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| Chronic Obstructive Pulmonary Disease (COPD)**A Pathway to Prioritisation** |
|  | March 2014 |

 Executive Summary

The purpose of this report is to explore the pathway of care for COPD patients and identify interventions that the NHC should conduct health technology assessments (HTAs) on in order to improve health outcomes and efficiency. In *Strategic Overview: Respiratory Disease in New Zealand*, the National Health Committee (NHC) identified chronic obstructive pulmonary disease (COPD) as a respiratory disease in which there exists a potential for health gain and material savings. This document is intended to outline the pathway of care of COPD and identify interventions along that pathway which may be used to improve health outcomes.

COPD affected over 138,833 patients and accounted for over $125 million of Vote: Health expenditure in 2010/11. Within that cost, patients who experienced exacerbations were more expensive to treat and had worse health outcomes than stable patients; Māori from areas of high deprivation were over-represented among this patient group.

After a meeting of the Respiratory Working Group (RWG), the RWG highlighted the areas of pulmonary rehabilitation, diagnosis/case finding, long-term oxygen therapy variation, advance care planning, non-invasive ventilation, case management and clinical monitoring of symptoms as areas where health gains may exist. Outside of the NHC and RWG process, stakeholders from the health and disability sector submitted 11 proposals to the Health Innovation Partnership (HIP) for funding consideration. The joint Health Research Council (HRC)/NHC assessment committee chose 6 of those proposals for further consideration in the assessment process. Final funding decisions for those field trials are expected in mid-2014.

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# Purpose

The purpose of this report is to explore the pathway of care for COPD patients and identify interventions that the National Health Committee (NHC) should conduct health technology assessments (HTAs) on in order to improve health outcomes and efficiency.

# Introduction

The NHC is tasked with improving health outcomes whilst maintaining or reducing costs through the prioritisation of the most cost effective new and existing health technologies. It does this by assessing ‘value for money’ in terms of health outcomes and cost to the health sector. The NHC’s goal is to improve health outcomes and health sector sustainability through better investment and targeting of technologies and service reconfiguration. With this goal in mind, the NHC identified respiratory disease as a priority area as it affects a large number of people and results in a significant spend in Vote: Health – the Government’s health expenditure.

In November 2013, the NHC published *Strategic Overview: Respiratory Disease in New Zealand*. That document explored the burden of respiratory disease from a prevalence/incidence, health outcomes, resource utilisation and cost perspective in order to identify which respiratory disease the NHC should focus further work in 2013/14. Based on the evidence presented in that report, the NHC identified Chronic Obstructive Pulmonary Disease (COPD) as best fitting with its decision-making criteria and has agreed to conduct further assessment as per its tiered assessment approach[[1]](#footnote-1).

This report provides information that was used as a basis for engaging with a respiratory working group (RWG) to inform recommendations on assessments to be undertaken. The RWG is comprised of various sector representatives who reviewed the evidence presented in this report and provided their own expertise. This report is the final version of the draft report that went to the RWG and summarises both the evidence that went to the RWG as well as its commentary on which areas along the COPD pathway of care have the potential for material health gains.

The NHC assesses the COPD pathway of care by examining Australasian and United Kingdom (UK) guidelines. This pathway then forms the basis of a cost model whereby COPD patient cohort costs and flows are presented along the pathway of care. The pathway of care and data evidence are synthesised and a preliminary prioritisation of interventions for further assessment is proposed. This is based on which interventions best meet the goal of improving health outcomes within COPD care in the most cost effective manner. A limitations section outlines the shortcomings of the methodology and data used in this report.

# Background

## Chronic Obstructive Pulmonary Disease (COPD) Description

COPD is a chronic disease characterised by airflow obstruction that is not fully reversible. The airflow limitation is usually progressive and associated with an abnormal inflammatory response of the lung to noxious particles or gases([1](#_ENREF_1)). Small-airway narrowing (with or without chronic bronchi­tis) and emphysema caused by smoking are the most common conditions resulting in COPD (Figure 1).

Figure 1: Effects of COPD



The picture on the left shows the effects of emphysema (alveoli destruction) and the picture on the right shows obstruction from inflammation

COPD is characterised by the gradual development of symptoms (over many years), and an estimated 70–80% of cases are caused by tobacco smoke([2](#_ENREF_2)). Environmental smoke inhalation and genetic abnormalities are rarer causes. Patients with COPD typically present with shortness of breath, but symptoms are less easily controlled in contrast to asthma and patients often recover more slowly due to poor underlying lung function. Increasing disease severity leads to multi-organ complications and eventually death([3](#_ENREF_3)).

Smoking cessation is the most effective method of preventing COPD([4](#_ENREF_4)). For patients with COPD, treatment is multi-disciplinary with a variety of interventions that may include pulmonary rehabilitation, long-term oxygen therapy and medications. Exacerbations are typically managed in the primary care setting using medical management, but hospitalisations also occur. There is a limited role for surgical management([3](#_ENREF_3)).

## Prevalence and Incidence

COPD is a major respiratory disease in New Zealand in terms of prevalence. In the 2006/07 New Zealand Health Survey, the prevalence rate of 6.6% of adults equated to 96,100 adults or 1 in every 15 individuals over 45 years([5](#_ENREF_5)). These prevalence figures are likely to underestimate the true rate of disease since many COPD patients are undiagnosed. This is likely due to signs and symptoms of the disease only appearing later in the disease course and limited access to spirometry in primary care[[2]](#footnote-2). We estimate that over 138,000 New Zealanders over the age of 35 had COPD in 2010/11 (see section 5). Even when diagnosed, many patients may not know the official name for the disease they suffer from and many suffer from other co-morbidities such as ischaemic heart disease (IHD) and lung cancer.

COPD is very uncommon in younger individuals; however, damage to the small airways can affect younger patients and probably affects another 5-10% of the population, many of whom acquire the condition as a consequence of passive smoking and infections in the first few years of life. Whilst not affecting lung function substantially, the condition often resurfaces in later life and can be the cause of recurrent or persistent bronchitis in patients over 45 years. These patients are often wrongly diagnosed and managed as having late onset asthma.

COPD disproportionately affects Māori and women, with the prevalence among Māori being twice that of people of other ethnic groups. This could possibly be due to a higher smoking rate among Māori compared to non-Māori individuals. Women from areas with high deprivation are also more likely than women from more affluent areas to have COPD([5](#_ENREF_5)).

## Health Outcomes

COPD accounted for 1,523 deaths in New Zealand in 2006([6](#_ENREF_6)). COPD deaths tend to occur in individuals aged over 65 years. COPD was responsible for the loss of 35,339 disability-adjusted life-years (DALYs) in 2006. DALYs combine years of life lost (YLLs) and years lived with disability (YLDs) such that one DALY is equivalent to loss of one year of healthy life. As such, they are more than just a metric for death; they include both fatal and non-fatal outcomes. Of all of the respiratory diseases, COPD is the biggest cause of both deaths and DALYs. Nearly 75% of those DALYs were lost in individuals aged over 60 years([6](#_ENREF_6)).

## Health Utilisation and Cost

COPD hospitalisation rates were highest in individuals aged over 50 years([6](#_ENREF_6)). In the 2006–2009 years, ethnic-standardised hospitalisation rates were as follows in Table 1 and Table 2:

Table 1: Age-standardised COPD hospitalisation rates per 100,000 for adults aged over 45 Years by gender and ethnicity

|  |  |
| --- | --- |
| Māori | non-Māori |
| Males | Females | **Total** | Males | Females | **Total** |
| 1800.7(1683.6–1925.9) | 2217.6(2095.9–2346.4) | 2021.7(1936.3–2110.9) | 549.8(532.1–568.1) | 439.3(422.6–456.7) | 484.1(471.9–496.5) |

Source: [Tatau Kura Tangata: Health of Older Māori Chart Book](http://www.health.govt.nz/nz-health-statistics/health-statistics-and-data-sets/maori-health-data-and-stats/tatau-kura-tangata-health-older-maori-chart-book) 2011, NMDS 2006-2008

Table 2: Age-standardised COPD hospitalisation rates per 100,000 Adults aged over 50 years by age, gender and ethnicity

|  |  |
| --- | --- |
| Males | Females |
| 50–64 years | 65+ years | 50–64 years | 65+ years |
| Māori | non-Māori | Māori | non-Māori | Māori | non-Māori | Māori | non-Māori |
| 991.8(916.7–1073.0) | 201.6(190.0–213.8) | 3333.9(3074.4–3615.4) | 1010.1(969.4–1052.5) | 1560.6(1466.6–1660.7) | 232.3(218.5–246.9) | 3823.0(3542.6–4125.6) | 803.2(764.2–844.2) |

Source: [Tatau Kura Tangata: Health of Older Māori Chart Book](http://www.health.govt.nz/nz-health-statistics/health-statistics-and-data-sets/maori-health-data-and-stats/tatau-kura-tangata-health-older-maori-chart-book) 2011, NMDS 2006-2008

Hospitalisations are more common in both women and Māori (with the exception of non-Māori women aged over 65 years), a reflection of the prevalence burden.

In terms of ambulatory sensitive (avoidable) hospitalisations, COPD ranks among the top 20 causes accounting for about 10% of avoidable hospitalisations in Australia([7](#_ENREF_7)). In one report, COPD accounted for 95% of all avoidable respiratory deaths([8](#_ENREF_8)); however, the disease classification in the cited report did not include lung cancer which is a significant cause of avoidable mortality([9](#_ENREF_9)). Further, COPD is an independent risk factor for not only lung cancer but also ischaemic heart disease (IHD), cerebrovascular accidents (CVA) and pneumonia such that COPD patients often have co-morbidities which contribute to their functional status and survival. Internationally, New Zealand has the third highest rate of avoidable hospitalisations due to COPD in the OECD (Figure 2)([10](#_ENREF_10)).

Figure 2: COPD hospitalisation rates in the OECD

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Source: OECD Health Data 2013

The main costs to the health and disability system in New Zealand attributable to COPD include medications, hospital care and primary care visits. Additional costs accrue from ED visits, smoking cessation programmes, the provision of rehabilitation services, longer lengths of stay when admitted for reasons other than COPD and long-term oxygen therapy (LTOT).

Depending on the number of prevalent cases, the direct costs in New Zealand have been estimated at $102 million to $192 million per annum([11](#_ENREF_11)). We estimate that COPD was responsible for over $131 million in costs in 2010/11 (see section 5.3 for breakdown of costs).

In terms of hospitalisations, COPD contributed to $54 million in hospitalisation costs (20.3% of total respiratory hospitalisation cost) in 2011/12([6](#_ENREF_6))—the largest single disease cost burden in respiratory disease. In total, 7,716 individuals with COPD were hospitalised an average of 1.5 times for a total of 11,619 discharges in 2011/12([6](#_ENREF_6)).This translates to a hospitalisation rate of about 0.08% of all COPD patients with a 30 day readmission rate of 17.9%([6](#_ENREF_6)). Hospitalisations were relatively long at an average of 4.2 days whilst the average cost per hospitalised patient was about $7,700([6](#_ENREF_6)).

# Methods

This section briefly outlines the methodology used to inform the contents of this report: pathway of care, prevalence, costs and patient stratification. For a more detailed methodology section, please see Appendix 3.

