HRC REF
10/510

Research for New Zealand Health Delivery
Project Full Application (HD210F)

Applicants are advised to:
1) confirm that they have been invited to submit a full applicaton;
2) confirm which Investment Signal fund they have been approved to apply for;
3) read the Guidelines for definitions and instructions before completing this form;
4) read the HRC Rules for applicant eligibility criteria and budgetary entitlements;
5) confirm the application due date for hardcopies and electronic files;
6) ensure that the correct version of this application form is used.

Incomplete or late applications will not be accepted.

Indicate type of computer used to complete this form (X): **Windows PC**: X or, **MAC**:

Double-click header, replace "10/xyz" with your application Ref#; replace "NI surname" with your surname. Double-click elsewhere on the form to return to main part of form. Enter the Ref# in the box at the top of the page.

MODULE 1: GENERAL INFORMATION

Research Title *(limit to 80 characters and spaces)*		
Intervention study of children at high risk of chronic lung disease		
Host Organisation	Clinical Centre for Research and Effective Practice (CCREP)	
Research Location	Counties Manukau District Health Board	
Total Cost of Research	$1,198,758	From Budget
Commencement date	01 August 2010	Day/month/2010
Term	36	Months

First Named Investigator			
Title	First Names	Surname	Ethnic Identity**
Doctor	Adrian	Trenholme	
Doctor	Catherine	Byrnes	
Email address	atrenholme@middlemore.co.nz		
Organisation	Counties Manukau District Health Board		

** Optional

Lay Summary of Research (150 word limit)

Include research objectives, principal methodologies and how the outcomes will deliver to key objectives of the Investment Signal.

The objective is to reduce the development of chronic respiratory infective, and often irreversible, disease which develops subsequent to a severe lower respiratory infection in early childhood in the predominantly Māori and Pacific children of South Auckland. Following hospital admission at <2 years age in a first ever trial, 400 children will be randomised to 'usual' care or to receive an 'intervention programme' based on a model of care employed to reduce early lung disease in children with cystic fibrosis. The international hospital-based programme will be adapted to be delivered locally and in a community setting. The desired outcome is a 50% reduction in respiratory morbidity within 24 months achieved in a cost-effective manner. If successful, we will have developed a multi-disciplinary programme with family-community-hospital partnership applicable throughout New Zealand and internationally to improve health care delivery to high risk populations with the additional prevention of lifelong disease.

List of Named Investigators

Details must be the same as those in the individual CVs in Module 6

Copy and paste table for additional names

Named Investigator 2

Title	First Names	Surname	Ethnic Identity**
Dr	Catherine	Byrnes	
Email address	c.byrnes@auckland.ac.nz		
Department	Paediatric Department, Faculty of Health & Medical Sciences		
Organisation	University of Auckland		
Role in project	Co Principal Investigator		

** Optional

Named Investigator 3

Title	First Names	Surname	Ethnic Identity**
Dr	Harley	Aish	
Email address	harley@aish.co.nz		
Department			
Organisation	Bairds Rd Family & Christian Health Centre		
Role in project	Primary Care Advisor and General Practitioner		

** Optional

Named Investigator 4

Title	First Names	Surname	Ethnic Identity**
Mr	Henare	Mason	Māori
Email address	MasonH@middlemore.co.nz		
Department	Projects Manager Māori Health		
Organisation	Counties Manukau District Health Board		
Role in project	Māori Advisor		

** Optional

Named Investigator 5

Title	First Names	Surname	Ethnic Identity**
Dr	Teuila	Percival	
Email address	tpercival@middlemore.co.nz		
Department	Kidz First Children's Hospital and Community Health		
Organisation	Counties Manukau District Health Board		
Role in project	Pacific Advisor		

** Optional

Named Investigator 6

Title	First Names	Surname	Ethnic Identity**
Prof	Diana	Lennon	
Email address	d.lennon@auckland.ac.nz		
Department	School of Population Health		
Organisation	University of Auckland		
Role in project	Co-investigator		

** Optional

Named Investigator 7

Title	First Names	Surname	Ethnic Identity**
Ms	Joanna	Stewart	
Email address	j.stewart@auckland.ac.nz		
Department	Section of Epidemiology and Biostatistics, SOPH		
Organisation	University of Auckland		
Role in project	Biostatistitian		

** Optional

Named Investigator 8

Title	First Names	Surname	Ethnic Identity**
Ms	Charissa	McBride	
Email address	cmcbride@middlemore.co.nz		
Department	Kidz First Children's Hospital and Community Health		
Organisation	Counties Manukau District Health Board		

Role in project	Nurse Researcher, Study co-ordinator

** Optional

Named Investigator 9

Title	First Names	Surname	Ethnic Identity**
Ms	Karen	Hoare	
Email address	Lecturer / Nurse Practitioner		
Department	University of Auckland/Greenstone Family Clinic		
Organisation	University of Auckland		
Role in project	Co-investigator and Advisor		

** Optional

Named Investigator 10

Title	First Names	Surname	Ethnic Identity**
Mr	William	Leung	
Email address	w.leung@auckland.ac.nz		
Department			
Organisation	University of Auckland		
Role in project	Co-Investigator/Health economist		

** Optional

Named Investigator 11

Title	First Names	Surname	Ethnic Identity**
Dr	Russell	Metcalfe	
Email address	Russell.metcalfe@adhb.govt.nz		
Department	Department of Radiology Starship Children's Hospital		
Organisation	Auckland District Health Board		
Role in project	Paediatric Radiologist		

** Optional

MODULE 2: RESEARCH

Section 2A – Summary of Proposed Research (1 page limit)

Relevance to Investment Signal: The primary outcome is to determine whether an international model of care from the specialised patient population of cystic fibrosis (CF) can be adapted as an intervention programme to be delivered in a local and community setting to a NZ paediatric Māori and Pacifica population at high risk of developing chronic lung disease. This will lead to early detection, improve diagnosis, provide intervention and therefore lead to a significant reduction of ongoing respiratory morbidity within 24 months. The programme incorporates a multi-disciplinary approach with Māori, Pacific, primary, secondary and tertiary care as participants. Cost and cost effectiveness will be assessed as an integral part of this study.

Hypothesis: An early intervention programme based on CF care will reduce respiratory morbidity (chronic moist cough (CMC), moist cough in clinic (MCIC), & chest Xray (CXR) abnormalities by 50% in 24 months.

Aims: To reduce respiratory morbidity in the predominantly Māori and Pacific children of South Auckland (SA) which develops subsequent to an admission for severe lower respiratory infection (LRI) by adapting the model of care employed for children with CF. To determine if this also decreases the presence of CSLD (including bronchiectasis) at age 2 to 4 years.

Research Design and Methods:

Participants: Children <2 years age admitted to SA with *severe* LRI (pneumonia and/or bronchiolitis - admission ≥5 days and/or supplemental oxygen for > 48 hours and/or admission to Intensive care unit, and/or consolidation on CXR) between 1st Aug 2010 & 31st Oct 2011.

Design: A randomised controlled study enrolling 400 children to either 'intervention' or 'control' groups. All children will have an initial assessment during the index admission and will complete a 24 month final outcome visit with clinical assessment, standard questionnaire, examination, CXR, upper airway or sputum cultures.

Intervention (n=200): The intervention programme is based on the CF model of care for early childhood with regular clinic review for any deviation from normal health and to institute early treatment and/or preventative care. Reviews will be undertaken as a minimum at 1-3, 6, 9, 12, 15, 18, 21 and 24 months after the day 0 assessment and as required in one of three community centres (Otara, Mangere, Manurewa) staffed by the nominated general practitioner (GP) or nurse practitioner and practice nurse. Any child with ongoing respiratory problems will be referred to the Paediatrician clinic for further management and immediate discussion/transfer to paediatric respiratory specialist care as needed. Co-ordination will be undertaken by the study respiratory nurse who will attend all clinics and will undertake follow up in the community of any non-attenders.

Control group (n=200): The families will receive the current 'usual care' which is GP review for family directed health concerns with re-referral to paediatric services as necessary.

Statistics: Assuming 80% retention with 40% of controls having chronic respiratory symptoms (less than seen in our pilot studies) there will be 91% power to detect a 50% reduction at the 1% level of significance.

Main Outcome Measures:

Primary Endpoint: Evidence of respiratory morbidity at 24 month follow up during a time of stability, as assessed by:

- CMC on history (defined as daily moist cough for >3 months or 3 or more episodes of moist cough for > 1 month).
- And/or abnormal CXR Brasfield score of ≤ 22/25 (25/25 = normal).
- And/or abnormal clinical examination (defined as clubbing and/or MCIC and/or crackles on auscultation).

Secondary Endpoints: Readmissions with LRI, medically attended LRI/wheezing episodes/asthma diagnosis all CXR changes, Bx on HRCT when requested, nasal swab/sputum cultures, estimation of direct health costs of intervention.

Costs and Cost effectiveness: 95% confidence intervals for incremental cost-effectiveness ratios and cost-effectiveness acceptability curves will be calculated for endpoints to compare the intervention with usual care. Only direct costs of health care will be included.

Anticipated Impact and Timeframe for Benefit to End-Users:

This seeks to apply a low technological, multi-disciplinary clinical intervention by current personnel to reduce the precursors of chronic lung disease for children at risk, by 50% within 24 months. If proven successful and cost effective, we will have developed an evidence based standard of care and a community based programme applicable throughout New Zealand and internationally to improve health care delivery to high risk populations. It will improve current inequity of health outcomes and be able to prevent lifelong disease.

Section 2B – Description of Proposed Research

Rationale for Research

"We have been watched enough, please do something" (quote from Māori parent whilst consenting to be part of the LRI follow up study).

Lower respiratory infection (LRI) is a significant problem for NZ children and the proposed intervention is a programme of change with regular clinical follow-up combining two approaches that have been successful in other areas, firstly early intervention in children with cystic fibrosis (CF) internationally and secondly community based care in adults with chronic lung disease in South Auckland (SA). This type of randomised interventional study has never been previously undertaken. It will provide health benefit whilst determining the feasibility of instituting a new health care delivery model in the community and also collecting informative data for this disadvantaged population within the next five years.

