, this may be due to the fact that one is always with Chris in his clinic and they have learned the basics before starting to do it themselves.*

*The weekly communication meetings have been crucial to the success and speed of the process. The only delay is the next step of the process, whether this be for higher level study or commencement of CPAP, both being relied upon Christchurch where the list is immense - I can't wait until the Coast are able to do this step, for the sake of the patient.*

*I think that at the start we are always too critical and over cautious with assessment, but as the process continues, it gets better. The follow-up of some of these patients is able to be done in conjunction with a CNS and Consultant - the virtual concept appears to be working well here, and for the odd patient on the Coast."*

## **Summary Conclusions and Recommendations**

The Nurse Co-ordinated Sleep Study pilot has achieved its aims and established a new service catering for a group patients previously without a clear pathway for diagnosis or management of their condition. The model implemented provides GPs with a pathway to ordering investigations related to sleep medicine and a mechanism for follow-up on results and advice for ongoing management. Results of satisfaction surveys will not be available until March/April 2009 but anecdotally it seems that GPs feel reassured that a service is now available on the Coast.

WCDHB's pilot model mirrors those already in place at the CHSDU, in private sleep clinics, and with providers contracted to provide sleep services to DHBs in other parts of the country. The key to the success of WCDHB's model has been maintaining strong links with a specialist physician in monitoring of results and ongoing education for the Nurse Specialists in how to deal with more complex cases. This component of the service does not form part of the models implemented by some of the private services investigated during the planning stages of the pilot.

The service is continuing post pilot with auditing every three months over the next year or so to monitor performance and implications on funding, staffing levels, etc.

### **Funding**

In its current configuration the service appears to be financially viable and without the need for alteration to existing funding arrangements, however review of this situation will need to form part of continual monitoring as the service grows.

A review of the funding arrangement between West Coast and Canterbury DHBs for sleep services is recommended in the long term to ensure that funding is being applied appropriately.

### **Opportunities for Other DHBs**

Level 4 Sleep Study is an investigation that could be conducted and reported by a Medical Technician or a Practice Nurse provided appropriate training in how to co-ordinate studies is delivered and supported with supervision by a specialist physician or GP With Special Interest.

For DHBs wishing to reduce or eliminate demand for Level 4 Sleep Study as an initial investigation for sleep disordered breathing, the model trialled at WCDHB could easily be put in place utilising specialist nurses, or could be implemented across a region for uptake by GPs and Practice Nurses on a patient pays basis.

## **Future Development**

### **Higher Level Investigations**

Feedback from the Sleep Technician at the CHSDU recommends the availability of a slightly higher level screening study, e.g. ApnoeaLink, which is being used in Australia as a screening tool. This type of study records and analyses airflow as well as oximetry and pulse which provides an Apnoea/Hypopnoea Index (AHI) as well as a Desaturation Index (DI)

*“The AHI determines OSA severity along with DI but with airway flow data we can also see Upper Airways Resistance. UAR can result in poor quality sleep and therefore a lot of symptoms associated with sleep deprivation. It can more accurately determine treatment pathways, e.g. ENT consult.”*

The CHSDU currently has five patients from the West Coast waiting for ApnoeaLink, which is co-ordinated by courier as per the pre-pilot Level 4 Sleep Study service. Co-ordination of an ApnoeaLink service on the West Coast would require additional capital expenditure. Data produced from monitoring of the service will provide information on the number of patients referred on to the CHSDU for ApnoeaLink following Level 4 Sleep Study. If numbers are significant the option of introducing ApnoeaLink on the West Coast will be discussed with management to determine financial viability and long term sustainability.

### **CPAP Therapy**

West Coast patients requiring Positive Air Pressure Therapy are currently managed by the visiting Sleep Nurse Specialist and CHSDU as per the IDF funding arrangement. The pathway for patients requiring CPAP following diagnosis would be streamlined if West Coast DHB could provide this service, however it is likely that additional commitment of Respiratory Nurse Specialist FTE would be required. At present this is not considered to be a viable option.