## Pathway of care

To inform the pathway of care section, various guidelines were searched. A regional Australasian guideline, COPD-X, and a UK National Institute for Health and Care Excellence (NICE) guideline were used as the primary sources for best practice comparison.

Horizon scanning was conducted utilising a combination of ad-hoc references, a subscription to GP Research Review from June 2013 until September 2013 and HealthPACT horizon scanning reports. Together with clinical input from an in-house Medical Oncologist, these interventions were presented along the pathway of care along with standard interventions.

Information about each prioritised intervention was limited to Cochrane Reviews. Where no Cochrane Reviews existed, HTAs and/or systematic reviews were used. Cost data for interventions and patient cohorts were gathered from a variety of sources including the Auckland DHB non-resident price list([12](#_ENREF_12)) and the New Zealand *Burden of Disease Epidemiology, Equity and Cost-Effectiveness Programme (BODE3)* costing protocol([13](#_ENREF_13)).

For general DHB service provision data, results from the *Alleviating the Burden of Chronic Conditions(*[*14*](#_ENREF_14)*)*  (ABCC) study were cited. Where DHB-specific data was sought, each DHB’s website was searched using the terms ‘Chronic Obstructive Pulmonary Disease’ and ‘COPD’ between June and July 2013 for respiratory or COPD service plans. Where no information was found on a DHB website, DHBs were contacted directly.

## Prevalence

The New Zealand Health Tracker (NZHT) is a health census of resident New Zealanders created through the linkage of data in the Ministry of Health’s national collections and other data sources. It was established and is maintained by the Ministry of Health’s Health and Disability Intelligence (HDI) unit and is currently up-to-date to 2010/11. While COPD prevalence data from the NZHT has not previously been published they were used here in preference to the previously published New Zealand Health Survey results([5](#_ENREF_5)), as they are more up-to-date and more comprehensive than the survey results which rely on self-reporting and weighting of population samples to represent the whole. The NZHT is also very useful as it allows patients’ service use and, hence, costs to be analysed.

The definition for a prevalent COPD case used here is the same as that used in the *New Zealand Burden of Diseases, Injuries and Risk Factors Study, 2006–2016* (NZBDS)([15](#_ENREF_15))aside from the age limitation which was 15 years in the NZBDS.For this analysisCOPD is defined as any person aged 35 years or older who has any history (from 2001 to 2011) of being prescribed any relevant pharmaceuticals or any admission with any diagnosis of COPD.

## Costs

Each patient’s pharmaceutical, general practitioner (GP), outpatient, emergency department (ED) and hospital ‘costs’ have been summed to create a cost-per-patient.

There are other costs to the health system that result from COPD. For example a COPD patient admitted to hospital with pneumonia may have a longer stay than a patient without COPD for the same admission. COPD is a degenerative disease and may be the reason for a patient needing community services such as home help or needing to move into an aged care facility. COPD patients may receive occupational and physiotherapy. To provide a picture of the COPD cost data in a timely manner, only the costs mentioned above (pharmaceutical, GP, ED and outpatient costs) have been included. While these are not comprehensive, they provide enough information to assess the COPD pathway in terms of the interventions that should be assessed to improve health outcomes for New Zealanders.

## Patient Stratification

Patients have been put into mutually exclusive groups indicative of the severity of their COPD as outlined in Table 3. Patients have been classed according to their service use and costs, not by their lung function and exacerbations.

Table 3: Disease stage definitions used for the data presented in this document

|  |  |  |
| --- | --- | --- |
| Disease stage | Disease State | Definition |
| Early | Stable | Not in late stage.Not had minor exacerbation. |
|  | Minor exacerbation | Not in late stage.Been prescribed ipratropium bromide (with or without salbutamol) in 2010/11. |
| Late | Stable | Not had moderate-severe exacerbation, or in end-stage.Has been prescribed Tiotropium bromide and had a hospital discharge for COPD prior to July 2010. |
|  | Moderate-severe exacerbation | Not in end-stageHas had a hospital discharge of COPD in 2010/11 |
|  | End-stage disease | 2010 Mortality Collection record of COPD, or NMDS record of died in care, or NNPAC record of receiving oxygen at home. |

Source: 2013 NHC

# Pathway of Care

Whilst there are many variations of the specific details of a COPD pathway, all COPD pathways follow the same basic principles of diagnosis and treatment. Figure 3 outlines the pathway of care for COPD and the interventions that comprise that pathway. This pathway provides a general picture of COPD care, but not every patient will travel through the pathway in the same way nor will they receive the same interventions along the pathway of care. Lastly, the pathway of care presented does not communicate the important effect on health outcomes or cost of comorbidities. To estimate this effect would be a major statistical exercise.

Nevertheless, excluding COPD, we found that over half (55%) of COPD patients have one of twelve co-morbidities[[3]](#footnote-3) we have looked at (lung cancer, colorectal cancer, (female) breast cancer, prostate cancer, other cancer/s, ever-hospitalised stroke, anxiety and/or depression (past 12 months), gout, diabetes, heart failure, dementia, ischaemic heart disease). About 30% of these patients had one co-morbidity, 15% had two, 7% had three, 2% had four and less than 1% had five or more comorbidities.

In terms of specific co-morbidities, 14% of COPD patients had gout, 10% had ever been hospitalised with a stroke, 24% had ischaemic heart disease, 18% had diabetes, 3% had dementia, 4% had heart failure, 12% had a mood or anxiety disorder, 1% had colorectal cancer, 1% had lung cancer, 3% of men had prostate cancer, 2% of women had breast cancer, and 3% had other cancer/s.

Figure 3: Pathway of care for COPD



Notes: Lung volume reduction surgery (LVRS) and lung transplant have been removed from the pathway of care because they are rarely performed. There is also limited evidence for pneumococcus vaccination (Pneumovax®) and it is not currently funded for all COPD patients, so it too has been excluded from this pathway.

Source: Refer to Methods

# Costs

This section summarises the costs associated with various COPD populations. It is divided by total New Zealand, deprivation and ethnicity populations. For a more detailed breakdown of costs, see Appendix 1.

## Total New Zealand

Most patients with COPD fell into the early stable disease state while the costs associated with COPD patients’ care (GP visits, hospital stays, ED visits, pharmaceuticals and outpatient visits) have been summed to provide figures for the total NZ COPD population. Figure 4 shows the breakdown of COPD patients and costs by disease state.

Figure 4: Total COPD population and cost by disease state

Source: 2013 NHC analysis of 2010/11 New Zealand Health Tracker data

Out of the total New Zealand COPD population, moderate-severe exacerbations of late stage patients accounted for the largest proportion of total COPD costs (34%). Per patient, end stage COPD patients as well as moderate-severe exacerbations were the most expensive to treat at about $6,100 and $7,600, respectively. Combined, these two groups of patients comprised over 49% of total COPD costs despite accounting for only 6% of total COPD patients. Generally, as patients progress through disease states (i.e. early to late) and into exacerbations and/or end stage care, average costs increase. Within all patient groups, stable patients cost less to manage than patients experiencing exacerbations.

## Deprivation

On average, the cost of treating a COPD patient increases with higher deprivation (New Zealand Index of deprivation, NZdep2006: high is deciles 9 and 10 those living in the most deprived neighbourhoods, moderate is deciles 3 to 8, low is deciles 1 and 2 those living in the least deprived neighbourhoods). This difference is driven in large part by end-stage care where high-deprivation patients cost about 22% and 8% more per patient to treat than low and moderate deprivation end-stage patients, on average (Figure 5).

Figure 5: Per–patient average cost by deprivation and disease state

Source: 2013 NHC analysis of 2010/11 New Zealand Health Tracker data

High-deprivation patients are over three times as likely as low deprivation patients to have had a moderate-severe exacerbation and about 54% more likely than patients from neighbourhoods of moderate deprivation to have had a moderate-severe exacerbation. For the end-stage state, high-deprivation patients are over three times more likely and 46% more likely than low and moderate deprivation patients, respectively, to fall within this disease state. Whilst high-deprivation and moderate deprivation patients are less likely than low deprivation patients to be managed as stable in the early disease stage, they are more likely than low deprivation patients to be managed as stable patients in the later stage of COPD.

## Ethnicity

Per patient COPD health care costs for Māori are on average 19% greater than non-Māori. Māori have greater health care costs at all deprivation levels compared to non-Māori (Figure 6). This disparity is largely attributable to end-stage care where Māori are nearly 16% more expensive to manage than non-Māori end-stage patients (Figure 7). There is a noticeable difference in the average cost to treat non-Māori as deprivation decreases whereas the cost to treat Māori of high, moderate and low deprivation is very close.

Figure 6: Per patient average cost for Māori versus non-Māori by deprivation level

Source: 2013 NHC analysis of 2010/11 New Zealand Health Tracker data

Figure 7: Māori versus non-Māori by disease state

Source: 2013 NHC analysis of 2010/11 New Zealand Health Tracker data

## Regional variation among Māori, high-deprivation COPD patients

As highlighted in the above sections, deprivation and ethnicity are associated with patient costs. Of all of the population subsets, Māori from high-deprivation areas have the highest average costs. To investigate this further, we looked at regional variation.

Among DHBs there is variation with regards to certain health outcomes for Māori, high-deprivation COPD patients. Although this analysis is not detailed enough to explain why variation is occurring, it is a good indication that there exists significant differences among DHBs with regards to health outcomes for the most vulnerable population. As demonstrated in the previous section, Māori, high-deprivation patients account for a significant proportion of the cost differences among patient groups. Gains in this patient population may be significant for reducing overall cost and improving health outcomes.

Regional variation with regards to hospital discharges, non-admitted ED rates and readmission rates are shown in Figure 8,

Figure 9, and

Figure 10, respectively. All rates are age-standardised to the Health Tracker population. Not every figure has all 20 DHBs represented because the numbers were too small to report. Small numbers were also the reason why not all rates were deprivation and ethnic standardised. The figures demonstrate that there is the potential for improvement among hospital discharge rates, non-admitted ED rates and readmission rates in a number of regions. More work would be needed to ascertain the reasons behind the variation; however, there exists significant disparity between DHBs as to what services they offer for COPD and the rate of service use among different patient groups. Some of these differences are highlighted in the Intervention Section and Appendix 3.

Figure 8: Hospital discharge variation by DHB for Māori, high-deprivation COPD patients

Note: Rate is number of discharges per 100 Māori, high-deprivation COPD patients by DHB

Source: 2013 NHC analysis of 2010/11 New Zealand Health Tracker data

Figure 9: Non-admitted emergency department (ED) rate variation by DHB for Māori, high-deprivation COPD patients

Note: Rate is number of non-admitted ED visits per 100 Māori, high-deprivation COPD patients by DHB

Source: 2013 NHC analysis of 2010/11 New Zealand Health Tracker data

Figure 10: 30-Day readmission variation by DHB for Māori, high-deprivation COPD patients

Note: Rate is number of 30-day readmissions per 100 Māori, high-deprivation COPD patients by DHB

Source: 2013 NHC analysis of 2010/11 New Zealand Health Tracker data

# Interventions

The following table summarises the various interventions along the COPD pathway of care (Table 4). It includes what is currently on the pathway of care and proposed interventions that are not currently on the care pathway but have been mentioned by the RWG as potentially value adding. Efficacy has been determined using the sources mentioned in the methods section and cited in text. Aspects for consideration are possible areas that the NHC may be able to address through an assessment. Growth is in reference to the estimated cost growth of the intervention based on clinical guidance. Both its current level of growth and a judgment as to whether or not that growth pattern is sustainable or unsustainable has been included. Since the COPD patient population is likely to grow in the near future, total cost growth can either be driven by an increase in costs or an increase in resource utilisation. Status in New Zealand is based on the *Alleviating the Burden of Chronic Conditions (ABCC)* study as well as anecdotal DHB information. Value is the potential benefit the NHC could add by conducting an assessment in that space. Population is the potentialpopulation in which an intervention may be used; there may be others.