LRI admission for NZ children: The NZ rate of hospital admissions for LRI (predominantly bronchiolitis or pneumonia) from 1996 to 2006 was 10.9/1000 for children <15 years, and for SA was 18.3/1000 - both very high by international standards[1]. In the < 2 year age group admissions for LRI are 103/1000 nationally but are again higher in SA at 177/1000. The relative risk of admission for LRI is 1 European, 5.2 Pacific and 2.9 Māori, in addition there was a 4.9 relative risk for those in the lowest socioeconomic quintile. When compared to population studies in the US and UK, this is an increase of 2.5 x overall, 4.5 x for Pacific, 3.5 x for Māori, and 4 x for those in decile 10 [2,3,4,5,6,7]. In 2000-2004 respiratory diseases in Māori children were the first to third most common reason for admission to hospital in the age groups <1year age, 1-4 years age, 5-14 years age, 15-24 years age[8]. Admission rates for LRI in the early age groups are also increasing over time and increasing in severity i.e. not associated with an increased admission of less severe disease. Bronchiolitis admissions increased 118% over a decade (1988-1998), accompanied by an increase in severity; from 25% requiring any support to 59% requiring oxygen, 21% nasogastric fluids, 22% intravenous fluids, 8% admitted with apnoea and 3.1% requiring ventilation[9]. Pneumonia also had an annual increase of 5% over 7 years (to 1995) with increased severity and again admissions were skewed towards the younger age group[10]. In the Pacific Island Family Study following 1398 children has shown that breathing problems (cough and wheeze) are the most frequent symptoms complained of by Pacific parents[11,12]. Elliot et al in 1971 surveyed 2143 pre-school Rarotongan children performing a chest x-ray (CXR) on every third child with abnormalities seen in 37% and peak age of abnormality 24 months[13].

Progression from LRI to Chronic moist cough (CMC), Chronic suppurative lung disease (CSLD) and Bronchiectasis (Bx): While the exact pathway from LRI to persistent and chronic respiratory symptoms and ultimately irreversible lung disease is not yet understood, cohort studies of Alaskan and Australian Aboriginal children have clearly demonstrated that early admission to hospital with severe LRI is strongly linked to later development of CSLD/Bx[14,15]. A follow-up study of Alaskan children subsequent to hospital admission with RSV bronchiolitis or pneumonia < 3years age demonstrated 46% with productive cough, 22% with chronic bronchitis and 10% with Bx at age 5 years. The relative risks were 3.9 if their CXR had shown parenchymal densities and 3.0 if there were persistent parenchymal densities for great than 6 months. A case control study of Aboriginal children in Australia demonstrated that a history of hospitalised pneumonia gave an odds ratio of 15.2 for developing Bx. Two studies have described the high rates of Bx in NZ children with 80% being Māori and/or Pacifica[16,17]. A prospective national surveillance study for all new cases diagnosed in 2001-2003 describe an incidence of 3.7 per 100,000 which is 3-18 times higher than described in other western countries[18,19] If all the children live to 15 years, this gives a prevalence of 1 in 3,000 overall, but 1 in 1700 in Māori and 1 in 650 in Pacifica. This means that the incidence in Pacifica is four times more common that CF in the general NZ population. The disease is more severe in our population than any other populations described with 81% bilateral disease and 64% having 4 or more lobes involved[20]. Ethnicity and deprivation are also strongly linked to morbidity and premature mortality for Bx in the SA adult population[21,22]. In both our NZ paediatric studies, the first hospital admission for respiratory disease had occurred 4 years prior, and mean duration of CMC 2 years prior to the diagnosis[16,17,20]. Despite extensive investigation only 10% had a specific underlying immune problem, again a smaller percentage than any other population described. It is therefore increasingly realised that a proportion of children progress from early, severe LRI to CMC, CSLD and/or Bx[23,24,25]. While we currently have trials of management underway to treat children with Bx, prevention of irreversible disease should be possible[26,27]. This has been the subject of a recent Thoracic Society of Australia and New Zealand task force in 2009 with the recommendations to be published[28].

Cystic Fibrosis Model of Care: CF is a genetically determined disease seen predominantly in European populations which also results in repeated and progressive lung disease. An increasing life expectancy with reduced respiratory and nutritional morbidity has already been achieved in children with CF using a clinical model of care with regular review from infancy, early detection of deviation from normal health and early intervention to prevent ongoing disease this has now been published as "Standards of Care" [29,39,31,32]. Leading research groups (NZ, Australia, Alaska, UK)[24,26,27,] have recommended a CF style approach for non-

CF Bx, but this is already too late to prevent the actual disease. *We believe that by commencing this early intervention programme when the risk factors for developing the disease rather than the disease itself appears* we will prevent respiratory morbidity and irreversible disease. This also requires taking the model outside of the specialised hospital clinics in which it is currently practised and basing it in the community[29,30]. We have the at risk population within a geographically constrained area, with known high end-disease prevalence of greater severity than those in other areas (suggesting under-estimation), and the connected multi-disciplinary team with which to conduct this research. This has been confirmed by our pilot study.

LRI follow up study of SA children: We conducted a prospective epidemiology study of LRI in children hospitalised in SA from August to December 2007 and found that 223 of 489 had a discharge diagnosis of pneumonia or severe bronchiolitis as defined for this application[33]. These were approached in order of enrolment for one year follow up. The first 130 were contacted and 94 (with a demographic profile the same as the study group overall) were able to be seen with a clinical review, examination, questionnaire and CXR. We found 50% had a significantly abnormal CXR, 30% had CMC and 30% had moist cough in clinic (MCIC) with only 20% well. In summary two thirds had evidence of continuing respiratory morbidity with one or more of these abnormalities 12 months after the index event of hospital admission even when reviewed at a time of stability.

Relevance to Investment Signal

a) Contribution to Purpose and Goals Outlined in the Investment Signal

Purpose: We seek to find a workable solution to the inequitable and escalating numbers of Māori and Pacific children and adults with chronic lung disease which the current healthcare system is struggling to accommodate and is dealing with in an ad-hoc manner. The primary aim of this investigator-led research is to determine whether an international model of care from the specialised patient population of CF delivered in tertiary hospitals can be adapted as an intervention programme and be delivered in a local and community setting to NZ Māori and Pacifica paediatric populations at high risk of developing chronic lung disease. It is in part also modelled on a community based programme that has been instituted in adults but with already established chronic lung disease in SA[34]. The proposal is innovative and will be the first ever randomised study of this intervention programme with the aim of prevention, rather than amelioration, of a disease process. The study is based in clinical practice with a multidisciplinary team involving primary, secondary and tertiary health care with clear roles and reciprocal lines of communication, and has Māori and Pacifica participants. The main outcome measure is a 50% reduction in the intervention group compared to the control group within 24 months. Although this study has a clear focus on health benefit, under the direction of the health economists, cost and cost effectiveness will be an integral part of the final assessment.

Goals: This study will contribute as the next step in developing the culture of child health clinical research in SA in partnership with families, community and health providers locally and to consolidate links overseas. The programme incorporates a multi-disciplinary approach with Māori, Pacific, primary, secondary and tertiary care as participants. We aim to achieve a significant reduction in ongoing respiratory morbidity in children in the intervention group using a community based and therefore accessible programme. If successful this will improve equity of health outcomes for a disadvantaged Māori, Pacifica and low socioeconomic population. The same programme of intervention may also improve the health disparities for other diseases that are also seen in higher numbers within these groups - such as otitis media, cellulitis, dental caries, and other infective diseases[27,35]. It could aid staff retention as it can be used by all health personnel and particularly nurse practitioners to run these clinics in the future. The programme will see benefits in real time and if proven successful the results will be translated and used to develop and apply new standards of care to this high risk group which will ultimately be relevant locally, throughout New Zealand and internationally.

b) Relevance to the Investment Signal Themes

The key to success of this research is adapting an international intervention programme which has already been effective in decreasing morbidity and increasing survival in children with cystic fibrosis and use it to improve clinical decision making for another local patient group at high risk of similar disease development. As well as improving decisions for individuals, it will also improve decisions around transfer to and from the hospital setting. There will be earlier referral and communication with more pertinent assessment and management and an earlier return to continued community follow-up. While the programme has a number of possible interventions, only those pertinent to provide the individual patient/family/whanau centred care will be used. It is the application of recently described medical information that is going to be used within this research proposal rather than new and/or expensive technology. By also using concepts which have been successfully undertaken in moving into the SA community the management, of adults with established lung disease, we have designed the programme to be accessible in the community. Three sites will be set up in areas of high need - Mangere, Manurewa and Otara - and run by nominated general practitioner (GP), nurse practitioner and practice nurses. As well as improved coordination of community, paediatric and specialist care, there will be improved integration of current community and public health systems that are already

available. This will enhance co-ordination of services across the sector with, as examples, use of local immunisation clinics, smoke cessation programmes, dental health care, and housing support. The interventional programme is deliberately using current health personnel in a more productive and effective manner and up skilling performance. As the research builds on current workforce capacity, we believe that the intervention programme will prove sustainable and cost effective. It may also improve capability and increase workforce capacity as once developed the programme can be implemented by nurse or other health worker led clinics. As decrease in respiratory illness is an aim of the study, it will ultimately improve the sustainability of hospital services with reduction in chronic lung disease and reduction of the need for secondary and tertiary specialist support. The model of enhanced primary care and nurse practitioner involvement is very much aligned to the current developments in primary care practise being developed at the Minister's request in SA, and our research is supported by the local primary care clinical governance group.

c) Contribution to Health Equity

Māori and Pacific populations have a higher prevalence of both acute (bronchiolitis, pneumonia, pertussis, tuberculosis) and chronic (bronchiectasis) respiratory tract infections than the general population. Furthermore, rates of all of these diseases are higher in NZ than other developed countries[1,2,8,10,17]. Following hospital admission for severe LRI in the first years of life, an event that has increased in frequency and severity over the past decade, children then suffer ongoing respiratory morbidity. Not only is this a problem in itself, but it can additionally translate into irreversible lung disease, premature death and chronic adult respiratory disease[36,37]. Significant mortality may not be identified until early adulthood, but the disparities across the population are extreme with death rates 5.9 times for females and 7.6 times for males in Māori compared to non-Māori. High rates of this endstage disease have also been documented for adults since the 1950s and in children since the 1970s[8]. So addressing this is not before its time. Poor access to healthcare, no follow up from hospital admission, poor access to health promotion programmes, environmental confounders and economic state rather than specific or genetic underlying disorders contribute to this burden as our own previous research has demonstrated[16,17,20]. This study will determine the success of an intervention programme designed to address a range of these problems, instituted early as triggered by one major risk factor for ongoing disease development. We see this as a new approach to address the health disparity that we see, with engagement of the affected families encouraged by access to the programme in the community.

d) Relevance to End-Users

We anticipate that in Auckland alone it would be relevant for 400-600 high risk children and their families/whanau each year. The research lends itself to the development of a model of care to follow-up and prevent both short term and long term respiratory disease subsequent to an index event. It is designed to take hospital specialist care to GP and practice nurse led clinics sited in areas of current greatest need. It has specifically incorporated other public health care systems available in the community, but not currently utilised as they all need to be accessed separately by families who are often disenfranchised. The intervention programme also provides criteria for referral both to but also from paediatric and specialist services early in a disease process rather than waiting for established disease. The whole programme is therefore built on current personnel and more effective use of health care available, not only in the region in which this study will be undertaken but is also available nationwide in NZ. The costs and cost effectiveness of the intervention programme will be calculated but we do not anticipate a future significant additional resource need. Development of multidisciplinary and multicultural research team personnel and expertise embedded in this highly disadvantaged population is an important component of this application.

