Public Health England

Protecting and improving the nation's health

NHS Health Check content review form

Please read the guidance notes before completing this form. Please only complete the contact details and section 1 and return the form to the ESCAP secretariat at nhshealthchecks.mailbox@phe.gov.uk **by 31 March 2017**.

Contact details

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Organisation	British Lung Foundation	Date	21 March 2017

Section 1

	1. Please tick the categories that apply to your proposal.
x	It involves introducing a new component to the risk assessment.

2. Please provide a short summary describing your proposed change [*max 200 words*]

We propose including an evidence-based short set of questions, similar to those used in dementia screening, to:

(1) provide early indications of potential respiratory disease, and
(2) determine evidence of poor lung function which could affect an individual's future health.

This would include a question about the individual's smoking history, in addition to the question about their current smoking status, which is already a part of the Health Check. People taking part in the Health Check will also be asked several questions to assess the presence of any significant symptoms of respiratory disease such as breathlessness, chest infections, persistent cough or sputum production.

The answers to these questions should be used to determine whether further investigation is needed. In instances where the Health Check is carried out by a GP or Nurse Practioner, a referral could be made immediately. The questions could also trigger a referral to a local

authority service such as smoking cessation or an exercise based service, or a cardiovascular specific service.

There is now strong evidence to support the inclusion of these questions in the Health Check which we have detailed below. We understand that a similar this proposal has been considered by ESCAP in recent years, but that the evidence now available should prompt a review.

3. Please state which strategic health priority in the NHS outcome framework or the public health outcome framework the proposed change supports
[*max 200 words*]

[*Please identify up to three priorities*]

From the Public Health Outcomes Framework:

- 4.7 Reducing premature mortality from major causes of death, in particular 'Under 75 mortality rates from respiratory disease'.
- 4.04 Reducing under 75 mortality rate from cardiovascular diseases considered preventable.
- 2.14 Smoking prevalence – adults (over 18s).

From the NHS Outcomes Framework:

- 2 Health-related quality of life for people with long-term conditions

4. Please identify which of the programmes objectives the proposed change supports [*please tick*]

x	To promote and improve the early identification and management of the individual behavioural and physiological risk factors for vascular disease and the other conditions associated with those risk factors.
x	To support individuals to effectively manage and reduce behavioural risks and associated conditions through information, behavioural and evidence based clinical interventions.
x	To help reduce inequalities in the distribution and burden of behavioural risks, related conditions and multiple morbidities.
☐	To promote and support appropriate operational research and evaluation to optimise programme delivery and impact, nationally and locally.

5. How will the proposed change support the(se) objective(s)?

This change would support the above Health Check objectives in three ways:

Firstly, significant new evidence[i] that has been gathered out on behalf of the British Lung Foundation shows that reduced respiratory function is a strong predictor of all-cause

premature mortality, in individuals who have never smoked as well as current or past smokers. Of significance to the aims of the Health Check, the association between reduced respiratory function and cardiovascular mortality is particularly pronounced, more so than mortality from cancer. This evidence finds that reduced lung function is *as strong a predictor of cardiovascular mortality as BMI, and stronger than blood pressure*.

The implications of this study point to the need to make lung function testing a routine part of healthcare for all individuals, even those who have not smoked. Reduced lung function could be used as a trigger to refer people to services or treatments which would reduce their risk of developing a cardiovascular disease.

Although we do not believe it is practical to expect providers of the Health Check to carry out spirometry testing on all individuals, the use of the simple questions we recommend will identify people whose lung function may be a risk factor and refer them to appropriate primary care, local authority services or wider health advice.

Secondly, these questions would act as preliminary screening for COPD and would help to address the significant problem of under-diagnosis, which currently sees an estimated two million people living with undiagnosed COPD throughout the UK.[ii] There is a strong inter-relationship between lung and heart disease.[iii]

Around 33% of COPD patients have hypertension, 19% have coronary heart disease and 6% have heart failure.[iv] A 15-year follow up study has demonstrated that the presence of low lung function and a diagnosis of chronic obstructive pulmonary disease is strongly and independently related to the incidence of heart failure, even when all other risk factors like smoking were adjusted for.[v] The presence of lung disease is therefore also an indicator for vascular disease.