Table 4. Summary of interventions in COPD

| **Intervention** | **Description** | **Status in NZ** | **Population** | **Efficacya** | **Growthb** | **Aspects for Consideration** | **Valuec** |
| --- | --- | --- | --- | --- | --- | --- | --- |
| GP Spirometry and Improved Case-Finding([16](#_ENREF_16)) | Spirometry is the test used to measure pulmonary function for suspected COPD patients. Case-finding is a targeted approach to identifying suspected COPD patients for further assessment with the aim to increase the diagnosed COPD population. | According to the ABCC study most, if not all, DHBs have spirometry. Not every GP’s office has spirometry and some DHBs have dedicated spirometric testing facilities. Case-finding is not in regular use throughout the country. | Suspected COPD patients; could increase diagnosed population by 20,000-63,000 patients. | Efficacious\* | Unsustainable (/) | National spirometry co-ordination, increased use/diagnosis | G |
| CT Screening([16](#_ENREF_16)) | Computed Tomography (CT) screening is an imaging technology used to provide a detailed view of internal structures. Whilst it is effective at producing high-quality images, it is not recommended for all COPD patients- only patients with other co-morbidities such as lung cancer. | Generally speaking, all DHBs have advanced imaging equipment such as CT scanners.  | COPD patients with certain co-morbidities | Good for some, unnecessary for others\* | Sustainable (/) | Prevent inappropriate use | R |
| Pulmonary Rehabilitation([17](#_ENREF_17))  | Pulmonary rehabilitation (PR) is a broad, integrated programme that includes physical and psychological interventions. It has the potential to reduce readmissions by 25% for patients admitted to hospital with an exacerbation of COPD and mortality by about 17%. | According to the ABCC study mentioned above, the vast majority of DHBs offer some form of PR. Anecdotally, very few patients are actually referred to PR and complete the programme.([18](#_ENREF_18)) The proportion of discharged patients currently receiving a referral to PR is about 7% according to a Waitemata DHB audit | Non-referred, discharged COPD exacerbation patients (~5,200) | Efficacious\*\* | Sustainable (+) | Increasing referral, uptake and completion rates for discharged COPD patients | G |
| All COPD patients (~138,000) | Mixed efficacy\*\* | Unsustainable (+) | Increasing referral, uptake and completion rates for all COPD patients | R |
| (Home) Telehealth([19](#_ENREF_19)) | Providing care via a telecommunications mechanism (i.e. phone, Skype) | In New Zealand, one of the more common uses of telehealth is the advent of Healthline, a phone service staffed by nurses who can guide patients through particular questions and advise treatment options. Quitline is also another example of services offered via telephone. | Minor exacerbations(~42,000) | Mixed efficacy\*\* | Sustainable (/) | Invest in new technology/refer to HIP | R |
| Integrating patient records from a variety of sources across a common platform | Some DHBs are trialling patient management systems that attempt to integrate care across primary and secondary services. The purpose of this is to better co-ordinate services and allow multiple clinicians to input to a patient’s care plan.  | All COPD patients (~138,000) | Unknown+ | Sustainable (+) | Invest in new technology/refer to HIP | R |
| Monitoring patient signs remotely | Within COPD, telemonitoring of vital signs (i.e. oxygen saturation, pulse, etc.) has been trialled, but the extent to which this can impact on COPD health outcomes is still questionable to some clinicians. | Advanced stable and end stage(~10,000) | Mixed efficacy+ | Sustainable (/) | Invest in new technology/refer to HIP | R |
| Smoking Cessation([16](#_ENREF_16)) | Smoking cessation is a general term for any intervention or combination of interventions that assists a person with quitting smoking. | Smoking cessation services are widely available in New Zealand. 100% of DHB respondents to the ABCC questionnaire reported having smoking cessation services available. Where smoking cessation services were limited was in terms of audit/quality improvement programmes. The specific services that various DHBs offer are unknown at this stage. | All COPD patients (~138,000) | Efficacious\*\* | Sustainable (+) | Economic evaluation of current therapies; evaluation of E-cigarettes | R |
| Influenza and Pneumococcal Vaccination([16](#_ENREF_16)) | These vaccinations protect against diseases that have negative effects on the respiratory system. | Annual influenza vaccines are currently funded for the whole COPD population. Pneumococcal vaccines (Pneumovax®) are not currently funded on the immunisation schedule. | All COPD patients (~138,000) | Efficacious\* | Sustainable (/) | Increased coverage for all COPD patients (Pneumovax®) | R |
| Self-Management and Education to increase health literacy([20](#_ENREF_20)) | Self-management involves patients actively involved in his or her care plan. This is usually supplemented with educational materials about the disease and treatments. | Self-management and education underlies a lot of the COPD treatment given. Combined with other types of care such as pulmonary rehabilitation, self-management may be effective at empowering patients. Some DHBs have ‘blue cards’ that outline a COPD action plan whilst others provide educational material. | Established stable (~81,000) | Mixed efficacy\*\* | Sustainable (/) | HIP referral | R |
| Community Multidisciplinary clinic (MDC) | A Multi-Disciplinary clinic may include a GP, respiratory nurse specialist, respiratory physician and other clinicians. | ‘Super-Clinics’ are being developed in certain regions that bring together specialists from a variety of disciplines. | All stable/minor exacerbations(~130,000) | Unknown+ | Sustainable (+) | HIP referral | R |
| Depression Interventions([16](#_ENREF_16)) | Depression and anxiety are common co-morbidities in people with COPD. Treatment may be a combination of pharmaceuticals, therapy and group support groups. | Some DHBs offer support groups for COPD patients where patients can interact with other COPD patients and form bonds. It is unknown to what extent pharmaceutical antidepressants are used within the COPD population. | Established stable (~81,000) | Efficacious\* | Sustainable (/) | Proper non-pharmaceutical use | R |
| Non-Invasive Ventilation (Acute)([21](#_ENREF_21)) | Non-Invasive Ventilation (NIV) is the use of ventilator support (i.e. positive pressure ventilation) to help achieve adequate ventilation. | A proportion of DHBs offer some form of NIV. NIV has been shown to have good evidence and may have a case for extended coverage, especially in general wards for acute exacerbations. The evidence for its use as a chronic therapy is weak. | Late stable and end stage(~10,000) | Efficacious\*\* | Unsustainable (/) | National strategy; investment in NIV for acute exacerbations; reprioritisation of chronic NIV use. | G |
| Hospital at Home([22](#_ENREF_22)) and/or community care | Hospital at home is the use of various respiratory personnel and/or services (i.e. respiratory nurse specialist) in the home. | Only 1 mid-sized DHB was identified as having a hospital at home team for COPD exacerbations. Respiratory nurse specialists are common in many DHBs. Notably, South Canterbury DHB offers an in-home respiratory nurse specialist service. It is unknown to what extent this is the case in the rest of New Zealand. Some DHBs have primary care options to mitigate the need for hospitalisations (i.e. Primary Options for Avoiding Acute Care). These services are not necessarily offered in the home but try to achieve the same outcomes as hospital at home to keep patients out of hospital by offering services in the community.  | Moderate-severe exacerbations(~6,000) | Mixed Efficacy\*\* | Unsustainable (-) | HIP evaluation and national strategy | R |
| Early Facilitated Discharge | Planning between the GP, patient and other individuals involved in care may help to shorten hospital stay and reduce re-admissions. The plan may include a wide variety of materials/steps and should be completed within 1-2 days of admission. | Facilitated discharge/care planning has anecdotally been suggested as an area for improvement. In order to successfully discharge someone early in an orderly fashion, DHBs also need support services in place within the community (i.e. respiratory nurse specialists for home visits, community primary care options, etc.). Not every DHB has these services in place. | Moderate-severe exacerbations(~6,000) | Efficacious+ | Unsustainable (/) | National Strategy | R |
| Nutrition/Exercise Counselling([16](#_ENREF_16)) | Nutrition counselling includes allied health professionals (i.e. nutritionists) providing advice and support for COPD patients. | Many DHBs offer nutritional counselling services, not just specific to COPD patients. | Moderate-severe exacerbations(~6,000) | Efficacious\* | Sustainable (/) | HIP referral | R |
| Lung Volume Reduction Surgery([23](#_ENREF_23)) | Lung volume reduction surgery (LVRS) involves the resection of damaged lung areas. | LVRS procedures are rarely performed in the US or Australia.([16](#_ENREF_16)) | Few | Mixed Efficacy, Mostly Negative\*\* | Sustainable (/) | Prevent inappropriate use | R |
| Lung Transplant([16](#_ENREF_16)) | A lung transplant involves the removal of healthy lung tissue from a living donor into a COPD patient to replace damaged lung tissue. | Very few lung transplants are performed on COPD patients currently. Anecdotally, it is estimated 3 are performed yearly. | Few | Mixed efficacy, mostly negative\* | Sustainable (/) | Prevent inappropriate use | R |
| Long-Term Oxygen Therapy([16](#_ENREF_16)) | Long-term oxygen therapy (LTOT) is the daily use of domiciliary oxygen for COPD patients in order to help maintain healthy arterial blood gas levels and thus reduce mortality. | Many DHBs have home oxygen services available. Some DHBs favour oxygen concentrators over traditional bottles as the preferred oxygen therapy delivery apparatus. Anecdotally, LTOT rates vary widely by DHB. | End stage(~3,000) | Efficacious\* | Sustainable (/) | National approach to oxygen delivery system (i.e. concentrators or tanks); exploration of intervention rates among DHBs. | G |
| Advance Care Planning([16](#_ENREF_16)) | Advance Care Planning (ACP) is the discussion of a patient’s end of life wishes. | ACP occurs in some DHBs but is relatively new in New Zealand. CDHB has piloted some early work to increase ACP in Canterbury. | All COPD patients(~138,000) | Efficacious\* | Sustainable (+) | National strategy for increasing ACP for COPD patients | G |
| Case Management | Case management involves allocating complex patients to individual respiratory specialist nurses for personalised disease management. | Case management has limited use | End stage and severe exacerbation patients(~9,000) | Unknown+ | Sustainable (/) | Further use of case management | Y |
| Symptom Monitoring | Symptom monitoring involves the use of spirometry and other diagnostic tools to track disease progression in patients. | Symptom monitoring already occurs as part of usual care | All COPD patients(~138,000) | Unknown+ | Sustainable (/) | An additional GP visit a year to track progress | Y |
| a **Source:** \* COPD-X; \*\* Cochrane; + Neitherb **Growth:** / Stable; + Growing; - Decreasingc **Value of NHC assessment**: red (R) = little value; yellow (Y) = some value; green (G) = high value. |

# Respiratory Working Group Commentary

On 29 January 2014, the RWG met in Auckland to discuss which areas along the COPD pathway of care had potential for improvement in both health gain and reduced expenditure. The discussions from this meeting are contained in Appendix 4. After discussion with the RWG, the list of proposed interventions in Section 7 was narrowed down to 7 possible interventions:

1. Earlier diagnosis through targeted case finding
2. Pulmonary rehabilitation (PR) (2 scenarios)
3. Non-invasive ventilation (NIV) variation
4. Long-term oxygen therapy variation
5. Case management
6. Advance care planning (ACP)
7. Clinical monitoring of symptoms

The RWG did not refer any interventions to HIP. The RWG also reiterated that they would like to see services moved from hospital into the community where possible and that care should be integrated throughout the patient journey. Some of the proposed changes are more material and feasible to implement than others.