Research Design and Methods

Aims: To reduce respiratory morbidity in the predominantly Māori and Pacific children of SA which develops subsequent to an admission for severe LRI by adapting the model of care employed for children with CF. To determine if this also decreases the presence of CSLD (including Bx) at age 2 to 4 years.

Hypothesis: An early intervention programme based on CF care will reduce respiratory morbidity CMC, MCIC, & chest Xray (CXR) abnormalities by 50% in 24 months.

Design: A randomised controlled intervention study in which 400 SA children will be enrolled with half having an intensive intervention programme performed by an integrated multidisciplinary team with a minimum of three monthly clinic visits compared to a control group of current 'usual care' as currently practised in SA with GP and paediatrician review on an as needed basis. The intervention includes: vigorous antibiotic therapy for LRI and/or wet cough, chest physiotherapy, asthma therapy, smoking cessation education, immunisation (including Influenza and Pneumococcal vaccines), nutritional support, dental reveiw, community health worker engagement, routine clinical management of co-morbidities and referral to other appropriate medical/social/financial services. Both groups of children will be assessed after 24 months.

Participants: SA children <2 years admitted to hospital with *severe* LRI (pneumonia or bronchiolitis - admission ≥5 days, supplemental oxygen for >48 hours and/or admission to intensive care unit, and/or consolidation on CXR) after August 1 2010 with enrolment of 400 anticipated to be complete by October 31 2011. A retrospective epidemiology study in SA 2002-2006 found on average 1048 children under two years of age admitted to hospital with LRI per year with just over 50% of these considered severe as described in this study, making approximately 500 eligible children per calendar year with the majority admitted during the winter months of July through to October.
Exclusions:

- Children with more than two prior admissions to hospital with LRI
- Prematurity <32 weeks gestation
- Children with a diagnosis of chronic lung disease
- Children known to have chronic health problems of clinical significance affecting daily life:
    - cardiovascular
    - neurological
    - immunodeficiency
    - multiple congenital abnormalities
    - enteral feeding

Primary Endpoint: Evidence of respiratory morbidity at 24 month follow up during a time of stability, as assessed by:

- CMC on history (defined as daily moist cough for >3 months or 3 or more episodes of moist cough for > 1 month).
- And/or abnormal CXR Brasfield score of ≤ 22/25 (25/25 = normal)[38].
- And/or abnormal clinical examination (defined as clubbing and/or MCIC and/or crackles on auscultation).

Secondary Endpoints:

- Readmissions to hospital with LRI
- Medically attended LRI episodes treated by primary care and emergency care
- Medically attended wheezing episodes/asthma diagnosis by medical practitioner
- All CXR changes
- Bx on HRCT when requested as part of Starship Hospital clinical guideline for the work up of CSLD
- Nasal swab/sputum cultures positive when taken as part of routine clinical care
- Estimation of direct health costs of intervention care and control care

Methodology:
Enrolment: Children will be identified as eligible for this study during the index admission with severe LRI. They will be approached by the study recruitment nurse and/or CHW and/or study respiratory nurse team where study information will be provided and consent sought. Children will be randomised to a control or intervention group as outlined below.
Index Admission:

Initial assessment The following data will be collected on all children in both groups:

- Demographic details
- Respiratory Symptoms questionnaire
- Examination
- Medical history
- CXR report (for later review) if performed

Initial management for intervention group: The areas identified, for education, and/or referral and/or management will be instituted as described under the primary intervention clinics and coordinated with hospital discharge plans.

A primary clinic appointment will be made for 1 to 3 months depending on need. The CHW will contact the families after one month to reassess progress and arrange an earlier clinic appointment if required .

Control Group (n=200)
These children will receive an initial assessment in hospital and then current 'usual care' in SA. Usual care consists of GP review for family directed health concerns, well child and immunisation visits, with re-referral to paediatric services if there are clinical concerns and then primary, secondary and tertiary health care as it is currently provided. Following admission to hospital with LRI few children have secondary care follow up (7.3% from 2007/08 LRI epidemiology cohort). It would be very unusual for any of these children to be intensively managed in the way outlined in the intervention. The children and their families will be contacted at one year by the CHW to maintain contact and to review primary and secondary health care contacts,

medication use and current health status. They will be reviewed in clinic two years following their index admission with severe LRI and will be assessed in the same way outlined for the intervention group.

Intervention Group (n=200)
These children will receive an adapted programme based on the CF model of care for early childhood. The essence of this model of care is for regular review from infancy, early detection of deviation from normal health and early intervention to prevent ongoing disease. The key to success for this project is the engagement, support and rigorous follow up for children and their families. The CHW has a central role in this process alongside the practice nurses and study respiratory nurse and experienced local GPs in addition to secondary and tertiary teams. Co-ordination will be undertaken by the study respiratory nurse who will attend all clinics and will undertake follow up in the community of any non-attenders with assistance form the CHW.
The model of care was developed by the need to show applicability of results to the current health system balanced by the need for vigorous research outcomes.
Intervention includes:

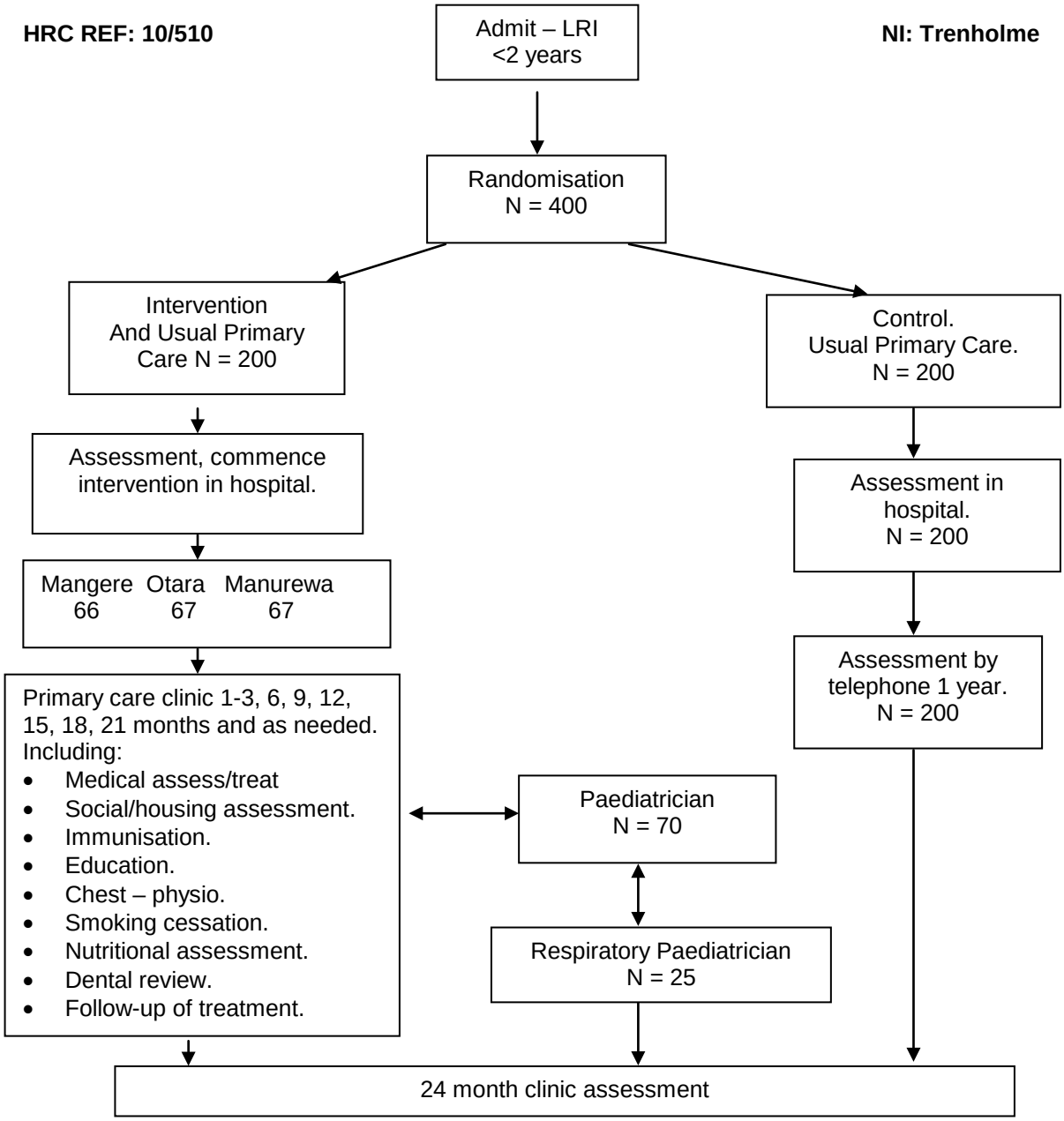
- Antibiotic therapy for LRI or wet cough - an action plan for the treatment of respiratory infections will be developed with the family and copied to the identified primary care practitioners
- Chest physiotherapy - education and demonstration by the study nurse or physiotherapist
- Asthma therapy - according to PSNZ Asthma Guidelines[39]
- Smoking cessation education for family members
- Immunisation with routine, Influenza and Pneumococcal vaccines where indicated
- Nutritional support to optimise growth
- Dental assessment where necessary
- Community Health worker engagement
- Routine clinical management of co-morbidities e.g. gastro-oesophageal reflux
- Referral to other appropriate medical/social/financial services.
- Rigorous follow up of all interventions to ensure family engagement in response

Study Setting: We have three centres based in primary care staffed by primary care practitioners and supported by CHWs with close support from secondary and tertiary health practitioners. We anticipate that one third of children enrolled to the primary intervention group will have few respiratory problems and one third will have moderate respiratory problems well managed by 3 monthly primary care follow up. The remaining third will have challenging respiratory problems requiring the most intensive input and management involving secondary and tertiary care. The research group involving all clinical staff and investigators will have monthly Friday morning two hour meetings to coordinate research activities and any arising clinical matters. We will provide three levels of care as outlined below:

Primary clinic (n=200) Following initial assessment the intervention group will be reviewed at least three monthly throughout two years in the primary clinic. A standardised process of assessment, action, follow up and referral (decided by consensus from the primary secondary and tertiary teams) will be performed as outlined below. The three clinics are in high deprivation areas of Otara, Mangere and Manurewa in SA . Three GPs and one nurse practitioner within three practices have agreed to participate and have had input to this proposal. Families of children randomised to intervention are able to choose which clinic to attend. Children will continue to access their own family GP for all other health matters. Their GP and well child provider will be provided with full information about clinic visits and outcomes and be supported in their role as the primary health practitioner. The clinic primary health care practitioners will have immediate access to communication with a paediatrician and/or respiratory paediatrician and/or allied health support in addition to usual referral pathways.