Thirdly, questions relating to respiratory health will provide an additional opportunity to identify smoking. Although individuals are already asked about their current smoking status in the Health Check, studies have found inconsistencies between self-reported smoking levels and levels indicated through biochemical testing. This suggests that self-reported smoking status alone may not be sufficient assessment.[vi,vii] Questions relating to respiratory symptoms such as breathlessness and persistent cough would help identify individuals displaying symptoms commonly associated with smoking but who have not self-reported tobacco use, thereby providing opportunities for smoking cessation interventions in smokers currently slipping through the net.

The link between smoking and both circulatory and lung disease is well-established: tobacco use contributes to 35% of all respiratory deaths and to 13% of all circulatory disease deaths.[viii]

The identification of smoking related lung damage will provide additional incentive to smokers to quit as it identifies them as having a specific smoking related health problem rather than smoking being a risk factor. This emphasises the concept of smoking cessation as treatment for disease not simply as prevention.

This proposal would also help meet the Health Check objective of reducing inequalities. The Health Check programme has been highly successful in addressing health inequalities. The results of the official evaluation so far shows that attendance is highest amongst the most deprived quintile[ix], giving a unique opportunity to reduce inequalities in the social distribution of lung disease. BLF research[x] shows that people in the most deprived communities are 2.5 times more likely to die from COPD than the least deprived. By increasing diagnosis of COPD and supporting people to reduce their risk factors for lung disease, our proposal would help to close that gap.

Finally, in addition to meeting existing objectives focussed on heart disease, the addition of this element would allow for a simple but crucial expansion of Health Check objectives to incorporate other key priority areas identified by the Secretary of State of Heath. The NHS Public Health Outcomes Framework includes an objective to reduce premature mortality from respiratory conditions. Given that respiratory disease is the third leading cause of death in the UK, after cancer and heart disease,[xi] lung health should be recognised as an important priority in its own right.

COPD alone causes over 30,000 deaths per year in England and Wales, with nearly a third of these being premature deaths.[xii] Using the Health Check to identify and flag symptoms associated with COPD and respiratory disease will present opportunities for earlier diagnosis.

6. What is the evidence for the clinical effectiveness of the proposed change?

We propose to include questions in the Health Check to assess an individual's likelihood of having reduced lung function, putting them at greater risk of ill health and premature mortality in the future, and their likelihood of having COPD.

The evidence for the clinical effectiveness of respiratory related questions is drawn from the new research we have attached, carried out by Professor David Strachan and Ramyani Gupta at the Population Health Institute, St George's University of London.

The research uses UK Biobank data from lifetime non-smokers to establish a link between reduced lung function, measured using spirometry testing, and mortality.

The research shows, based on a very significant population sample, that reduced lung function is an indicator of all cause mortality, with particularly high associations for cardiovascular mortality. It is a *stronger* indicator of cardiovascular mortality than blood pressure, and *as strong* an indicator as BMI.

The study is based on the use of spirometry testing to measure lung function. However, we recognise that the costs associated with carrying out spirometry testing in all Health Check appointments may be prohibitive, and would not be of use to individuals who have a healthy lung function. We therefore recommend that a series of respiratory questions are asked with individuals whose responses give cause for concern referred to primary care for further testing, including spirometry.

Individuals whose answers point to problems with lung function can also be signposted or referred to services which would help them reduce their risk of developing cardiovascular disease. This could include a range of services offered by local authorities, including smoking cessation, weight management and exercise. This is already a standard part of the Health Check so is well evidenced. Our proposal would only increase the number of individuals identified who may benefit from these services.

For the second purpose, identifying cases of COPD, our proposal is in line with NICE guidance, which recommends that 'a diagnosis of COPD should be considered in patients over the age of 35 who have a risk factor (generally smoking) and who present with exertional breathlessness, chronic cough, regular sputum production, frequent winter 'bronchitis' or wheeze.'

There are significant numbers of people with undiagnosed COPD in the UK who may benefit from access to available treatments and interventions. Recent studies found that screening of smokers over 40 in general practice may yield up to 20% undiagnosed COPD cases, with a substantial proportion (42-70%) of those having moderate or severe disease stage.[xiii] [xiv] According to the best estimates of the total size of the undiagnosed population, screening for COPD may result in as many as 400,000 extra diagnoses.[xv]

Whilst we are not recommending any one particular questionnaire to be included as part of the Health Check, we include some examples of specific questionnaires below to demonstrate that this can be an effective tool for assessing levels of breathlessness and other respiratory symptoms, and finding COPD patients in practice. We would like the Expert Scientific and Clinical Advisory Panel (ESCAP) to consider the exact phrasing of any questions as part of the Health Check content review process and would be happy to assist with identifying respiratory experts for a pilot project to test the questions in practice.