# NHC Executive Perspective

The purpose of this section is to highlight areas we think are material enough to warrant further work. It is based on data as well as consultation with various DHBs, clinicians and the RWG. It is one way of looking at the evidence and is not intended as a final conclusion or recommendation.

This report highlights a few key findings regarding COPD in New Zealand that may help to improve the pathway of care. First, although moderate-severe exacerbations and end-stage COPD account for only about 6% of COPD patients, they account for nearly half of all the costs. Within this 6%, high-deprivation Māori patients have the highest average cost. This is especially true for end-stage disease care. Adjusting the pathway of care to address Māori and high-deprivation health needs would likely lead to health savings through fewer moderate-severe exacerbations and better use of end-stage care.

Across DHBs, there exists disparity with regards to hospital discharge, non-admitted ED and readmission rates for high-deprivation Māori COPD patients. Although the driving factors behind these disparities are unclear, these findings indicate that there is potential for more efficacious regional service delivery that would improve health outcomes for high-deprivation Māori, in particular, and reduce health expenditure nationally.

Generally speaking, there are barriers within COPD care provision that may prevent patients from receiving proper medical management. These barriers affect all COPD patients but have a magnified impact on Māori and high-deprivation patients. Firstly, COPD is thought to be underdiagnosed. This may be due to a combination of factors including manifestation of symptoms later in the disease, issues with access to spirometry and difficulty targeting/tracking COPD patients. Under-diagnosis has a flow-on effect of further skewing the primary/secondary care interface to ensure continuity of care. It may also partly explain what is driving exacerbation rates since many COPD patients are diagnosed late in the disease when treatment costs are higher. Spirometry, though, is just one aspect of diagnosis. A combined assessment of targeted case-finding (of smokers with a chronic cough) and spirometry could help to improve health outcomes by increasing diagnosis rates by 12.5%-25%[[4]](#footnote-4) over current levels([24](#_ENREF_24)).

Secondly, PR, whilst widely offered, is often underutilised in patients discharged from an exacerbation of COPD. According to a 2012 New Zealand-based study, 2569 individuals diagnosed with COPD in New Zealand were offered pulmonary rehabilitation (PR), 1786 started PR and 1378 completed a programme in 2009 ([18](#_ENREF_18)). Using the prevalence rates presented in this report, about 1.8% of COPD patients were offered PR. Among discharged COPD patients, a Waitemata DHB audit found the referral rate to be only 7%([25](#_ENREF_25)). This underuse of referrals is further compounded by the nearly 50% non-completion rate. NHC assessment would add value to the health sector by evaluating the effectiveness of increasing referral, uptake and completion rates for discharged COPD patients.

Also underutilised is acute non-invasive ventilation (NIV). Whilst all DHBs provide NIV access, not all DHBs provide access to NIV on a general ward. A UK audit showed only 12% of patients admitted to hospital with an exacerbation of COPD received NIV, which is about 50% below the number of patients eligible to benefit from NIV([26](#_ENREF_26)). A NHC assessment could see increased use of NIV as well as the possible introduction of NIV to general wards.

Long-term oxygen therapy (LTOT) is thought to be over-utilised in some DHBs and under-utilised in other DHBs based on best practice guidelines. About 300 patients were being unnecessarily prescribed LTOT whilst about 90 patients who could have benefited from LTOT were not receiving treatment in 2004([27](#_ENREF_27)). The NHC has the potential to reduce this variation and improve adherence to best practice through an assessment.

Lastly, advance care planning (ACP) is lacking for COPD patients. ACP may help to improve patient outcomes at the end of life provided there are services in place to meet the needs of end of life patients. Without proper community services and an early ongoing conversation, ACP is less effective.

Increasing PR for all COPD patients would likely have large budget implications and be less effective clinically than a more targeted approach. Case management may also have merit, but there is limited evidence to show that it is as cost effective as some of the alternative assessments under consideration. Lastly, clinical monitoring already occurs and it is unclear what the benefits would be from an assessment. Figure 11 illustrates where these potential assessments would take place along a possible revised pathway of care. The revised care pathway is not a complete pathway but shows where some of the assessments mentioned above would fit along the continuum of care.

Figure 11: Assessments along care pathway



Note: This figure shows a possible COPD pathway that combines relevant assessments from the intervention table. It is not a complete pathway of care but rather shows how NHC assessments could impact the care pathway.

Source: NHC, 2014

# Health Innovation Partnership

In addition to NHC assessments, some proposals were sought from the sector for field trial research during an open request for proposal (RFP) round. Of the 11 RFP applications received, 6 were selected to proceed to the next stage of the application process. The applications came from a variety of sources across the health sector and cover an eclectic array of topics.

These trials, if selected, will look at telehealth, new integrated models of care as well as emerging technology in the space of COPD care. Trials are expected to last for 2 years with the final projects selected for funding in mid-2014.

# Limitations

Whilst this report offers a relatively comprehensive picture of COPD in New Zealand, there are some inherent limitations in the methodology. By limiting our pathway of care analysis to only two guidance documents, there is the possibility that there are aspects of the pathway of care not mentioned in this document. This is unlikely, as most guidelines tend to only differ marginally. Moreover, guidelines are not rigid protocols for treatment and should be viewed as a guide for informing best practice. The two guidelines selected, COPD-X and NICE, were chosen for their regional relevance (COPD-X) and evidence-based advice (NICE). As such, they represent a robust baseline on which to base our own pathway of care.

Another limitation of this report was the incomplete picture of COPD services offered by DHBs. Whilst high-level information about service provision was available from the ABCC study, its results were not always applicable to every DHB as was apparent with the pulmonary rehabilitation example. Efforts were made to research and contact individual DHBs to uncover the services they provide, but it was infeasible to contact every DHB and discover each individualised COPD service plan. To mitigate this limitation, DHBs with established regional plans were contacted directly and their insight into local service provision was cited. These DHBs were identified as Auckland, Waitemata, Counties Manukau and Canterbury DHBs. To capture perspectives outside of the larger urban centres, various clinicians were contacted through the Royal Australasian College of Physicians to provide informal feedback on this report.

Both the greatest strength and limitation in this report was in the data methodology. By using Health Tracker, we were limited in how we could define COPD patients along the pathway of care. Because we relied on patients having an interaction with the health system and, thus, a diagnosis, our prevalence estimate is likely below the actual COPD prevalence since many COPD patients are undiagnosed. However, there is also a chance we may have captured patients who do not have COPD but were prescribed one of the pharmaceuticals for another condition or that a patient had been given a comorbid diagnosis of COPD in a hospital without a full investigation. The method we have used is simplistic but thorough so it should be closer to the true COPD prevalence than survey methods.

The incidence of COPD ED rates probably over-counts the true incidence of COPD-related ED presentations since many COPD patients have other co-morbidities which could have brought them to ED. This is also true of the estimated GP presentations, although it is likely that a GP will enquire about a patient’s COPD regardless of the purpose of the consult. As mentioned above there are other costs associated with COPD, including sector support groups that receive funding and aged care, that have not been accounted for here; however the overall ‘picture’ and conclusions would likely be the same. Because our patient cohorts are defined by their service utilisation, they should not be viewed as clinically grouped cohorts but rather service-use cohorts.

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Appendix 1: Cost Tables

Total New Zealand

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Total NZ | Count | % of count | Total cost ($) | Avg cost ($) |
| Early Stable | 80,585 | 58.0 | 26,801,100 | 330 |
| Minor Exacerbation | 42,151 | 30.4 | 24,465,500 | 580 |
| Late Stable | 7,434 | 5.4 | 12,052,800 | 1,620 |
| Moderate-Severe Exacerbation | 5,609 | 4.0 | 42,655,800 | 7,600 |
| End Stage | 3,054 | 2.2 | 18,773,800 | 6,150 |
| Total | 138,833 | 100.0 | 124,748,900 | 900 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Total Māori | Count | % of count | Total cost ($) | Avg cost ($) |
| Early Stable | 11,847 | 57.2 | 4,079,400 | 340 |
| Minor Exacerbation | 6,192 | 29.9 | 3,866,400 | 620 |
| Late Stable | 1,061 | 5.1 | 1,657,900 | 1,560 |
| Moderate-Severe Exacerbation | 1,129 | 5.4 | 8,525,800 | 7,550 |
| End Stage | 493 | 2.4 | 3,420,500 | 6,940 |
| Total | 20,722 | 100.0 | 21,550,000 | 1,040 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Total non-Māori | Count | % of count | Total cost ($) | Avg cost ($) |
| Early Stable | 68,738 | 58.2 | 22,721,700 | 330 |
| Minor Exacerbation | 35,959 | 30.4 | 20,599,100 | 570 |
| Late Stable | 6,373 | 5.4 | 10,394,900 | 1,630 |
| Moderate-Severe Exacerbation | 4,480 | 3.8 | 34,130,000 | 7,620 |
| End Stage | 2,561 | 2.2 | 15,353,300 | 6,000 |
| Total | 118,111 | 100.0 | 103,199,000 | 870 |

Deprivation

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Total High-deprivation | Count | % of count | Total cost ($) | Avg cost ($) |
| Early Stable | 19,611 | 56.5 | 6,732,100 | 340 |
| Minor Exacerbation | 10,485 | 30.2 | 6,324,400 | 600 |
| Late Stable | 1,957 | 5.6 | 3,156,800 | 1,610 |
| Moderate-Severe Exacerbation | 1,785 | 5.1 | 13,745,400 | 7,700 |
| End Stage | 870 | 2.5 | 5,721,600 | 6,580 |
| Total | 34,708 | 100.0 | 35,680,300 | 1,030 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Total Moderate Deprivation | Count | % of count | Total cost ($) | Avg cost ($) |
| Early Stable | 49,920 | 57.8 | 16,551,900 | 330 |
| Minor Exacerbation | 26,564 | 30.8 | 15,292,000 | 580 |
| Late Stable | 4,697 | 5.4 | 7,604,400 | 1,620 |
| Moderate-Severe Exacerbation | 3,306 | 3.8 | 24,933,400 | 7,540 |
| End Stage | 1,885 | 2.2 | 11,435,400 | 6,070 |
| Total | 86,372 | 100.0 | 75,817,100 | 880 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Total Low Deprivation | Count | % of count | Total cost ($) | Avg cost ($) |
| Early Stable | 11,054 | 62.3 | 3,517,000 | 320 |
| Minor Exacerbation | 5,102 | 28.7 | 2,849,200 | 560 |
| Late Stable | 780 | 4.4 | 1,291,500 | 1,660 |
| Moderate-Severe Exacerbation | 518 | 2.9 | 3,977,000 | 7,680 |
| End Stage | 299 | 1.7 | 1,616,800 | 5,410 |
| Total | 17,753 | 100.0 | 13,251,500 | 750 |