Paediatrician clinic (n= approx 70) This clinic will be based in a CMDHB outpatient centre. Allied health support including physiotherapists, dietitian, and social worker will be available at these clinics. Study respiratory nurse and CHWs will also be available to this clinic.

Respiratory Paediatrician clinic (n=approx 25) The respiratory paediatrician will see children at either CMDHB or Starship* hospital depending on clinical need. Study respiratory nurse and CHWs will be available to this clinic.



PRIMARY INTERVENTION

Staffing: Each primary care centre will be staffed by a GP, nurse practitioner and practice nurse supported by the study respiratory nurse. All staff will undergo an intensive education programme relating to all aspects of the intervention.

Clinic frequency: Each child will have booked clinic reviews at 1-3, 6, 9, 12, 15, 18, 21 and 24, months after the day 0 assessment as a minimum. It is anticipated we will have an average of two additional clinic visits to follow up on required interventions.

Study Procedures

Assessment

Demographic details: address, telephone contact, caregiver details and social circumstances including access to medical care, housing details, smoking and other known risk factors will be asked in a standard format.

Respiratory symptoms questionnaire: will be completed based on that using the same questionnaire as the international Bx Intervention Study (Byrnes C, et al, 2008) which was piloted in the one year follow up study.

Medical history: will be collected using a standardised data sheet/case report form including birth history, immunisation status, breast feeding, feeding issues (including gastro-oesophageal reflux), family history (including atopy), medication, social issues and new diagnoses.

Primary care LRI episodes: will be collected through history and contact with primary care providers. The data will include number of consultations and number of courses of antibiotics collected in a standard format.

Hospital admissions (including short stay admissions): will be collected by chart review. Information will be recorded on the diagnosis, severity, treatment and radiological investigations.

Clinical Examination: will include height, weight, presence of wet cough, MCIC, wheeze, clubbing, chest deformity, pulse rate, respiratory rate, subcostal in-drawing, accessory muscle use, cyanosis, hyperinflation, chest asymmetry and auscultation including presence of wheeze and/or crackles, dental review, cardiac auscultation and standard nose and throat assessment.
CXR: will be routinely performed at three months and again at 2 years after the index hospital admission and in addition as clinically indicated by consensus guideline. All CXRs will be reported by a paediatric radiologist blinded to the clinical information, using the WHO definition of alveolar consolidation[40] and the Brasfield score (≤22/25 is definitely abnormal) [38].
Management:
Management of Moist Cough/Abnormal CXR: Children identified with CMC and/or MCIC and/or crackles will be prescribed antibiotics for 14 days with daily family physiotherapy and reviewed. If signs and/or symptoms persist after two such courses they will be referred to the paediatrician clinic. Children with an abnormal CXR will have the CXR repeated at three months and if persistently abnormal will be discussed with the Paediatrician.
Children with a clinical diagnosis of CSLD including Bx will be referred to the Paediatrician clinic or direct to the respiratory Paediatrician if deemed necessary by the Paediatrician.
General Management: Children who have recurrent wheezing will be assessed using the current Paediatric Society of New Zealand guidelines for asthma 1-15 year olds[39]. Follow up of any medical intervention and review progress to assess effectiveness will be arranged. Social and housing issues identified during clinic visits will be referred to the appropriate local agencies. Medical problems identified during clinic visits will be managed by the clinic Doctor or practice nurse and referred to an appropriate agency (e.g. ENT for CSOM).
Physiotherapy: The clinic nursing staff will educate and demonstrate how to perform chest physiotherapy for children identified with wet cough.
Housing: Families identified who are eligible for local health housing and insulation schemes will be referred with family consent. Support letters for any required housing improvements for families living within housing NZ houses will be provided where appropriate.
Social: Families identified with child protection or family violence issues will be assessed and referred according to local guidelines. Families identified as having financial and transport issues reducing access to health care will be referred to appropriate agencies.
Nutrition: All families will be educated on appropriate nutrition for the age of the child. Children identified with chronic respiratory issues or nutritional issues will receive specific nutritional advice relevant to their needs. Prescriptions will be provided for identified iron and vitamin deficiencies. Children with failure to thrive or obesity will be discussed with a paediatrician.
Dental: All children will be provided with free age appropriate dental hygiene products and given demonstration on appropriate use. Children identified with caries will be connected with local dental providers and educated about risk factors for caries development.
Immunisation: Immunisation status will be checked with parents/caregivers and the National Immunisation register. Catch up immunisations will be referred to the child's GP and/ or arranged in clinic by agreement with the usual practitioner. Influenza immunisation will be arranged for all eligible children.
Skin: Information will be given to all families/whanau on skin hygiene and common skin conditions such as insect bites, cellulitis and eczema. Children with significant identified skin conditions such as moderate to severe eczema will be treated as needed and referred appropriately.
Smoking*:* Families identified as smoke exposed will be offered smoking cessation programmes including medication. Clinic staff will be certified to educate and prescribe medication as part of the CMDHB smoking cessation programmes.
Communication: All GPs and WCC providers will be notified of any child who is enrolled in the study and study information and contact details for the study team made available. A clinic letter summarising the clinic assessment and medical plan (where appropriate) will be sent to the designated GP and the family.

SECONDARY INTERVENTION
Staffing: Each secondary clinic will have a paediatrician, study respiratory nurse, CHWs with access to dietitian, physiotherapist, dental assessment and social worker.
Clinic site: Manukau Super clinic
Clinic work load: We anticipate needing to evaluate and follow up 70 children. It has been accepted by the child health service manager at Kidz First Children's Hospital that these children are eligible.
Referral criteria: The children will be referred by the primary care clinic because of one of the following:

- Suspected chronic lung disease and/or Bx due to history of CMC, abnormal examination, or persistently abnormal CXR
- Diagnostic difficulties e.g. asthma
- Unresolved problems identified in primary clinic requiring input from the Paediatrician or allied health
- Primary Care request

Procedures:

- Engagement with the family/whanau through the CHW
- Detailed review of clinical history, examination, investigations and diagnosis made
- Intensive efforts to address modifiable factors identified in primary clinic with input from allied health workers
- Intensive respiratory therapy:
    - Physiotherapy education, demonstration review and follow up
    - Re-inforce smoking cessation interventions
    - Vigorous antibiotic therapies including intravenous treatment where necessary
    - A home assessment will be arranged
- Follow up:
    - Frequent follow up both in clinic and community follow up will be arranged from weekly to three monthly according to clinical need.
- Investigations:
    - Stage 1 of Starship Hospital's Bx protocol (including HRCT) when indicated:
        - CMC unresponsive to therapy after 6 months
        - Clubbing
        - MCIC or clinical signs at consecutive clinics of more than two clinics per year
        - CXR consistent with Bx or persistent abnormality over 3 months
        - CMC with recurrent wheezing
- Discuss with Respiratory Paediatrician:
    - HRCT diagnosis of Bx
    - Clinical CSLD but HRCT not diagnostic

TERTIARY INTERVENTION

Staffing: The tertiary clinic will have a respiratory paediatrician, study respiratory nurse, CHWs, (link to current CHW service) with access to dietician, physiotherapist and dental assessment and social worker through tertiary respiratory clinic.

Clinic site: Manukau Super clinic and/or Starship Hospital. We anticipate needing to evaluate and follow up 25 children. It has been accepted by the child health service manager at Starship Hospital that these children are eligible.

Referral criteria: The children will be referred by the secondary care clinic because of one of the following:

- Children with diagnosed of CSLD
- Children with HRCT diagnosis of Bx
- Children with diagnostic uncertainty e.g. asthma/Bx/primary ciliary dyskinesia
- Paediatrician request

Procedures:

- Complete investigations in accordance with Starship's Hospital Bx guideline.
- Sweat test where indicated
- Bronchoscopy/bronchoalveolar lavage when indicated
- Nitric oxide testing where indicated
- Formal lung function testing where possible
- HRCT where indicated
- Tertiary care allied health assessment and treatment including speech language therapist
- Tertiary care treatment and follow up for children identified with CSLD and Bx

24 month final outcome clinic visit: All children in both the intervention and control groups will undergo the same clinical assessment in the primary care clinic completing a standard questionnaire, examination, CXR and data form as outlined under *"Primary intervention see subheading: Assessment*". It will not be possible to effectively blind assessors to treatment group. Both intervention and control groups will be seen mixed within the same clinics with no overt designation of group allocation. The assessment will be performed by a GP or Paediatric fellow who is independent of the intervention teams. Children in the control group identified with possible or probable CSLD or other significant health issues will be referred to appropriate health care agencies. The Paediatrician and Respiratory Paediatrician will be available to consult on health issues identified in the control group children and will closely supervise this final clinic.

Costs and Cost effectiveness: Under the direction of the health economists, 95% confidence intervals for incremental cost-effectiveness ratios and cost-effectiveness acceptability curves will be calculated for all primary endpoints to compare the intervention with usual care[41]. Only the direct costs of health care (to the health funder plus any personal costs) such as hospital admissions, clinic visits, primary care, pharmaceuticals and their subsidies will be included. Productivity and other societal costs will not be estimated.

Randomisation: Randomisation of patient number to intervention or control will be achieved using block randomisation, with random block size, to ensure season is balanced in the 2 groups. The recruitment nurse will contact non study personnel supported by the local clinical research unit Clinical Centre for Research and Effective Practice (CCREP) to obtain computer generated randomisation number and arm of trial.