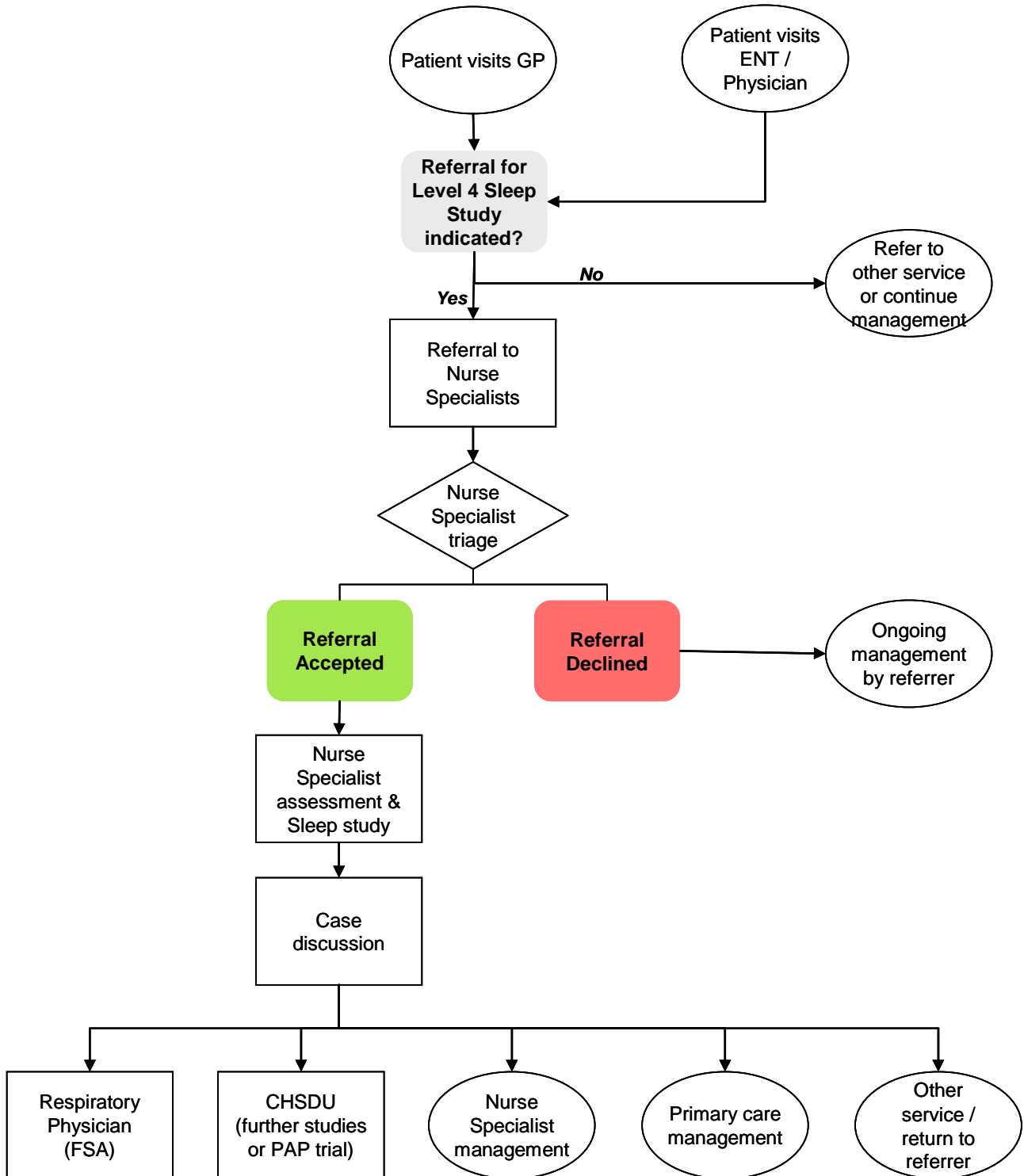
If funding arrangements with CDHB were reviewed it is possible that necessary funding for additional FTE could be raised. This recommendation will be discussed further with WCDHB and CDHB Planning and Funding and operational managers as the service progresses.