Ethnicity and Deprivation

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Māori High-deprivation | Count | % of count | Total cost ($) | Avg cost ($) |
| Early Stable | 5,791 | 57.1 | 1,967,600 | 340 |
| Minor Exacerbation | 2,949 | 29.1 | 1,865,000 | 630 |
| Late Stable | 544 | 5.4 | 824,400 | 1,520 |
| Moderate-Severe Exacerbation | 594 | 5.9 | 4,400,400 | 7,410 |
| End Stage | 263 | 2.6 | 1,606,600 | 6,110 |
| Total | 10,141 | 100.0 | 10,664,000 | 1,050 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Non-Māori High-deprivation | Count | % of count | Total cost ($) | Avg cost ($) |
| Early Stable | 13,820 | 56.3 | 4,764,500 | 340 |
| Minor Exacerbation | 7,536 | 30.7 | 4,459,400 | 590 |
| Late Stable | 1,413 | 5.8 | 2,332,400 | 1,650 |
| Moderate-Severe Exacerbation | 1,191 | 4.8 | 9,345,000 | 7,850 |
| End Stage | 607 | 2.5 | 4,115,000 | 6,780 |
| Total | 24,567 | 100.0 | 25,016,300 | 1,020 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Māori Moderate Deprivation | Count | % of count | Total cost ($) | Avg cost ($) |
| Early Stable | 5,494 | 57.0 | 1,924,600 | 350 |
| Minor Exacerbation | 2,957 | 30.7 | 1,818,900 | 620 |
| Late Stable | 485 | 5.0 | 777,500 | 1,600 |
| Moderate-Severe Exacerbation | 493 | 5.1 | 3,767,000 | 7,640 |
| End Stage | 214 | 2.2 | 1,712,100 | 8,000 |
| Total | 9,643 | 100.0 | 10,000,100 | 1,040 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Non-Māori Moderate Deprivation | Count | % of count | Total cost ($) | Avg cost ($) |
| Early Stable | 44,426 | 57.9 | 14,627,300 | 330 |
| Minor Exacerbation | 23,607 | 30.8 | 13,473,100 | 570 |
| Late Stable | 4,212 | 5.5 | 6,826,900 | 1,620 |
| Moderate-Severe Exacerbation | 2,813 | 3.7 | 21,166,400 | 7,520 |
| End Stage | 1,671 | 2.2 | 9,723,300 | 5,820 |
| Total | 76,729 | 100.0 | 65,817,000 | 860 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Māori Low Deprivation | Count | % of count | Total cost ($) | Avg cost ($) |
| Early Stable | 562 | 59.9 | 187,200 | 330 |
| Minor Exacerbation | 286 | 30.5 | 182,500 | 640 |
| Late Stable | 32 | 3.4 | 56,000 | 1,750 |
| Moderate-Severe Exacerbation | 42 | 4.5 | 358,400 | 8,530 |
| End Stage | 16 | 1.7 | 101,800 | 6,360 |
| Total | 938 | 100.0 | 885,900 | 940 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Non-Māori Low Deprivation | Count | % of count | Total cost ($) | Avg cost ($) |
| Early Stable | 10,492 | 62.4 | 3,329,800 | 320 |
| Minor Exacerbation | 4,816 | 28.6 | 2,666,700 | 550 |
| Late Stable | 748 | 4.4 | 1,235,500 | 1,650 |
| Moderate-Severe Exacerbation | 476 | 2.8 | 3,618,600 | 7,600 |
| End Stage | 283 | 1.7 | 1,515,000 | 5,350 |
| Total | 16,815 | 100.0 | 12,365,600 | 740 |

Appendix 2: ABCC Study Summary Table

ABCC Study Summary Table: Summary of Evidence-Based COPD Service Provision by DHB Size

|  |  |  |  |
| --- | --- | --- | --- |
| Variables | Small DHBs positive responseN=3 | Medium DHBs positive responseN=6 | Large DHBs positive responseN=6 |
| Audit/ quality improvement for COPD admissions | 0/3 | 2/6 | 3/6 |
| Overall leadership in COPD | 1/3 | 3/6 | 4/6 |
| Protocols/guidelines for COPD management | 1/3 | 5/6 | 3/6 |
| Spirometry | 3/3 | 6/6 | 6/6 |
| Spirometry audit/quality improvement programme | 1/2 | 2/6 | 3/5 |
| Pulmonary rehabilitation (PR) | 3/3 | 5/6 | 6/6 |
| Ongoing home-based exercise programme | 0/3 | 2/6 | 3/5 |
| Ongoing (post-rehab) support | 3/3 | 6/6 | 2/5 |
| Other rehab community-based service | 0/3 | 6/6 | 2/5 |
| PR audit or quality improvement programme | 1/2 | 4/6 | 6/6 |
| Long-term oxygen therapy (LTOT) service | 3/3 | 6/6 | 6/6 |
| Service lead for LTOT (large ‘nil response’ rate) | 1/2 | 3/4 | 3/6 |
| Written guidelines for LTOT | 3/3 | 6/6 | 6/6 |
| LTOT Audit / quality improvement programme (large ‘nil response’ rate) | 1/2 | 0/6 | 3/4 |
| Non-invasive ventilation (NIV) for stable COPD (large ‘nil response’ rate) | 0/3 | 0/6 | 3/5 |
| NIV for COPD exacerbation (large ‘nil response’ rate) | 1/2 | 3/4 | 4/5 |
| Hospital at home teams for COPD exacerbation | 0/3 | 1/6 | 0/6 |
| Smoking cessation | 3/3 | 6/6 | 6/6 |
| Audit or quality improvement programme for smoking cessation (large ‘nil response’ rate) | 1/2 | 0/6 | 0/6 |
| COPD self-management / education programme | 2/3 | 4/6 | 3/6 |
| Audit / quality improvement programme for COPD self-management (poor response rate) | 0/3 | 0/6 | 1/1 |
| COPD Case management | 1/3 | 4/6 | 3/6 |
| Audit / quality improvement programme for COPD case management (large ‘nil response’ rate) | 0/3 | 6/6 | 6/6 |

Note: Results are positive responses / total responses.

Source: Alleviating Burden of Chronic Conditions (ABCC) NZ study **(**[**14**](#_ENREF_14)**)**

Appendix 3: Full Methodology

This appendix outlines the full methodology used to inform the contents of this report: pathway of care, prevalence, costs and patient stratification.

Pathway of care

To inform the pathway of care section, various guidelines were searched. A regional, Australasian guideline, COPD-X, and a UK National Institute for Health and Care Excellence (NICE) guideline were used as the primary sources for best practice comparison.

Horizon scanning was conducted utilising a combination of ad-hoc references, a subscription to GP Research Review from June 2013 until September 2013 and HealthPACT horizon scanning reports. Together with clinical input from an in-house Medical Oncologist, these interventions were presented along the pathway of care along with standard interventions.

Information about each prioritised intervention was limited to Cochrane Reviews. Where no Cochrane Reviews existed, HTAs and/or systematic reviews were used. Cost data for interventions and patient cohorts were gathered from a variety of sources including the Auckland DHB non-resident price list([12](#_ENREF_12)) and the New Zealand *Burden of Disease Epidemiology, Equity and Cost-Effectiveness Programme (BODE3)* costing protocol([13](#_ENREF_13)).

For general DHB service provision data, results from the *Alleviating the Burden of Chronic Conditions(*[*14*](#_ENREF_14)*)*  (ABCC) study were cited. Where DHB-specific data was sought, each DHB’s website was searched using the terms ‘Chronic Obstructive Pulmonary Disease’ and ‘COPD’ between June and July 2013 for respiratory or COPD service plans. Where no information was found on a DHB website, DHBs were contacted directly.

Prevalence

The New Zealand Health Tracker (NZHT) is a health census of resident New Zealanders created through the linkage of data in the Ministry of Health’s national collections and other data sources. It was established and is maintained by the Ministry of Health’s Health and Disability Intelligence (HDI) unit and is currently up-to-date to 2010/11. While COPD prevalence data from the NZHT has not previously been published they were used here in preference to the previously published New Zealand Health Survey results([5](#_ENREF_5)), as they are more up-to-date and more comprehensive than the survey results which rely on self-reporting and weighting of population samples to represent the whole. The NZHT is also very useful as it allows patients’ service use and, hence, costs to be analysed.

To be included as a prevalent case, a person had to be alive on 30 June 2010 and must have been enrolled in a primary health organisation (PHO) at that time, or had a contact event in a PHO in 2010/11 or a recorded event in the NMDS. This method excludes most people who have emigrated. A case had to meet the relevant diagnostic criteria outlined below.

For this analysisCOPD is defined as any person aged 35 years or older who has any history (from 2001 to 2011) of being prescribed ipratropium bromide, salbutamol with ipratropium bromide or tiotropium bromide (see Table 5); or any history of being prescribed theophylline or aminophylline and has no prior (since 1988) admission diagnosis of asthma; or has a history of any admission with any diagnosis of COPD. Each admission has one or more diagnosis codes associated with it. These codes are currently based on the Australian Modification of the World Health Organization’s International Classification of Diseases (ICD-10-AM). For the purposes of this analysis, the ICD (9-CM-A, ninth revision) codes used for COPD admission records from 1988 to 1999 are:

* 490 (Bronchitis, not specified as acute or chronic)
* 4910 (Simple chronic bronchitis)
* 4911 (Mucopurulent chronic bronchitis)
* 49120 (Obstructive chronic bronchitis without mention of acute exacerbation)
* 49121 (Obstructive chronic bronchitis with acute exacerbation)
* 4918 (Other chronic bronchitis)
* 4919 (Unspecified chronic bronchitis)
* 4920 (Emphysematous bleb)
* 4928 (Other emphysema)
* 496 (Chronic airway obstruction, not elsewhere classified)

The ICD-10-AM codes used for admission records from 1999 to 2011 are:

* J40 (Bronchitis, not specified as acute or chronic)
* J410 (Simple chronic bronchitis)
* J411 (Mucopurulent chronic bronchitis)
* J418 (Mixed simple and mucopurulent chronic bronchitis)
* J42 (Unspecified chronic bronchitis)
* J430 (MacLeod's syndrome)
* J431 (Panlobular emphysema)
* J432 (Centrilobular emphysema)
* J438 (Other emphysema)
* J439 (Emphysema, unspecified)
* J440 (Chronic obstructive pulmonary disease with acute lower respiratory infection)
* J441 (Chronic obstructive pulmonary disease with acute exacerbation, unspecified)
* J448 (Other specified chronic obstructive pulmonary disease)
* J449 (Chronic obstructive pulmonary disease, unspecified)

Table 5: Pharmaceuticals used in the New Zealand Health Tracker definition of COPD

|  |  |
| --- | --- |
| Pharmaceutical | Comment |
| Ipratropium bromide | Often used as an inhaler to treat exacerbations. |
| Salbutamol with ipratropium bromide | Often used as an inhaler to treat exacerbations. |
| Tiotropium bromide | Dispensed since 2005.Long acting (more than 24 hours), modification of ipratropium bromide. |
| Theophylline | Relief of bronchospasm. Available orally via special application for long using patients. Currently only registered for intravenous use. Not regarded as front line treatment. People who were only dispensed Theophylline or Aminophylline were only included as prevalent COPD if they had no prior (since 1988) recorded ICD diagnosis of asthma. |
| Aminophylline | Relief of bronchospasm. Available orally via special application for long using patients. Currently only registered for intravenous use. Not regarded as front line treatment. People who were only dispensed Theophylline or Aminophylline were only included as prevalent COPD if they had no prior (since 1988) recorded ICD diagnosis of asthma. |

Of the 138,833 people identified as prevalent cases of COPD, the majority (65.1%) were identified through their pharmaceutical history alone, 9.3% were identified through their diagnosis history alone, and 25.7% were identified through both their history of pharmaceuticals and their diagnoses (Figure 12).