Sample Size Determinations: 400 children will be randomised 1:1 to intervention and control groups. Assuming 80% retention, 160 per group will be available at 2 year follow up. Note that this retention has been demonstrated in our previous SA studies[33,42]. With this sample size and assuming 40% of the controls have chronic respiratory symptoms (less than seen in the one year follow up study) there will be 91% power to detect a 50% reduction at the 1% level of significance (i.e. 20% of the intervention group having chronic respiratory symptoms). There will be 80% power to detect 45% reduction, at the 1% level. Should the rate in the control group only be 30%, there will still be 90% power to detect a 50% reduction at the 5% level of significance. The SA area includes 113,000 children< 15 years of age including 26% Maori and 29% Pacific with 71% of children living in the lowest socioeconomic quintile[35]

Analysis: The primary hypothesis of a difference in chronic respiratory morbidity at 24 months post index hospital admission between the intervention and control groups will be tested using logistic regression with chronic respiratory morbidity, present or absent as the outcome and age, ethnicity, deprivation index, and group as explanatory variables. The "intention to treat" population will be used for all those completing the 24 month follow up. A further exploratory analysis will be done including the interactions of the other variables with group to ensure there is no evidence indicating the possibility of a differential effect of the intervention.
Other outcomes will be investigated with the same explanatory variables using binary or ordinal logistic regression or linear regression, depending on the distribution of the variable.

Current or Previous Research by the Applicants Relevant to this Proposal

We have a research group combining primary, paediatric and respiratory specialist care with Māori and Pacific involvement, and which includes both established and relatively new health researchers.
Dr Adrian Trenholme led the first 1 year outcome study and will jointly lead this study with Dr Cass Byrnes.

- Dr Adrian Trenholme has led a series of studies on epidemiology and prevention strategies for LRI in SA. The findings of these studies have been used to inform appropriate numbers for the current application.
- Dr Cass Byrnes has developed the respiratory testing clinics for CSLD/Bx, and led several studies in epidemiology and intervention for CF and Bx. This includes: the Auckland Bronchiectasis Study 1998-2002 (ref), the National Bronchiectasis Study 2001-2003 (ref), the Comparison of Longitudinal Lung Function in Children with CF and Bx (ref), the Cystic Fibrosis Bronchoalveolar Lavage Study (7 centres Australia and Auckland Centre enrolling nationwide) five year longitudinal study with current publications (refs) completed collection January 2010 with a Plenary session presented of American Cystic Fibrosis Conference 2009, the Bronchiectasis Interventional Study (Alaska, Australia, New Zealand) commenced 2008 to 2011. Some of the protocols from this last study have been adapted for the current application.
- Professor Diana Lennon has led many infectious disease population based studies. Of particular relevance here is her experience with community engagement, recruitment and retention of families/whanau in SA as part of the rheumatic fever primary prevention and meningococcal vaccine studies.
- Dr Teuila Percival is the Vice President of the Ta Pasifika (Pasifika Medical Association) and is a general paediatrician in SA and is a lead investigator of the Auckland Pacific Island Family Cohort Study which informed numbers for this study.
- Dr Henare Mason (Whahatohea, Te Aroha Tuhoi) is Projects Advisor for Te Kaahu Ora Māori Health Services, on the CMDHB Māori Research Review Committee and on the clinical trial research unit for Uni Services. He was one of the lead investigators with Professor Lennon on the rheumatic fever primary prevention study in SA with a key role in community engagement.
- Dr Wendy Walker (Whahatohea) is the clinical director of Kidz First Children's Hospital.
- Dr Harley Aish is a prominent SA GP and member of Pro Care who was instrumental in the development of shared evidence based Primary /Secondary care guidelines for Bronchiolitis and Pneumonia currently used by Starship, Kidz First hospital and the Paediatric Society.
- Ms Toni Ashton and William Leung are health economists and are providing advice for this study.
- Ms Joanna Stewart is a Biostatistician at the University of Auckland
- Charissa McBride has been the project manager for the follow up study and development of this study and has 5 years experience in co-ordination of research studies in SA.
- Karen Hoare is a Nurse Practitioner for child and youth primary health care employed by the University of Auckland and who is a partner with the Greenstone GP practice.

- Dr Russell Metcalfe Senior Paediatric Radiologist, Starship Children's Hospital, is an expert in the education of paediatric respiratory radiology and is the main radiologist who scores chest x-rays clinically for children with Bx and CF.

They have all provided advice and support for both the pilot study and this current study, and will continue involvement to study end. There is a huge opportunity to train young paediatricians, Māori and Pacific health workers in research as part of this project.

Dissemination Plan and Engagement of End-Users to Support Knowledge Transfer and Uptake

This research group is already made up of multidisciplinary personnel from community and hospital settings with leaders in Māori and Pacific health involved. All will be involved in dissemination of the results of the research and with the recommendation (if successful) of a continued programme within the current health service - locally and nationally. This will include dissemination to:

- General practices and conferences
- Nursing practices and conferences
- Māori Health stakeholders including District Health Boards Māori Boards and Māori health hui
- POU, Māori Health Governance at CMDHB
- Pacific Stake holders including District Health Boards
- Clinical Governance Forum CMDHB
- Paediatric Conferences
- Lay Health groups
- Media - especially local and national radio and TV with Māori and Pacific media streams
- Submitted for peer review journal publications
- Offered to Ministry of Health

Presentations will be offered locally, nationally, and internationally.

Impact of Research Outcomes

a) Within Five Years of Contract Commencement

We seek to reduce the respiratory disease in this cohort of children who are in the intervention programme and have estimated a 50% decrease. We will prove that this model of care works for a high risk group in preventing further respiratory disease, in a community setting, in the population of SA. If this model is successful and able to roll out to all children in the region, it is likely that this can commence with further reduction in respiratory disease within the 5 years. It is known from literature in other high risk communities such as Alaskan Aboriginal and Australian Aboriginal communities that those who are at high risk of developing this chronic lung disease are also at high risk of developing otitis media, cellulitis, dental caries, and, in Australia, malnutrition (co-morbidities seen in 60-70% of the groups that they described with chronic respiratory symptoms)[27]. In our first year follow up study, there was an increase in otitis media, cellulitis and dental caries so it is likely that we can therefore similarly impact these other co-morbidities[33].

b) Longer Term Impact

In the longer term we can establish this model of care as the new Standard of Care for this group of high risk children. It will be part of routine clinical care in SA and could rollout as part of routine clinical care throughout New Zealand. It is easily achievable as it is person, rather than technology, driven and will connect established health care providers. If successful, it is likely that this model could suggest new Standards of Care internationally, most particularly to other populations at high risk of disease such as seen in Australia and Alaska. In the longer term, it could reduce chronic respiratory disease secondary to early severe LRI and potentially reduce numbers requiring recurrent hospitalisation for ongoing respiratory disease. In the very long term we believe it will impact on numbers with irreversible disease such as chronic bronchitis, CSLD and Bx locally and nationally. It will ultimately reduce the numbers of adults with chronic lung disease and certainly reduce the number that we are transitioning with severe lung disease into the adult health services at the current time. As mentioned, it may also pertain to other diseases where significant risk factors can be determined early and disease can be avoided by such a programme of integrated follow up and care, for example otitis media, dental caries, cellulitis, rheumatic fever and other infective disorders or chronic ill health parameters.

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MODULE 4: RELEVANCE OF RESEARCH TO MAORI

1. How might your research contribute to the health needs of Maori? What is the health significance and context of this research to Maori? Discuss the incidence or prevalence in Maori, or indicate if not known to be significantly different from the general population.

A review of Māori Health Providers in primary care 2001-2002 showed respiratory problems accounted for 12.2/100 visits overall but were higher in the <25 years age group (38/100 for males and 28/100 for females)[43]. Rates of hospital admissions for asthma, bronchiolitis, pneumonia, bronchitis, Bx and COPD are all higher in māori compared to non Māori[8]. In 2000-2004 respiratory diseases in Māori children were the first to third most common reason for the admission to hospital in the age groups < 1 year, 1-4 years, 5-14 years and 15-24 years of age[8]. It is clear that there is health inequality for Māori children living in SA as the rates of respiratory illness are significantly higher, with development of irreversible lung disease over three times that of Pakeha. These children of the SA region have the highest hospitalisation rate in New Zealand[1]. In 2004-2006 respiratory disease mortality for all ages in New Zealand was 4 times higher in Māori and deaths from Bx 7 times higher than in non-Māori[8]. Hospital admission of infants for bronchiolitis was twice as common in Māori and for pneumonia was 73% higher in females and 59% higher in males than in non-Māori. Admission rates were also 4 times higher for COPD and although generally rates increase with increasing age, Māori rates reach non-Māori rates 20 years of age earlier. Early intervention to prevent the development of ongoing respiratory disease would have clear benefits for the Māori population of SA and New Zealand, and help reduce the gap in respiratory health currently observed between Māori and their Pakeha counterparts. The early intervention involves the application of a standard of health care for infants that are known to be at high risk of developing chronic respiratory disease. The intervention involves engaging with whanau through the provision of enhanced primary and sometimes secondary/tertiary health care. The holistic model of care is utilising a wellness approach where issues will be addressed to improve whānau ora.

2. Describe the competency (e.g. cultural, relevant training, networks) of the research team to undertake the proposed research.

We have assembled a team of researchers with extensive experience of clinical work and research studies working with the families of children in the SA region. Dr Wendy Walker, clinical director of Kidz First Children's Hospital and leading Māori Paediatrician and Mr Henare Mason projects advisor for Te Kaahui Ora Māori Health services have both been involved in the planning and development of this research study and bring a unique combination of clinical and research experience. Mr Henare Mason is a member of the CMDHB Māori Research Review Committee (MRRC), the clinical trial research unit for Uniservices at Auckland University, and is the Chair of the Tamaki PHO. Professor Diana Lennon has had leading roles in the Rheumatic Fever prevention study and the Meningococcal vaccine studies and roll out. Dr Trenholme has worked as a Paediatrician in SA since 1985 and has been involved in active paediatric respiratory research within this community for the last seven years. This research and clinical work has resulted in working closely with the Māori Support Services (Te Kaahui Ora) and Pacific Island Support Services at CMDHB. Dr Cass Byrnes has led the development of the Bx clinic and is the lead for the Bx Interventional Study which seeks to prevent disease progression in indigenous children and links NZ with Australian Aboriginal and Alaskan First nations communities. She has been invited to write a review chapter on Respiratory Symptoms in Indigenous Children for the Paediatric Clinics of North America and an article on Respiratory Infections in Māori Tamariki and Taitamariki for the Journal of Paediatric and Child Health. Her research and clinical work allows her to link closely with the Māori Support Services and Pacific Island Support Services at Auckland District Hospital Board. The Asthma and Respiratory Foundation of NZ had invited her to talk in Health hui delivered on marae. For the last three years she has also been a facilitator for Te Kupenga Hauroa Māori during Māori Health week. The study protocol is before the Māori health governance group at (POU) CMDHB, of whom Henare Mason is a member, and we anticipate ongoing consultation, support and advice. Research staff will be expected to undertake the Tikanga Best Practise (TBP) training offered by CMDHB.