### **Work with Other DHBs**

Apart from the West Coast, the CHSDU provides diagnostic and management services to other regions. The West Coast DHB model could easily be implemented in these regions utilising documentation developed for West Coast DHB's Respiratory Nurse Specialists.

# APPENDIX 1

## Pilot Service Flow Chart



## APPENDIX 2 Referral Form

REFERRAL FOR SCREENING ASSESSMENT OF SLEEP DISORDERED BREATHING		
<b>Mail To:</b>	<b>Respiratory Nurse Specialists Community Services Grey Base Hospital PO Box 387 GREYMOUTH 7801</b>	<b>For further information contact:</b> Rae Smith or Wendy McNeish Ph: 03 768 0499 ext 2757 Fax: 03 768 2793 Email: <a href="mailto:wendy.mcneish@westcoastdhb.org.nz">wendy.mcneish@westcoastdhb.org.nz</a> <a href="mailto:rsmith@westcoastdhb.org.nz">rsmith@westcoastdhb.org.nz</a>
<b>PATIENT DETAILS (or affix label)</b>		<b>Date of Referral:</b> .....
<b>Name:</b> .....	<b>NHI:</b> .....	
<b>Address:</b> .....	<b>D.O.B.</b> ...../...../.....	<b>Age:</b> ..... <b>Gender:</b> M/F
.....	<b>Telephone:</b> Home: .....	<b>Work:</b> .....
<b>REFERRING PRACTITIONER</b>		
<b>Referrer Name:</b> .....	<b>Tel:</b> .....	
.....	<b>Fax:</b> .....	
<b>Practice Name &amp; Address:</b> .....	<b>Referring Practitioner Signature:</b> .....	
.....	.....	
<b>SLEEP DISORDER FOR INVESTIGATION</b>		
<input type="checkbox"/> Obstructive Sleep Apnoea <input type="checkbox"/> Other (please state) .....		
<b>CLINICAL INFORMATION</b>		
ESS (see over page) .....	<input type="checkbox"/> Snoring most / every night <input type="checkbox"/> Choking arousals / witnessed apnoeas <input type="checkbox"/> Daytime hypersomnolence <input type="checkbox"/> Sleepy when driving <input type="checkbox"/> Psychiatric co-morbidity <input type="checkbox"/> Cardiovascular co-morbidity	
Weight .....kg    Height .....cm		
Neck Circumference .....cm		
Occupation .....		
Desaturation Index (if known) .....		
Apnoea Hypoapnoea Index (if known) .....		
<b>Other Medical Problems:</b>		
<b>Clinical History:</b>		
<b>Other Relevant Information:</b>		
<b>Date received:</b> .....	<b>Received by:</b> .....	<b>Entered:</b> .....
<b>Date triaged:</b> .....	<b>Triage Category:</b> .....	<b>Patient type:</b> .....

## EPWORTH SLEEPINESS SCORE (ESS)

How likely are you to doze off or fall asleep in the following situations, in contrast to feeling just tired?

This refers to your usual way of life in recent times. Even if you have not done some of these things recently, try to work out how they would have affected you.

Use the following scale to choose *the most appropriate number for each situation*:

**0** = would *never* doze

**1** = *slight* chance of dozing

**2** = *moderate* chance of dozing

**3** = *high* chance of dozing

	Chance of Dozing (please circle)			
	0	1	2	3
Sitting and reading	0	1	2	3
Watching television	0	1	2	3
Sitting inactive in a public place (e.g. theatre, meeting)	0	1	2	3
As a passenger in a car for an hour without a break	0	1	2	3
Lying down to rest in the afternoon when circumstances permit	0	1	2	3
Sitting and talking to someone	0	1	2	3
Sitting quietly after lunch without alcohol	0	1	2	3
In a car while stopped for a few minutes in the traffic	0	1	2	3
<b>Total</b>				<b>/24</b>