Figure 12: Source of COPD prevalent population using NZ Health Tracker, 2010/11



90,317

12,840

35,676

Source: 2013 NHC analysis of 2010/11 NZHT

Costs

Hospital events

Hospitalisation event (inpatient and day patient) data from the National Minimum Data Set for the 2010/11 financial year were used with filtering to exclude non-publically funded and/or non-casemix purchased events. The diagnosis code used was either the primary diagnosis or the secondary diagnosis if the primary diagnosis was a ‘Z’ code (Factors influencing health status and contact with health services). The ICD-10-AM codes listed above in the Prevalence section were used to define COPD-related hospital events.

Price has been used as a proxy for cost as it is more readily available and is correlated with the cost of the services being summarised. Each (filtered) hospitalisation event has a resource-based volume measure of the relative resources used in the delivery of inpatient heath care based on the diagnosis code (derived using Weighted Inline Equivalent Separation methodology). For this analysis the WIESNZ10 caseweight has been multiplied by the national unit price for 2010/11 ($4,410.38).

Pharmaceuticals

The Pharmaceutical Collection was used to identify the COPD-specific pharmaceuticals listed in Table 5, other relevant respiratory pharmaceuticals and antibiotics, as well as influenza and pneumococcal vaccinations were also identified and the reimbursement cost of the pharmaceuticals included. This is the cost from the supplier, the mark-up and the dispensing fee minus the patient contribution. The reimbursement cost also includes Goods and Services Tax (GST, 15%), so this was multiplied by 0.8695652174 to remove this.

General Practitioner (GP) visits

Analysis of the 2006/07 New Zealand Health Survey showed that people aged 45 years and over with diagnosed COPD saw a GP four times on average (median) over a 12 month period. To reflect some of the variability in the frequency with which COPD patients visit their GP we used information from the PHO database on how many quarters of the 2010/11 year that each patient had had contact with their PHO and whether or not a patient had had any COPD-specific medicines dispensed in 2010/11. A patient who had no PHO contact and no COPD-specific medicines dispensed in 2010/11 was assigned zero GP visits, one who had PHO contact in one quarter of 2010/11 and no COPD-specific medicines was assigned one GP visit, a patient who had PHO contact in one quarter of 2010/11 and did have COPD-specific medicines dispensed in 2010/11 was assigned two GP visits, a patient who had contact with their PHO in all four quarters of 2010/11 was assigned five GP visits (Table 6). Using this method of attributing GP visits results in an average (median) of four visits for the 12 month period.

Table 6: Medicines and PHO contact groupings used to assign number of GP visits to each COPD patient, 2010/11.

|  |  |  |  |
| --- | --- | --- | --- |
| No. of times quarterly contact with PHO noted | Prescribed COPD medicine in past year | No. of GP visits assigned | No. of people |
| 0 | No | 0 | 6905 |
| 1 | No | 1 | 3345 |
| 1 | Yes | 2 | 5876 |
| 2 | N/A | 3 | 19274 |
| 3 | N/A | 4 | 49402 |
| 4 | N/A | 5 | 54031 |

Source: 2013 NHC analysis of 2010/11 NZHT data. This is a simplistic method used for the purpose of assigning the likely annual costs of a patient’s GP visits.

Table 7 presents the government cost per GP visit for each of the relevant age groups([13](#_ENREF_13)).

GP visits are funded by a combination of government capitation-based (per capita) payments and (private) patient fees. The government funding is based on the age, sex, ethnicity and deprivation level of patients enrolled with a primary health organisation[[5]](#footnote-5). The Burden of Disease Epidemiology, Equity and cost-Effectiveness Programme (BODE3) have analysed the government capitation funding formulae to produce some figures on the average government cost per GP visit for each of the relevant age groups([13](#_ENREF_13)) (Table 7).These are the ‘costs’ we have included for each GP visit.

Table 7: Average total cost per GP visit for enrolled patients by age (excluding GST)

|  |  |
| --- | --- |
| Age group | Average total government cost per visit ($) |
| 25 to 44 years | 36.92 |
| 45 to 64 years | 35.43 |
| 65 years and over | 32.96 |

Source: Protocol for Direct Costing of Health Sector Interventions for Economic Modelling (Including Event Pathways): Burden of Disease Epidemiology, Equity and cost-Effectiveness Programme (BODE3)([13](#_ENREF_13))

Outpatient and Emergency Department visits

The National Non-Admitted Patient Collection (NNPAC) includes data on outpatient and emergency department (ED) visits. ED visits that result in an admission are priced as part of the hospital admission using the WIESNZ10 caseweight described in the Hospital Events Section above.

The Nationwide Service Framework Library Purchase Unit Data Dictionary Version 16, 2010/11 was reviewed for COPD-relevant purchase unit codes, including emergency department visits and palliative care. These are outlined in

Table 8. For home oxygen and palliative care (DOM102 and M80005), these costs were counted once per patient per year as they contain a yearly purchase unit price as opposed to one applied per visit.

It is important to note that not all the purchase unit codes are mandatory for DHBs to report (

Table 8). This means that for some purchase units which we have data for, the data may not be complete as only some DHBs may have reported on these purchase units.

Each of the DHBs has a Production Plan (previously known as a Price Volume Schedule) which shows the planned price and volume for each purchase unit code for the coming year. These prices were mapped to each of the NNPAC events by DHB. Where no price was available from the production plan for a DHB the price used was as follows:

* the national price.
* the modal planned price of DHBs which had that purchase unit where there was no national price.
* the average planned price of DHBs which had that purchase unit where the price was a ‘bulk’ price and varied by DHB.

The palliative care purchase units were only included if the patient died of COPD.

Table 8: COPD-relevant purchase unit codes, national prices and number of COPD patients, 2010/11

| Purchase Unit Codea | Descriptiona | Definitiona | Mandatory to report | Price ($)b | No. of visitsc | No. of COPD patientsc  |
| --- | --- | --- | --- | --- | --- | --- |
| ED02001 | Emergency Dept - Level 2 | Emergency service in small hospital with designated assessment and treatment areas. Minor injuries and ailments can be treated. Resuscitation and limited stabilisation capacity. Nursing staff available to cover emergency presentations. Visiting medical officer is on call. May be local trauma service. | Yes |  263.39  | 1395 | 850 |
| ED03001 | Emergency Dept - Level 3 | As for level 2 plus: designated nursing staff available on 24-hour basis. Has unit manager. Some registered nurses have completed or are undertaking relevant post-basic studies. 24-hour access to medical officers on site or available within 10 minutes. Specialists in general surgery, anaesthetics, paediatrics and medicine available for consultation. Full resuscitation facilities in separate area. Access to allied health professionals and liaison psychiatry.  | Yes | 263.39  | 3392 | 2001 |
| ED04001 | Emergency Dept - Level 4 | As for level 3 plus: can manage most emergencies. Purpose-designed area. Full-time director, experienced medical officer(s) and nursing staff on site 24 hours. Experienced nursing staff on site 24 hours. Specialists in general surgery, paediatrics, orthopaedics, anaesthetics and medicine on call 24 hours. May send nursing and medical teams to disaster site. Participation in regional adult retrieval system is desirable. May be an area trauma service. | Yes | 263.39  | 10484 | 6605 |
| ED05001 | Emergency Dept - Level 5 | As for level 4 plus: can manage all emergencies and provide definitive care for most. Access to specialist clinical nurse is desirable. Has undergraduate teaching and undertakes research. Has designated registrar. May have neurology service.  | Yes | 330.18  | 2781 | 1918 |
| ED06001 | Emergency Dept - Level 6 | As for level 5 plus: has neurosurgery and cardiothoracic surgery on site. Sub-specialists available on rosters. Has registrar on site 24 hours. May be a Regional Trauma Service.  | Yes |  330.18  | 5871 | 4403 |
| PH1011 | Nicotine Replacement Therapy Services | The provision of pharmaceuticals for the specific purpose of smoking cessation | No | N/A |  | 0 |
| PH1021 | Pharmacist Health Education Services | Pharmacist Health Education Services provided to individuals or populations of patients on specified health areas as part of locally or nationally coordinated DHB, PHO or MoH approved public health programmes e.g. minimising the harm caused by alcohol, drug and illicit drug use, **smoking cessation**, reducing obesity. | Unknown | N/A |  | 0 |
| CS04008 | Community referred tests - respiratory | Respiratory tests referred by a general practitioner or private specialist, eg spirometry, lung function. Includes interpretation and reporting of the test. Excludes tests referred by DHB staff. | Yes | 235.68 | 2831 | 2355 |
| DOM102 | Community Services - home oxygen | A regular supply of oxygen to patients in the community by either oxygen concentrator and/or oxygen cylinders, as clinically indicated by the medical practitioner. Includes initial education to patients and their families or carers on the correct use of domiciliary oxygen and the supplies or disposables required. Excludes ongoing domiciliary nursing visits. | Yes | 550.76 | 9683 | 1827 |
| M65002 | Respiratory - 1st attendance | First attendance to respiratory physician or medical officer at registrar level or above or nurse practitioner for specialist assessment. | Yes | 472.06 | 4891 | 4403 |
| M65003 | Respiratory - Subsequent attendance | Follow-up attendances to respiratory physician or medical officer at registrar level or above or nurse practitioner. Excludes bronchoscopy. | Yes | 356.38 | 13048 | 7421 |
| M65005 | Respiratory - Bronchoscopy | Bronchoscopy, performed as an outpatient or day case. | Yes | 1142.46 | 20 | 20 |
| M65010 | Smoking Cessation Initiative - Respiratory | CHF project to provide support to prevent readmission and lower length of stay. There is a Service Specification & reporting requirements, Integration project. | No | 31.58 | 57 | 22 |
| M65012 | COPD Pilot | COPD Models of Care Programme. Includes Pulmonary Rehabilitation, Respiratory Nurse and Respiratory Testing | No | 184.82 | 2638 | 396 |
| COGP0010 | Immunisation Influenza | Funding for influenza vaccines administered by General Practitioners  | No | N/A |  | 0 |
| RM00111 | Tobacco Control | Smoking reduction programmes and smokefree environments. | No | N/A |  | 0 |
| T0105 | Specialised Heart/Lung Transplant Services - Lung transplant assessment | Assessment against agreed criteria for access for lung transplant. | No | N/A |  | 0 |
| COOC0025 | Health Action Plans - Smoking Cessation | Yet to be advised by DHBs | No | N/A |  | 0 |
| COOC0039 | COPD/CHF Disease management |   | No | N/A |  | 0 |
| M80004 | Palliative Care - Outpatient Services | First attendance to palliative care medicine specialist or medical officer at registrar level or above or nurse practitioner for specialist assessment. | Yes | 167.82 | 0 | 0 |
| M80005 | Palliative Care - Community Services | Programme of community-based care for people assessed as requiring specialist palliative care.  | No | 1168.57 | 15 | 1 |

Source: a) The Nationwide Service Framework Library Purchase Unit Data Dictionary Version 16, 2010/11 b) National/Modal/Average price as defined in the text c) 2013 NHC analysis of 2010/11 National Non-admitted Patient Collection data

A limitation of the non-admitted ED data is that there is no description of diagnosis associated with it. This means that COPD-specific non-admitted ED visits cannot be measured. However, COPD patients are significantly more likely to have had a non-admitted ED visit than people not in the COPD-prevalent population (odds ratio = 2.16, 2.12–2.20) (Figure 13). For the purposes of this analysis 50% of the ‘cost’ of all non-admitted ED visits have been included as attributable to COPD (the proportion of ED visits above a comparable, non-COPD population).