3. Identify the Maori groups consulted regarding this application and why and how they were selected.

Please see above question 2.

Iwi/hapu/Maori organisation as investigator	Arawa/Tuhoe
Iwi group	
Maori health researchers	Mr Henare Mason
Maori health group	Te Kaahui Ora, Māori governance group (POU) CMDHB
Other Maori group	CMDHB Māori Research Review Committee

4. Describe the process used with the above groups in the development of this application, their recommendations, and if they will have a role in the further development and/or implementation of this research project, or indicate if not applicable. Append any documentation resulting from that consultation.

Mr Henare Mason has offered himself as an advisor to the research study, he will continue to provide advice throughout the duration of the study through to dissemination of study results.

5. If there are Maori participants in the project, how has tikanga been incorporated into the methodology? For example, what culturally appropriate methods will be used to recruit, how is data from Maori to be collected, stored and analysed?

Māori children and their families will be identified during their initial hospital admission with LRI. Study recruitment strategies will be tailored to ensure kanohi kit e kanohi (face to face) contact is optimised in accordance with our Māori advisors recommendations. Whanau are a central part of the success of the proposed interventions therefore they will be supported and encouraged to be involved through the entirety of the study. The initial contact and consent process will be completed at face to face meetings in hospital by an experienced paediatric research nurse and Māori CHW, working closely with the whanau support (Te Kaahui Ora) based at Kidz First Children's Hospital, which will give whanau the opportunity to discuss the study and ask questions. The patient information sheet will contain contact information for the CHWs and other study staff. Patients will be given a commitment both verbally and in writing that all data will be kept confidential, their participation in the study will not affect other areas of health care they receive and that they have a voice and will be heard. Families will be informed of their right to withdraw from the study at any time up until data collection has ceased. Where possible the appropriate assigned Māori primary care CHW will make contact with every family prior to discharge from hospital to begin the relationship that will continue throughout the duration of the study. Each tamariki and whanau will be individually assessed at the point of first contact to ensure they receive the correct support; this initial assessment will be completed by the study nurses and CHW in negotiation with each family. The support that will be offered will include; continued verbal and/or face to face contact (as per whanau request), explanation of study health care and procedures, including help with transportation to appointments. This support will continue throughout the duration of the trial the research team will make every effort to ensure consistency of staffing to ensure the connection with the whanau is developed and maintained. Data will be collected from the whanau face to face by the study doctors, nurse practitioners, nurses and CHWs during the clinic visits. The CHWs will be made available to be present with whanau in the clinic. Our advisors will review all data collection forms prior to implementation. All study data will be stored in locked facilities to ensure patient confidentiality is maintained at all times.

6. Will this study lead to the development of Maori specific research methods? If so, please discuss.

No

7. How, when and to what Maori groups, will the researchers actively disseminate research results?

Māori will be informed of the findings through a variety of networks. Results of the study will be sent to individual participants. The results will be formally presented to the Māori Research Review Committee (MRRC) and the Māori health governance group (POU) CMDHB. We will seek input from the MRRC on appropriate Māori community Hui meetings to present the findings at the end of the study. Māori providers PHOs and community providers that are involved in the study will be offered both written and oral presentations of the research findings at the end of the study. A newsletter informing key stakeholders of study progress and relevant issues will be circulated every six months. Health professionals including Māori health services will be targeted in the presentation of the results to hospital and community health services. We will utilise media such as national radio and TV with Māori media streams. Results of the study will be offered to the Ministry of Health. Results will be published in peer-reviewed journals and presented at both national and international conferences.

MODULE 5: CONTRACT INFORMATION AND BUDGET

Use the HRC Excel Spreadsheets 'HRC210budget.xls' for Sections 5A – 5D.

For the hardcopy of the application

Attach a printout of the spreadsheet Sections 5A-5D (Contract Information (Objectives and Milestones), Budget, MOU Budget(s) and FTE Summary) after this page of the application form.

Ensure any page breaks are logically placed to facilitate review.

For the electronic copy of the application

Upload the electronic file, when submitting the application Word file to the HRC Electronic Application System (EASY). Note required file name convention.

Section 5E – Justification of Expenses

Justification of Research Staff (as listed in budget)

Note: if staff are different from the Expression of Interest, justify the change.

Dr Adrian Trenholme
Dr Adrian Trenholme has led a series of paediatric studies on epidemiology and prevention strategies for LRI in SA, and has worked as a Paediatrician in SA for over 25 years. In this project he has played a lead role in the development of the model of care outlined in this proposal. He will be the co-principal investigator will take shared responsibility for the study with Dr Catherine Byrnes. He will be provide a significant contribution to the clinical work of the secondary care clinic and provide liaison with the primary and tertiary clinics.

Dr Catherine Byrnes
Catherine (Cass) is a Senior Lecturer at the Paediatric Department, Faculty of Medical and Health Sciences, Auckland University (50% time) and an Honorary Consultant at Starship Children's Health (50% time) in Paediatric Respiratory Medicine. Her current clinical and research focus is in CSLD aetiology, management and prevention. She is the only paediatrician New Zealand to run specialised Bx and CF clinics. She has also led early Bx research in New Zealand children, and some of the concepts within this research proposal are based on her research and publications. Dr Byrnes has acted as advisor to the development of the study and as co-investigator will have regular meetings regarding the conducting, progression and outcomes of the study. A major contribution will come towards the end when a clinic will be specifically set up at Counties Manukau for her evaluation of the children who end the study with a chronic productive cough and CXR changes. This will determine their need for further investigations including bronchoscopy, bronchoalveolar lavage and the HRCT scan to detect permanent scarring which will be discussed with the families, organised and reviewed by her. It is necessary to have an experienced paediatric specialist as part of the study who regularly works within and for these whanau

Ms Joanna Stewart
Joanna Stewart is a senior biostatistician at the University of Auckland and will advise on aspects of study design and implementation, conduct or oversee data analysis, and assist in interpretation of results and writing of scientific reports.

Ms Charissa McBride (study coordinator)
Charissa is a senior Nurse who is the current research co-ordinator for Kidz First Children's Hospital and honorary research fellow at the University of Auckland. She has six years experience as a study co-ordinator for respiratory research in children. Charissa will project manage this research study oversee the research study co-ordination, study approvals, ensure all regulatory requirements are maintained, will manage data collection and coordinate data analysis through to publication.

Mr William Leung
William is a health economist working under the direction of Toni Ashton. He has experience in the cost effectiveness analysis of randomised control trials in respiratory, mental, and public health. He is currently leading the economic evaluation of an HRC-funded clinical trial assessing the effect of long term azithromycin in adult patients with non-cystic fibrosis Bx. William will advise on aspects of study design and implementation, conduct and interpret the cost-effectiveness analysis, and assist in the writing of scientific reports.

Justification of Working Expenses and Casual Staff (as listed in budget)

Study Respiratory Nurse
The study respiratory nurse will be a senior nurse practice nurse at one of the sites but in additional will provide support and coordination for all three community research clinics. This nurse will be supported by the study co-ordinator and have clinical supervision provided by the research investigators. They will be responsible for ensuring all sites are following study procedures and be available to the practice nurse as a resource for advice and additional help in clinics if required. This nurse will ensure there is liaison between all sites helping to ensure consistency of study processes and data collection. The study respiratory nurse where possible will attend secondary and tertiary respiratory clinics.

Practice Nurse
The practice nurses are a key member of the research team and will have a number of roles. They will work along side the doctors and CHWs to ensure continued relationship with children and families/whanau. They will spend time with each family/whanau at clinic providing education on each of the required interventions and any other related health topics. Nurses will be available during normal working days to answer queries from families in the intervention group and will liaise between the study staff and other providers where referrals have been made. Along with the CHW's the nurse will ensure families/whanau have full understanding of the prescribed interventions and will follow up with the families to ensure completion. They will have a responsibility to ensure research processes are being followed as per study protocol including collection, collation and storage of study data. The nurses will be provided with education arranged by the study investigators to ensure full training on all the prescribed study interventions, this will be updated yearly or as required.

Community Health Workers
The community health workers are an essential part of the research team as there are many barriers to effective study completion for families/whanau in the Counties Manukau region. The advice from the Māori and Pacific advisors is to include a personal face to face approach with the involvement of culturally appropriate study personnel and inclusion of the wider Whanau and family. A substantial community health worker presence has proven effective in achieving informed consent, gaining understanding and study completion with minimal attrition. The CHW will work along side the study team and closely with the site nurses to ensure family/whanau engagement. Where possible the CHW will initially meet the family/whanau at point of recruitment in to the study. Where possible that same CHW will continue to work with this family/whanau through to the completion of the study and provide continued support and explanation for all interventions required.

Kidz First Nurse Recruiter
The nurse recruiter will be responsible for reviewing all hospital admissions seven days a week and identify potential study candidates. They will then screen for eligibility and make an initial approach to eligible families/whanau to provide the study information both verbal and written. Where families/whanau wish to participate, either the nurse recruiter, or the study CHWs will complete the consent with the families. The recruiter nurse will complete the initial assessment for each recruited child and then refer to the appropriate community site as negotiated with the family.

Primary Intervention Site Visit Fee (Intervention group)
The primary site visit fee covers the cost of the doctor or nurse practitioner (where available), site clinic overheads including clinic room and other incidental costs associated with the clinic. The study requires three monthly clinics for two years for each child, the budget has allowed for an additional two visits per child to allow for additional follow up that may be required and/or if patients do not attend clinic this will allow some additional clinic time to arrange catch up appointments.

Primary Non Intervention Site Visit Fee (Control group)
Each child in the non intervention arm of this study will require one site visit per child, we have allowed for an additional two visits per child to allow for patients who do not attend clinic this will allow some additional clinic time to arrange catch up appointments.

Participant travel
Each participant will be provided with either a $20 petrol voucher or a taxi chit to ensure any transport costs can be covered by the families/whanau to allow them to attend clinic. We have found this is essential when working with population groups from high deprivation areas as this study.

Chest X-Rays
Each study participant will have a CXR as part of this study, the non intervention arm will have a CXR at the end of the study while the intervention arm will have one at one year and another at the end of the study. This is a primary endpoint of this study. The budget allows for $80 per CXR this cost is inclusive of a paediatric specialist radiologist review and report on each of the x-rays.

Education for site staff
The ongoing education for the site staff including; general practitioner, nurse practitioner, site nurses and CHWs is a crucial aspect of the study to ensure consistency of the interventions and data collection at each site. As the primary site clinics will be providing education to families regarding physiotherapy, nutrition, dental, social supports, immunisation and asthma. The study investigators will co-ordinate and provide education resources and sessions to ensure the nurses are continually updated and supported through to study conclusion.