# APPENDIX 3

## Respiratory Nurse Specialist Referral Prioritisation Criteria

**For patients with suspected sleep-disordered breathing and related conditions**

### **Priority 1 – Urgent**

*Next available appointment. Expected time frame less than 1 month.*

Any one of:

- Severe daytime sleepiness
- ESS > 16
- History of falling asleep driving
- Sleepiness related MVA
- DI > 20 or AHI > 40
- Known OSA on CPAP requiring review (compliance issues, incomplete symptomatic response)
- Significant co-morbidity - uncontrolled cardiac disease, hypertension or psychiatric disease
- Major interference with work or risk of loss of job
- Chronic (compensated) hypercapnic respiratory failure

### **Priority 2 – Semi-urgent**

*Expected time frame less than 3 months.*

Any one of:

- Mild-moderate daytime sleepiness
- ESS 10-16
- DI > 10, or > 5 with significant co-morbidity
- Controlled cardiovascular, psychiatric, respiratory disease
- Occupational driver without pathological sleepiness

### **Priority 3 – Routine**

*Return to GP care with management advice. May be accepted if capacity exists.*

- ESS < 10
- DI < 10 without significant co-morbidity
- Absence of suggestive clinical features

### **Insufficient Clinical Information**

*Refer to Nurse Co-ordinated Sleep Study Pilot Procedure. The referrer will be contacted to obtain more detailed clinical advice.*

***Referrals should ideally be on a Referral for Assessment of Sleep Disordered Breathing Form and include the following:***

- Details re snoring, witnessed apnoeas, choking arousals
- Assessment of daytime sleepiness
- Epworth sleepiness score
- Co-morbidity esp cardiovascular, respiratory and psychiatric
- Occupational information and other related risk activities
- Social impact
- Patient's weight and BMI
- Overnight oximetry (Level 4 Sleep Study) or similar
- Arterial blood gases or pulse oximetry if available

## APPENDIX 4

### Example Data Entry Quick Reference Sheet

#### ASSESSMENTS

1. Sleep Studies
2. New
3. Onsite / Outpatients Or Telephone
5. Sleep Disordered Breathing
6. Respiratory Nurse Led
7. Nurse Co-ordinated Sleep Study
8. Follow-up / Revisit
9. Overnight Oximetry

#### DOWNLOADING STUDIES

1. Sleep Studies
2. Indirect
3. Other
4. Sleep Study Downloads
5. Sleep Disordered Breathing
6. Respiratory Nurse Led
7. Nurse Co-ordinated Sleep Study
8. Follow Up / Revisit

#### CASE DISCUSSION PREPARATION

1. Sleep Studies
2. Indirect
3. Other
4. Case Discussion Prep
5. Sleep Disordered Breathing
6. Respiratory Nurse Led
7. Nurse Co-ordinated Sleep Study
8. Follow Up / Revisit

#### CASE DISCUSSION

1. Sleep Studies
2. Consultation / Liaison
3. Telephone
4. Case Discussion
5. Sleep Disordered Breathing
6. Respiratory Nurse Led
7. Nurse Co-ordinated Sleep Study
8. As per outcome of case discussion

## NURSE CO-ORDINATED SLEEP STUDY ISOFT CONTACTS DATA ENTRY GUIDE

**Edit Contact**

Purpose: 1 Sleep Studies      Prof. Carer: McNeish, Wendy

Type: 2 New      Team: 5 Sleep Disordered Bre

Location Type: 3 Onsite / Outpatients       Specialty: 6 Respiratory - Nurse Led

Location: 4 Type relevant text here

Health Org.:       Contract: 7 Nurse Co-ordinated Slee

Category: DHB Funded Purchase

- Contact/Journey Times

	Date:	From:	Duration:	To:	
Contact:	28/07/2008	15:00	1 Hours	28/07/2008 16:00	<input checked="" type="checkbox"/> Actual
Outward:	//	:	Minutes	//	:
Inward:	//	:	Minutes	//	:

Outcome: 8 Follow Up / Revisit      DQA Reason: Not Specified

Comments: 9 Type relevant text here

# APPENDIX 5

## Referral Processing