Figure 13: Number of non-admitted Emergency Department visits for COPD and Non-COPD-prevalent populations, 2010/11



Source: 2013 NHC analysis of 2010/11 NZ Health Tracker and National Non-admitted Patient Collection data

Contract costs

Another purchase unit (COOC0036) was identified when the Purchase Unit Data Dictionary was searched:-

*Community Asthma Services: Community based asthma and chronic obstructive pulmonary disease care and education service provided by interdisciplinary, cross sectoral care teams providing comprehensive, holistic and continuous health services to enrolled populations of people with asthma and COPD. The service is delivered within the primary care sector utilising a team approach.*

This purchase unit was not reported in NNPAC but instead is associated with contracts. This means that the value associated with these services is not easily matched with patient records, meaning that it is difficult to ascertain how much was ‘spent’ on COPD patients and what severity those patients were.

In 2010/11 $5,402,624 was contracted for these ‘Community Asthma Services’. However this may differ from the figure actually spent. There is no data on how much of this service is used by COPD patients compared with asthma patients; however if the service use ratio was the same as the ratio of health loss reported in the NZBDS (69.8% COPD)([15](#_ENREF_15)) then this would indicate that $3,771,643.21 was spent on ‘Community Asthma Services’ for COPD patients in 2010/11.

For the purposes of the analyses set out in this document this figure has not been included; however the information is still of use to decision-makers.

Total patient costs

Each patient’s pharmaceutical, GP, outpatient, ED and hospital ‘costs’ have been summed to create a cost-per-patient.

There are other costs to the health system that result from COPD. For example a COPD patient admitted to hospital with pneumonia may have a longer stay than a patient without COPD for the same admission. COPD is a degenerative disease and may be the reason for a patient needing community services such as home help or needing to move into an aged care facility. COPD patients may receive occupational and physiotherapy. To provide a picture of the COPD cost data in a timely manner, only the costs mentioned above (pharmaceutical, GP, ED and the outpatient costs listed in

Table 8 have been included. While these are not comprehensive, they provide enough information to assess the COPD pathway in terms of the interventions that should be assessed to improve health outcomes for New Zealanders.

Private patient fees

It is important to note that private patient fees are not included in our cost analyses, GP patient fees, fees for collecting prescriptions, and any medical treatment paid for directly by the patient, or the patient’s insurer are not included. The prescription and GP fees can be a barrier to patients accessing public health services, with 8% of adults not collecting a prescription and one in seven (14%) not going to a GP because of the cost in 2011/12. This was even more of a barrier to Māori and more deprived patients([28](#_ENREF_28)). While these fees have not been included in our cost analysis they should be considered in any pathway of care as patients not taking pharmaceuticals they have been prescribed, or not seeing a GP when they need to can have flow on effects in terms of a patient attending ED, which has no patient fee. Barriers to patients not managing their condition in the best way leads to a poorer quality of life, or increased risk of a severe exacerbation, and earlier death than if they had accessed the care needed.

Patient Stratification

Patients have been put into mutually exclusive groups indicative of the severity of their COPD as outlined in Table 3 of the main text: early stable; minor exacerbation; late stable; moderate-severe exacerbation; end-stage disease. Patients have been classed according to their service use and costs, not by their lung function and exacerbations.

It is important to note that most of the data are from 2010/11; however, the Mortality Collection is currently only available until December 2010 so it is likely that end stage is underestimated.

Comorbidities

As mentioned above if a person is hospitalised with a condition it may be the presence of another condition that results in an extended length of stay or higher costs. To provide some insight into the comorbidities of people with COPD we appraised the list of conditions with the highest disability-adjusted life years and years lived with disability in New Zealand([15](#_ENREF_15)) alongside available data and clinical advice. From this a list of potential comorbidities was selected to investigate among COPD patients for 2010/11:

* lung cancer
* colorectal cancer
* (female) breast cancer
* prostate cancer
* other cancer/s
* ischaemic heart disease
* ever-hospitalised stroke
* anxiety and/or depression (past 12 months)
* gout
* diabetes
* heart failure
* dementia.

Note that the current definition of asthma in the New Zealand Health Tracker means that patients cannot have asthma if they have COPD. To simplify comparisons this has also been excluded from the conditions in the ‘total population’.

The methods and limitations of how each of these diseases have been measured are outlined below.

Cancer

The New Zealand Cancer Registry (NZCR) is a population-based register of all primary malignant diseases diagnosed in New Zealand, excluding squamous and basal cell skin cancers.([29](#_ENREF_29)) NZCR data (including preliminary 2011 data) have been used to provide 2010/11 measures with an effective cure time of five years[[6]](#footnote-6). The ICD-10 codes used for colorectal cancer were C18 to C21, lung cancer were C33 and C34, breast cancer was C50 and was limited to females and prostate cancer was C61 and limited to males. “Other cancer/s” was made up of the residual C-codes.

Ischaemic Heart Disease

The definition for a prevalent ischaemic heart disease (IHD) case used here is the same as that used in the *New Zealand Burden of Diseases, Injuries and Risk Factors Study, 2006–2016* (NZBDS)*(*[*15*](#_ENREF_15)*)* aside from the age limitation which was amended retrospectively to 25 years in the NZBDS.The hospital records for this analysis go back to 1988.The IHD definition used here is outlined in Table 9.

Table 9, Definition criteria for New Zealand Health Tracker IHD indicator

|  | Description | Definition |
| --- | --- | --- |
| Any one of these diagnoses or procedures when aged 25 years or over: | Ischaemic heart disease | ICD-9: 410–414ICD-10: I20–I25 |
| Presence of aortocoronary bypass graft | ICD-9: V45.81ICD-10: Z95.1 |
| Presence of coronary angioplasty implant and graft | ICD-9: V45.82ICD-10: Z95.5 |
| Percutaneous angioplasty or stent intervention | ICD-9: 36.01–36.07ICD-10: 3530400, 3530500, 3531000, 3531001, 3531002 |
| Coronary Artery Bypass Graft, including reconstruction | ICD-9: 36.10–36.16ICD-10: 3849700–3849707, 3850000–3850004, 3850300–3850304,3863700, 9020100–9020103 |
| Aged 25 years or over and had any two dispensings of any of these pharmaceuticals in the previous 12 months  | Nitrate | Glyceryl trinitrateIsosorbide DinitrateIsosorbide mononitrateNicorandil |
| Calcium Channel Blockers | Perhexilin maleate |

Source: 2011/12 New Zealand Health Tracker

Ever-hospitalised Stroke

Ever-hospitalised stroke includes anyone who has had one of the diagnoses outlined in Table 10 since 1988.

Table 10, Diagnoses codes used to define ever-hospitalised stroke

|  |  |
| --- | --- |
| ICD-9 codes | ICD-10 codes |
| 430 Subarachnoid hemorrhage431 Intracerebral hemorrhage432 Other and unspecified intracranial hemorrhage433 Occlusion and stenosis of precerebral arteries434 Occlusion of cerebral arteries435 Transient cerebral ischemia436 Acute but ill-defined cerebrovascular disease437 Other and ill-defined cerebrovascular disease438 Late effects of cerebrovascular disease | G45 Transient cerebral ischaemic attacks and related syndromesG46 Vascular syndromes of brain in cerebrovascular diseases I60 Subarachnoid haemorrhageI61 Intracerebral haemorrhageI62 Other nontraumatic intracranial haemorrhageI63 Cerebral infarctionI64 Stroke, not specified as haemorrhage or infarctionI65 Occlusion and stenosis of precerebral arteries, not resulting in cerebral infarction I66 Occlusion and stenosis of cerebral arteries, not resulting in cerebral infarction I67 Other cerebrovascular diseases I68 Cerebrovascular disorders in diseases classified elsewhereI69 Sequelae of cerebrovascular disease |

Source: World Health Organization ICD-10 Version: 2010 <http://apps.who.int/classifications/icd10/browse/2010/en>; http://www.icd9data.com/

Heart Failure

This is a New Zealand Health Tracker indicator. To meet the definition for heart failure a person has to have had a diagnosis of heart failure (ICD-10: I50, ICD-9: 428) since 1988.

Diabetes

This is a robust New Zealand Health Tracker indicator. This includes people who have either type 1 or type 2 diabetes as well as a small number of people with diagnoses where diabetes is coded to unspecified or other specified diabetes (not type 1, 2, or gestational).

A person is counted as having shown an indication of diabetes type 1 or 2 if they meet at least one of the conditions specified below (from any data collection):

1. IC9-CMA diagnosis codes: 250, 6480; ICD-10-AM diagnosis codes: E10, E11, E13, E14, O240, 0241, O242, O243, O249
2. One or more outpatient attendances for services with the following purchase unit codes: M20006 (Diabetes education and management), M20007 (Diabetes – Fundus Screening), M20010 (High risk type I diabetes support), M20015 (High risk type I diabetes support for up to 18 year olds).
3. More than one dispensing of:
	* insulin
	* oral hypoglycaemics
	* metformin where the person is not a female aged between 12 to 45 years.
4. Where the person is female and aged 12–45 years: more than one dispensing of metformin and one of the following outpatient attendances: M20004 (Diabetes 1st attendance), M20005 (Diabetes subsequent attendance), MAOR0106 (Diabetes management - Māori).
5. Laboratory claims: Four or more Hba1c tests undertaken for an individual during a two year period from 1 July 1996 to present, and one or more Albumin Creatinine Ratio tests during the same two year period.
6. National Needs Assessment and Service Coordination Information System (Socrates): One or more diagnoses of insulin or non-insulin dependent diabetes (2801)

A person is not counted as having type 1 or type 2 diabetes at a particular point in time if one of the above criteria is first present in an episode of documented gestational diabetes, though diabetes type 2 can occur after a documented episode of gestational diabetes.

If someone has one or two type I diagnoses and none for type II, no oral hypoglycaemic / metformin dispensings, and no insulin dispensings then they are specifically excluded (because there isn't evidence of insulin treatment for someone with a type I diagnosis - possible coding error).

Gout

This is a robust New Zealand Health Tracker indicator. A person is counted as having shown an indication of gout if they have had a diagnosis of ICD-10 code M10 or ICD-9 code 274, or they have been dispensed colchicine or allopurinol. Dispensing of allopurinol alone is only taken as an indication of gout if there is no diagnosis of malignant neoplasms of lymphoid, haematopoietic and related tissues (ICD-10 codes C81-C96) recorded in either the NZCR or NMDS in the 24 months before the period end date.

Anxiety or Mood disorder

This is a New Zealand Health Tracker indicator which is classified as ‘partial capture’. There are likely to be people with an anxiety or mood disorder who are untreated, or treated via non-pharmaceutical methods privately.