Database and Data Entry
This is required to ensure consistent data checking and analysis is completed in a timely manner.

Consent forms and stationery
This cost is to allow for photocopying costs of the information sheets and consent forms.

Section 5F – Previous / Current Contracts

List Previous / Current Contracts. Final HRC reports may be made available to Science Assessing Committees.

Funding Agency	Health Research Council
Title of Research	The impact of pneumococcal vaccine on hospital admission in young children with pneumonia
Investigators	Dr Adrian Trenholme, Prof Diana Lennon, Ms Charissa McBride, Ms Joanna Stewart, Dr Emma Best
Start date and duration	01 August 2007 36 months (over 48 month period)
Total Value	$312,491
Nature of support (1 sentence)	Financial support for staffing and laboratory investigations (grant in aid)
If HRC contract, was Final Report filed? If not, why?	The study is still being undertaken, annual reports submitted.

Funding Agency	Auckland Medical Research Foundation
Title of Research	The unequal burden of lower respiratory tract infection for Māori and Pacific children of South Auckland: finding the cause and planning the solutions
Investigators	Dr Adrian Trenholme, Prof Diana Lennon, Ms Charissa McBride, Ms Joanna Stewart, Dr Emma Best
Start date and duration	01 August 2007 to 31 August 2008
Total Value	$110,000
Nature of support (1 sentence)	Research staff (grant in aid)
If HRC contract, was Final Report filed? If not, why?	

Funding Agency	Wyeth Pharmaceuticals
Title of Research	The impact of pneumococcal vaccine on hospital admission in young children with pneumonia
Investigators	Dr Adrian Trenholme, Prof Diana Lennon, Ms Charissa McBride, Ms Joanna Stewart, Dr Emma Best
Start date and duration	01 August 2007 36 months (over 48 month period)
Total Value	$175,000
Nature of support (1 sentence)	laboratory investigations (grant in aid)
If HRC contract, was Final Report filed? If not, why?	

Funding Agency	Health Research Council of New Zealand
Title of Research	Bronchiectasis Interventional Study
Investigators	Dr Catherine Byrnes, Dr Liz Edwards
Start date and duration	2008 -2010
Total Value	$555,894
Nature of support (1 sentence)	Salary for nurse specialist project manager and part-time salary for whanau support worker
If HRC contract, was Final Report filed? If not, why?	

Funding Agency	Auckland Medical Research Foundation
Title of Research	Bronchiectasis Interventional Study
Investigators	Dr Catherine Byrnes, Dr Liz Edwards
Start date and duration	2008-2009
Total Value	$99,165
Nature of support (1 sentence)	Grant in aid
If HRC contract, was Final Report filed? If not, why?	

Funding Agency	Travel grant from Australian Medical and Health Research Council
Title of Research	
Investigators	Dr Catherine Byrnes
Start date and duration	2009
Total Value	$5000
Nature of support (1 sentence)	travel to present data to European CF
If HRC contract, was Final Report filed? If not, why?	

Funding Agency	Auckland Medical Research Foundation travel grant
Title of Research	
Investigators	Dr Catherine Byrnes
Start date and duration	2008
Total Value	$3,000
Nature of support (1 sentence)	Conference funding to present one research abstract, chair one session & attend Congress of International Paediatric Pulmonology,
If HRC contract, was Final Report filed? If not, why?	

Funding Agency	Maurice & Phyllis Paykel Trust travel grant
Title of Research	
Investigators	Dr Catherine Byrnes
Start date and duration	2008
Total Value	$2000
Nature of support (1 sentence)	Conference funding to present two research abstracts, attend one day course and attend the American Thoracic Society, Toronto
If HRC contract, was Final Report filed? If not, why?	

Funding Agency	Asser Trust
Title of Research	Reported HRCT Scans in Children: Aim to Minimise Radiation and Maximise Information
Investigators	Dr Catherine Byrnes
Start date and duration	2008
Total Value	$5000
Nature of support (1 sentence)	Travel to Royal Brompton Hospital to complete research
If HRC contract, was Final Report filed? If not, why?	

Funding Agency	Starship Foundation Fellowship
Title of Research	
Investigators	Dr Catherine Byrnes, Dr Jan Sinclair, Dr Liz Edwards
Start date and duration	2008
Total Value	$60,000
Nature of support (1 sentence)	Salary for Fellow Dr Virginia Wootton
If HRC contract, was Final Report filed? If not, why?	

Funding Agency	Faculty Research Development Fund, Faculty of Medical and Health Sciences, University of Auckland
Title of Research	CF BAL study
Investigators	Dr Catherine Byrnes
Start date and duration	2007/2008
Total Value	$44,000
Nature of support (1 sentence)	Salary for project manager

If HRC contract, was Final Report filed? If not, why?	

Funding Agency	Asthma & Respiratory Foundation
Title of Research	Interventional Bronchiectasis Study
Investigators	Dr Catherine Byrnes, Dr Liz Edwards
Start date and duration	2007
Total Value	$29,969
Nature of support (1 sentence)	General funding
If HRC contract, was Final Report filed? If not, why?	

Funding Agency	Starship Foundation Fellowship
Title of Research	
Investigators	Dr Catherine Byrnes and Dr Liz Edwards
Start date and duration	2007
Total Value	$60,000 $5,000
Nature of support (1 sentence)	Salary for Fellow Dr Karen Munro and expenses
If HRC contract, was Final Report filed? If not, why?	

Funding Agency	Australian Medical and Health Research Council
Title of Research	CF BAL Study
Investigators	Dr Catherine Byrnes
Start date and duration	2006-2008
Total Value	$21,790
Nature of support (1 sentence)	Project salary manager
If HRC contract, was Final Report filed? If not, why?	

Funding Agency	Fisher & Paykel Fellowship
Title of Research	
Investigators	Dr Catherine Byrnes, Prof Innes Asher
Start date and duration	2005-2006
Total Value	$90,000
Nature of support (1 sentence)	Salary Dr David McNamara
If HRC contract, was Final Report filed? If not, why?	

Section 5G – Other Support

Other Research Applications Awaiting Decision

	Y	N
Are any NIs on this project also NIs on a programme application? (Y/N)		N
If Y, is this project a component of a programme application such that the Project will be considered withdrawn if the Programme is fully funded? (Y/N)		
If N, then in the area below identify the Programme, briefly outline its area of research and clearly explain how your Project is separate from it.		

Applicants must advise the HRC of the outcome of other research applications through their Research Office. Copy and paste table as required for additional pending applications.

Funding Agency	
Title	
Investigators	
Start Date and Duration	
Total Value	
Date of Outcome	
Areas of Overlap with this Application	

Funding Agency	
Title	
Investigators	
Start Date and Duration	
Total Value	
Date of Outcome	
Areas of Overlap with this Application	

Co-Funding: What other agencies or end-users have been approached or committed to joint or partial funding of this research?
No other agencies have been approached for funding for this study.

Section 5H – Letters of Collaboration/Supporting Documents List.

Memorandums of Understanding (see attached)

Auckland Uniservices Ltd – *formalising the arrangement for Dr Catherin Byrnes to work on the study*

Auckland Uniservices Ltd – *formalising the arrangement for Ms Joanna Stewart to work on the study*

Auckland Uniservices Ltd – *formalising the arrangement for Mr William Leung to work on the study*

Supporting Documents (see attached)

Quote - *Datasyn (Craig Evans) for database development and support.*

Letter of Support – *Pasifika Medical Association.*

Letter of Support – *Dr Alan Moffitt Director of Primary Care Development CMDHB.*

Letter of Support – *Dr Harley Aish re: confirmation of primary care clinic costing.*

MODULE 7: ADMINISTRATION

Do not copy any sections in MODULE 7. Send with original application only.

Section 7A – Ethical and Regulatory Agreement

First Named Investigator
Dr Adrian Trenholme
Research Title
Intervention study of children at high risk of chronic lung disease

	Yes	No
Requires human ethical approval?	Y	

If this application does not require ethical approval, please briefly provide reason

If this application requires consent from other regulatory bodies such as ERMA, MAF, DOC, GTAC, SCOTT or Biosafety, please provide reason
No other consent required for this study.

The following information will be used for administrative purposes.

	Yes	No
Is the proposed research a clinical trial, a community intervention study or innovative treatment?	✓	
If yes to the above, do you intend to have an independent Data Monitoring Committee?		✓
If yes to the above, will this be through the HRC's Data Monitoring Core Committee (DMCC)?		

Note: Information on the structure and operating guidelines of the HRC's DMCC are available from the HRC website. For further information please contact the Secretary to the DMCC, ethics@hrc.govt.nz.

The applicant has read the 'Guidelines on Ethics in Health Research', available from the HRC website (http://www.hrc.govt.nz/assets/pdfs/ethgdlns.pdf) and agrees to abide by the principles outlined in it. The undersigned also agrees to provide written evidence before any research procedures commence, that in any study involving animal or human subjects, animal or human materials or personal information, a properly constituted accredited Ethics committee (a list of currently accredited Ethics Committees is available on the HRC website) has examined and agreed to the ethics of the proposal outlined in this proposal. If minor changes in the research design or procedures have been required for ethical reasons, the HRC must be informed of them. The undersigned also undertakes to ensure that all regulatory consents are gained before research commences. For further information regarding the ethical approval process, please contact the Secretary to the HRC Ethics Committee, ethics@hrc.govt.nz, or the appropriate accredited Ethics Committee.

First Named Investigator		
Name:	Signed:	Date:
Head of Department/School/Faculty or Hospital		
Name:	Signed:	Date:

Section 7B – Administrative Agreement

Only the signed copy of this page is required. This form must be returned to the HRC with the original copy of the contract application.

Applications that do not have a fully completed administrative agreement will not be accepted.

All HRC applications must include an undertaking to abide by the following administrative agreement:

1. It is understood and agreed that this application and any contract awarded as a result of this application is subject to the Health Research Council of New Zealand Rules ("Permissible Use of Research Funding and Operation of Contracts"). Funds will not be expended for any other purpose than described in this application.
2. The host institution agrees and undertakes to bear all risk and claims connected with any operation covered by this application and to indemnify and hold harmless the Council against any and all liability suits, actions, demands, costs or fees on account of death, injuries to persons or property, or any other losses resulting from or connected with any act or omission performed in the course of the research.
3. The host institution agrees and undertakes to support for the duration of any contract, the work described in this application by making available accommodation, basic facilities for research and the services necessary for its fulfilment.
4. The Head of Department agrees to accept this research within his/her department if a contract is made, agrees to provide workload relief for research staff working on this contract (Principles of Full Cost Funding), and is aware that s/he may be requested by the HRC to provide a confidential assessment of the research during the term of the contract.
5. The host institution official designated below agrees to ensure that the research will have been approved, where necessary, by the appropriate institutional biosafety committee and/or all other required regulatory agencies before research is commenced.
6. The applicant(s) agrees to allow specified personal information to be used for statutory and publicity purposes.
7. The host institution has in place policies and processes to ensure that consultation with Maori has occurred and the application is responsive to the needs and diversity of Maori.

We the undersigned have read the above administrative agreement and undertake to abide by the conditions of this agreement in respect of any contract made by the Health Research Council of New Zealand as a result of this application. We the undersigned confirm that the information provided in this application is to the best of our knowledge true, that all sections are correct at the time of application submission, that each NI agrees to the stated FTE% contribution and that funding to any NI from any source will not exceed 100 FTE%.

First Named Investigator		
Name:	Signed:	Date:
Head of Department/School/Faculty or Hospital		
Name:	Signed:	Date:
Authorised official on behalf of host institution		
Name:	Signed:	Date:
Position:	Host name:	

Section 7C – Referees Unacceptable to Applicants

An individual or research group may be unacceptable as referees because: 1) they are competitors, 2) there is a conflict of interest, 3) there are commercially sensitivity issues.

Name	Professor Keith Grimwood
Organisation/Location	Queensland Institute of Medical Research
Reason	Competing interests

Name	
Organisation/Location	
Reason	

MODULE 8: CLASSIFICATION of RESEARCH (for HRC evaluation only)

This Module is mandatory; incomplete applications will not be processed.
Do not copy any sections in MODULE 8. Send with original application only.

Section 8A – Australian and New Zealand Standard Research Classification (ANZSRC) and HRC Classification

Applicants are required to categorise their research in two ways. The HRC Discipline* and HRC Fields of Research* categories are listed in the Appendix 1 and 2 of the Guidelines. The ANZSRC codes for FOR** and SEO** classifications can be found on the HRC weblink (http://classifications.hrc.govt.nz/) or the ANZSRC website – find the appropriate code(s) and description; insert in the table below.

Research Descriptors		
HRC Discipline*	Child Health	
HRC Fields of Research*		
Respiratory: airway disease		
MoRST Fields of Research (FOR)**		Weighting (%)
11 Medical and Health Sciences		
1114 Paediatrics and Reproductive Medicine		
111403 Paediatrics		
MoRST Socioeconomic Objective (SEO)**		Weighting (%)
C92 Health		
C9201 Clinical Health		
C920115 Respiratory system and Diseases (incl Asthma)		
Keywords		
Child health/Paediatrics	Respiratory disease	Lower respiratory infection
Health prevention	Chronic lung disease	

HRC Discipline and Fields of Research classifications are for HRC purposes only.
ANZSRC information is for HRC and MoRST purposes.
* See Guidelines
** ANZSRC code

Section 8B – Mapping Categories

Tick the box (✓) next to the category that best describes the starting point of your research:

Gene	
Cell biology	
Diagnostics	
Physiology	
Pharmaceuticals/Treatments	
Clinical studies	
Clinical trials	
Health economics	
Clinical services	✓
Knowledge Resources	
Risk factors	
Interventions	
At-risk populations	
Community services	

HRC REF
10/510

MODULE 4: RELEVANCE OF RESEARCH TO MAORI

1. How might your research contribute to the health needs of Maori? What is the health significance and context of this research to Maori? Discuss the incidence or prevalence in Maori, or indicate if not known to be significantly different from the general population.

A review of Māori Health Providers in primary care 2001-2002 showed respiratory problems accounted for 12.2/100 visits overall but were higher in the <25 years age group (38/100 for males and 28/100 for females)[43]. Rates of hospital admissions for asthma, bronchiolitis, pneumonia, bronchitis, Bx and COPD are all higher in māori compared to non Māori[8]. In 2000-2004 respiratory diseases in Māori children were the first to third most common reason for the admission to hospital in the age groups < 1 year, 1-4 years, 5-14 years and 15-24 years of age[8]. It is clear that there is health inequality for Māori children living in SA as the rates of respiratory illness are significantly higher, with development of irreversible lung disease over three times that of Pakeha. These children of the SA region have the highest hospitalisation rate in New Zealand[1]. In 2004-2006 respiratory disease mortality for all ages in New Zealand was 4 times higher in Māori and deaths from Bx 7 times higher than in non-Māori[8]. Hospital admission of infants for bronchiolitis was twice as common in Māori and for pneumonia was 73% higher in females and 59% higher in males than in non-Māori. Admission rates were also 4 times higher for COPD and although generally rates increase with increasing age, Māori rates reach non-Māori rates 20 years of age earlier. Early intervention to prevent the development of ongoing respiratory disease would have clear benefits for the Māori population of SA and New Zealand, and help reduce the gap in respiratory health currently observed between Māori and their Pakeha counterparts. The early intervention involves the application of a standard of health care for infants that are known to be at high risk of developing chronic respiratory disease. The intervention involves engaging with whanau through the provision of enhanced primary and sometimes secondary/tertiary health care. The holistic model of care is utilising a wellness approach where issues will be addressed to improve whānau ora.

2. Describe the competency (e.g. cultural, relevant training, networks) of the research team to undertake the proposed research.

We have assembled a team of researchers with extensive experience of clinical work and research studies working with the families of children in the SA region. Dr Wendy Walker, clinical director of Kidz First Children's Hospital and leading Māori Paediatrician and Mr Henare Mason projects advisor for Te Kaahui Ora Māori Health services have both been involved in the planning and development of this research study and bring a unique combination of clinical and research experience. Mr Henare Mason is a member of the CMDHB Māori Research Review Committee (MRRC), the clinical trial research unit for Uniservices at Auckland University, and is the Chair of the Tamaki PHO. Professor Diana Lennon has had leading roles in the Rheumatic Fever prevention study and the Meningococcal vaccine studies and roll out. Dr Trenholme has worked as a Paediatrician in SA since 1985 and has been involved in active paediatric respiratory research within this community for the last seven years. This research and clinical work has resulted in working closely with the Māori Support Services (Te Kaahui Ora) and Pacific Island Support Services at CMDHB. Dr Cass Byrnes has led the development of the Bx clinic and is the lead for the Bx Interventional Study which seeks to prevent disease progression in indigenous children and links NZ with Australian Aboriginal and Alaskan First nations communities. She has been invited to write a review chapter on Respiratory Symptoms in Indigenous Children for the Paediatric Clinics of North America and an article on Respiratory Infections in Māori Tamariki and Taitamariki for the Journal of Paediatric and Child Health. Her research and clinical work allows her to link closely with the Māori Support Services and Pacific Island Support Services at Auckland District Hospital Board. The Asthma and Respiratory Foundation of NZ had invited her to talk in Health hui delivered on marae. For the last three years she has also been a facilitator for Te Kupenga Hauroa Māori during Māori Health week. The study protocol is before the Māori health governance group at (POU) CMDHB, of whom Henare Mason is a member, and we anticipate ongoing consultation, support and advice. Research staff will be expected to undertake the Tikanga Best Practise (TBP) training offered by CMDHB.

3. Identify the Maori groups consulted regarding this application and why and how they were selected.

Please see above question 2.

Iwi/hapu/Maori organisation as investigator	Arawa/Tuhoe
Iwi group	
Maori health researchers	Mr Henare Mason
Maori health group	Te Kaahui Ora, Māori governance group (POU) CMDHB
Other Maori group	CMDHB Māori Research Review Committee

4. Describe the process used with the above groups in the development of this application, their recommendations, and if they will have a role in the further development and/or implementation of this research project, or indicate if not applicable. Append any documentation resulting from that consultation.

Mr Henare Mason has offered himself as an advisor to the research study, he will continue to provide advice throughout the duration of the study through to dissemination of study results.

5. If there are Maori participants in the project, how has tikanga been incorporated into the methodology? For example, what culturally appropriate methods will be used to recruit, how is data from Maori to be collected, stored and analysed?

Māori children and their families will be identified during their initial hospital admission with LRI. Study recruitment strategies will be tailored to ensure kanohi kit e kanohi (face to face) contact is optimised in accordance with our Māori advisors recommendations. Whanau are a central part of the success of the proposed interventions therefore they will be supported and encouraged to be involved through the entirety of the study. The initial contact and consent process will be completed at face to face meetings in hospital by an experienced paediatric research nurse and Māori CHW, working closely with the whanau support (Te Kaahui Ora) based at Kidz First Children's Hospital, which will give whanau the opportunity to discuss the study and ask questions. The patient information sheet will contain contact information for the CHWs and other study staff. Patients will be given a commitment both verbally and in writing that all data will be kept confidential, their participation in the study will not affect other areas of health care they receive and that they have a voice and will be heard. Families will be informed of their right to withdraw from the study at any time up until data collection has ceased. Where possible the appropriate assigned Māori primary care CHW will make contact with every family prior to discharge from hospital to begin the relationship that will continue throughout the duration of the study. Each tamariki and whanau will be individually assessed at the point of first contact to ensure they receive the correct support; this initial assessment will be completed by the study nurses and CHW in negotiation with each family. The support that will be offered will include; continued verbal and/or face to face contact (as per whanau request), explanation of study health care and procedures, including help with transportation to appointments. This support will continue throughout the duration of the trial the research team will make every effort to ensure consistency of staffing to ensure the connection with the whanau is developed and maintained. Data will be collected from the whanau face to face by the study doctors, nurse practitioners, nurses and CHWs during the clinic visits. The CHWs will be made available to be present with whanau in the clinic. Our advisors will review all data collection forms prior to implementation. All study data will be stored in locked facilities to ensure patient confidentiality is maintained at all times.

6. Will this study lead to the development of Maori specific research methods? If so, please discuss.

No

7. How, when and to what Maori groups, will the researchers actively disseminate research results?

Māori will be informed of the findings through a variety of networks. Results of the study will be sent to individual participants. The results will be formally presented to the Māori Research Review Committee (MRRC) and the Māori health governance group (POU) CMDHB. We will seek input from the MRRC on appropriate Māori community Hui meetings to present the findings at the end of the study. Māori providers PHOs and community providers that are involved in the study will be offered both written and oral presentations of the research findings at the end of the study. A newsletter informing key stakeholders of study progress and relevant issues will be circulated every six months. Health professionals including Māori health services will be targeted in the presentation of the results to hospital and community health services. We will utilise media such as national radio and TV with Māori media streams. Results of the study will be offered to the Ministry of Health. Results will be published in peer-reviewed journals and presented at both national and international conferences.