A person is counted as having shown an indication of a mood disorder if they have one of the codes specified below from the NMDS, Programme for the Integration of Mental Health Data (PRIMHD), Socrates, or Pharmaceutical Collections, or three of the tests specified for Laboratory Claims within the past twelve months:

ICD-10\_AM diagnosis codes: F30-F39 Mood (affective) disorders

ICD 9 CM(A) diagnosis codes: 296 Affective psychoses; 3004 Neurotic depression; 30113 Cyclothymic disorder; 311 Depressive disorder, not elsewhere classified

DSMIV diagnosis codes: 296 Mood disorders; 3004 Dysthymic Disorder; 30113 Cyclothymic Disorder; 311 Depressive Disorder NOS

Pharmaceuticals: amoxapine, dothiepin hydrochloride, doxepin hydrochloride, lithium carbonate, mianserin hydrochloride, mirtazapine, nefazodone, phenelzine sulphate, tranylcypromine sulphate, trimipramine maleate.

Laboratory Claims Collection: Three or more tests for Lithium in the 12 month period.

Socrates (Disability): Tier 2 diagnosis code: 1303 Bipolar disorder (manic depression); 1304 Depression.

Other diagnosis free text: BIPOLAR', 'DEPRESSION', 'MOOD DISORDER'.

The free text diagnosis was not used if the field also contained 'POSSIBLE', 'QUERY', 'SOME', 'SYMPTOMS'.

A person is counted as having shown an indication of an anxiety disorder if they have one of the codes specified below (from any data collection) within the past 12 months:

ICD-10-AM diagnosis codes: F400 - F48; ICD 9 CM-A diagnosis codes: 30000 - 30015, 30020 - 3003, 3005 - 3009, 3060 - 30650, 30652 - 3069, 30780, 30789, 3080 - 3091, 30922 - 30982, 30989, 3099; ICD 9 diagnosis codes: 3000-3003, 3005-3009, 306,3078, 3080-3094,3099.

DSMIV diagnosis codes: 30000-30015, 30021 - 3003, 3006 - 3009, 30780, 30789, 3083, 3090, 30924 - 3099.

Pharmaceuticals: bromazepam, buspirone hydrochloride, meprobamate.

Socrates (Disability): Tier 2 diagnosis code: 1302 Anxiety disorder.

Other diagnosis free text: ANXIETY DISORDER', 'PTSD', 'OCD', 'OBSESSIVE COMPULSIVE', 'POST TRAUMATIC STRESS', 'PHOBIA'.

The free text diagnosis was not used if the field also contained 'POSSIBLE', 'QUERY', 'SOME', 'SYMPTOMS'.

A person was included as having an indication of a mood or anxiety disorder if they fitted either the mood or anxiety disorder definitions given above, or if they had been dispensed one of the following pharmaceuticals in the past twelve months:

Alprazolam, citalopram hydrobromide, escitalopram, maprotiline hydrochloride, moclobemide, sertraline, sertraline hydrochloride, venlafaxine.

If the person had shown an indication of dementia during the same period, a dispensing of citalopram alone was not taken as an indication of mood/anxiety disorder (though note the person may still be picked up through any of the other inclusion criteria for mood/anxiety disorder).

Dementia

This New Zealand Health Tracker indicator is ‘in development’, previous work has found that this counts approximately one-third of the estimated cases. While this is limited it was decided that this indicator should still be included due to the burden dementia is having upon our ageing population.

A person is counted as having shown an indication of dementia if they have one of the codes specified below (from any data collection):

ICD10 diagnosis codes: F000 - F03, G30; ICD 9 CM diagnosis codes: 2900 - 2909, 2941, 3310; ICD 9 diagnosis codes: 290, 2941, 3310.

DSMIV diagnosis codes: 2900 - 29043, 2941, 2948.

Pharmaceutical Collection: Donepezil hydrochloride, rivastigmine.

Socrates (Disability): Tier 2 diagnosis code: 1405 Vascular dementia, 1499 Other dementia.

Other diagnosis free text: ‘DEMENTIA’.

The free text diagnosis was not used if the field also contained 'POSSIBLE', 'QUERY', 'SOME', 'SYMPTOMS'.

Appendix 4: RWG Discussion Notes

Background

To assist in the assessment of COPD, the National Health Committee (NHC) asked stakeholders to nominate representatives to a respiratory working group (RWG). The RWG was created to provide the NHC with expert advice on a range of COPD issues and to aid in its prioritisation of possible assessments. It is comprised of a respiratory physician, respiratory nurse specialist, public health physician, cardiothoracic surgeon, physiotherapist, ambulance representative, patient representative, general practitioner, DHB Planning and Funding representative, DHB COO representative and a clinical psychologist. On 29 January 2014, various members of the RWG met to discuss where improvements along the COPD pathway of care could be made. This document captures some of the main discussion points that come out of that meeting.

Foundations

NHC Background Information

The NHC is an independent ministerial advisory committee tasked with providing advice on the level of funding for non-pharmaceutical interventions. Its scope is therefore focused on services and pathways of care.

Prioritisation and Assessment Tools

The NHC has a variety of tools and criteria which it uses to prioritise its work. Interventions are assessed against the NHC’s 11 decision-making criteria (available at [www.nhc.health.govt.nz](http://www.nhc.health.govt.nz)) across 4 assessment domains. Emphasis is placed on clinical safety/effectiveness, cost effectiveness, ease of implementation (feasibility of adoption), materiality and risk in the first instance

Interventions can be classed as new investment, targeting and service reconfiguration opportunities. Assessments can either be in a classic health technology assessment (HTA), rapid implementation plan (RIP) or referred to the Health Innovation Partnership (HIP)

Methodologies

To conduct the background work for COPD, the NHC primarily used data from Health Tracker (HT) to identify COPD patients and analyse their associated health outcomes and service use. HT is a collation of various datasets (e.g. pharmaceutical, hospitalisations) that tracks individual patients with their NHI numbers. Like all datasets, there are limitations to this data. Limitations such as the cross-over of identical medications for different diseases (e.g. asthma and COPD) present challenges, but the data is a relatively comprehensive set of high-quality inputs by international comparison.

Potential Improvements along COPD Care Pathway

The RWG identified and discussed various areas along the care pathway where improvements could be made. These areas are explored in more depth in the following sections.

Case Finding, Diagnosis, and Monitoring of Symptoms

Spirometry is not universally available or deployed accurately both for early diagnosis and ongoing monitoring of the condition. Changing the way spirometry is delivered, possibly using a mobile service (e.g. unique or aligned with dental mobile units, breast-screening mobile units, surgical bus etc.), could improve coverage. Health Hawkes Bay has implemented a pilot involving spirometry. This pilot has the potential to improve both diagnosis and symptom monitoring in the primary-care setting.

In addition to spirometry, a need was identified for having a symptom-based screening questionnaire. This questionnaire could aid in selectively targeting patients for further investigation. This case finding could link in with smoking cessation efforts and could align with existing chronic care management approaches in an integrated care multidisciplinary team structure.

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| Case StudyCanterbury DHB (CDHB) has successfully implemented a more integrated, community-based COPD pathway. By introducing interventions such as ‘Blue Cards’ to help patients initiate an action plan (supported self-management), CDHB has reduced COPD ambulance trips to ED by 30% instead diverting them to GPs for appropriate management. |

Pulmonary Rehabilitation (PR)

Pulmonary rehabilitation (PR) was discussed as an intervention with very good evidence in favour of effectiveness. PR is underutilised due to a combination of low referral rates in some DHBs, low uptake rates and low completion rates. The RWG identified that these problems may be solved by utilising a rolling attendance system (as Counties Manukau DHB does) and/or a ‘coffee card’ system whereby patients can attend PR classes casually.

Oxygen and Non-Invasive Ventilation (NIV) Variation

There exists variation among DHBs with regards to long-term oxygen prescription rates (i.e. some DHBs may overprescribe) as well as issues of the type of oxygen generation prescribed.

More training and specialist support is required to safely implement NIV to supplement the standard NIV procedures already available in New Zealand. Home NIV and chronic NIV use is not recommended/evidence-based and should be discontinued if they are being practiced in DHBs.

Palliative and End of Life Planning

There is variation in the availability and utilisation of these services among DHBs. Advance care plans (ACPs) are important to good end of life support and should be discussed and agreed earlier in the pathway.

An Integrated Approach

With most of the issues highlighted and some case studies shared, the RWG focused on putting together these individual improvements and crafting an ideal COPD pathway that includes an integrated, systems-focused approach supported by a multidisciplinary team. Some of the identified issues affecting the entire system were patient identification, support infrastructure for clinicians, having the ability to initiate a rapid/mobile response to patient needs and the advent of new technologies. In addition to general system issues, Māori considerations were discussed in the context of the wider health system.

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| Case StudyOne member spoke about some of her experiences working with Māori COPD patients and the insights she’s had. By including the patient’s local circumstances, she incorporates medical care with wider social issues (i.e. housing, budgeting, the benefits of social engagement/support for clients). Some providers see their role as forging links with other health professionals and facilitating patient learning through educational groups in a bid to increase health literacy. Though specifically intended for Māori, these ideas and philosophies echo the sentiment of the entire RWG to better integrate care across a variety of domains. |

Conclusion

The proposed changes to the COPD pathway of care reflect a desire to integrate care, improve diagnosis/case finding and increase access/utilisation of effective interventions (i.e. PR and NIV) whilst reducing inappropriate interventions (i.e. some oxygen therapy and inhaled steroid prescriptions). Underpinning these changes are improvements to end of life care and infrastructure changes to support a regional model of care that offers case management.

The working group was keen to further the discussion via a dropbox for sharing articles, a collaborative website to share ideas to support a transparent movement. Whilst there are challenges to implementation, there are pockets of success around the country that have proven that positive change is possible. The RWG is keen to replicate that success and improve COPD care pathways.

National Health Committee (NHC) and Executive

The National Health Committee (NHC) is an independent statutory body which provides advice to the New Zealand Minister of Health. It was reformed in 2011 to establish evaluation systems that would provide the New Zealand people and health sector with greater value for the money invested in health. The NHC Executive are the secretariat that supports the Committee. The NHC Executive’s primary objective is to provide the Committee with sufficient information for them to make recommendations regarding prioritisation and reprioritisation of interventions. They do this through a range of evidence-based reports tailored to the nature of the decision required and time-frame within which decisions need to be made.

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<http://www.nhc.health.govt.nz/>

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1. For a more detailed explanation of the tiered approach, see Strategic Overview: Respiratory Disease in New Zealand available at www.[nhc.health.govt.nz](http://nhc.health.govt.nz/committee-publications/respiratory-overview-working-draft-0) [↑](#footnote-ref-1)
2. Source: Personal communication, 2013 [↑](#footnote-ref-2)
3. Methods for how we arrived at these co-morbidities are available in Appendix 3 [↑](#footnote-ref-3)
4. 12.5% based on uptake rate of half of smokers with a chronic cough being underdiagnosed by 25% (upper limit) [↑](#footnote-ref-4)
5. See <http://www.health.govt.nz/our-work/primary-health-care/primary-health-care-services-and-projects/capitation-funding> for further information on capitation funding. [↑](#footnote-ref-5)
6. This is a parsimonious approach and does not necessarily reflect the actual cure time of all cancers. [↑](#footnote-ref-6)