Available questionnaires include:

- The COPD-Population Screener[xvi] has featured in several studies in recent years. With only 4 questions, it is the shortest questionnaire, which has produced accurate results indicating the presence of COPD. 2357 subjects aged between 40 and 79 were recruited into this study and 6.5% of these were found to have airway obstruction. The study recommended a cut-point of 4-points, resulting in a sensitivity of 67.1% and specificity of 72.9% with an area under the ROC curve of 0.70. The positive predictive value was 14.6% and negative predictive value was 97.0%.[xvii] Another paper, analysing the effectiveness of the same questionnaire found that a score on the COPD-PS of greater than five was associated with a positive predictive value of 56.8% and negative predictive value of 86.4%. Patients with spirometry indicative of AO scored significantly higher (6.8) than patients without AO (4). Higher scores were associated with more severe AO, bronchodilator use, and overnight hospitalization for breathing problems.[xviii]

- CAP (developed by GSK) scores 0-20 with 11-20 being indicative of COPD. Smoking history, age of over 55 years and the presence of exertional breathlessness were key elements of this simple model, which had reliable measurement properties when tested in a random population. The area under the receiver-operating characteristic curve for this model was 0.77, sensitivity was 77.6%, specificity was 64.9% and the positive likelihood ratio was 2.21.[xix xx]

Some of the symptoms picked up by all questionnaires, most notably in the presence of breathlessness, a persistent cough and smoking history, could also be indicative of other conditions, such as lung cancer, interstitial lung disease and tuberculosis. It is important that these symptoms are not missed and that the referral pathway from the Health Check reflects this.

7. What is the evidence of cost effectiveness of the proposed change?

Historically, evidence on costs associated with lung disease has been limited. However, the BLF recently published a new study[xxi] which estimates that lung disease costs the UK £11 billion each year. Of this, around £9.9 billion is accounted for by direct costs to the NHS. £1.9 billion of the total cost is related to COPD.

The BLF will be commissioning further research to establish how these costs could be reduced or funding better allocated through improved diagnosis and more cost effective treatment. We would be keen to work with ESCAP as we take this work forward to ensure that it addresses key questions about our proposed amendments to the Health Check.
Our proposal would have implications for the prevention of and management of cardiovascular conditions. Our health economics research shows that ICD-10 category IX,

'diseases of the circulatory system', cost the UK £9.2 billion each year. We would be keen to work with ESCAM and the cardiovascular community to further understand what the potential costs and savings would be from our proposal.

We believe that our proposal, as stated, would have benefits for the management of multiple long term conditions. Maintenance of lung function will help individuals to cope with other conditions better, which should lead to decreased hospitalisation and use of primary health services. Although there is no modelling currently available specifically on this issue, it is estimated that 70% of NHS expenditure goes towards people with long term conditions. The average annual cost of treatment for a patient with two long term conditions is £3000, and with 3 long term conditions it is £8000.[xxii] There is therefore scope to reduce costs through better management of long term conditions.

On COPD specifically, modelling from the Department of Health suggests that earlier diagnosis of COPD could save the UK National Health Service more than £1 billion over 10 years.[xxiii]

8. Please provide an outline of how this would change current practice i.e. what would frontline professionals delivering the NHS Health Check need to do that isn't already a part of the programme?

Healthcare professionals will need to ask a number of additional questions and make a calculation based on the risk factors.

Referrals to local authority health and wellbeing services will need to be made if it is judged individuals would benefit from this in order to reduce their cardiovascular risk, but this is already standard practice.

A referral to a clinician in general practice will need to be made for further testing for those people considered at high risk of lung or heart disease.

The proposal is intended not to place an extra burden on frontline staff delivering the health check. Staff will need very minimal training in order to carry out the new component.

9. If you are proposing a new component to the programme, please describe the effective treatment and management systems that exist and are available.

This proposal would lead to an increase in the number of people who could be referred to services to reduce their risk of developing cardiovascular disease. This is already a well established part of the Health Check. NICE guidelines[xxiv] recommend a range of evidence based interventions to prevent cardiovascular disease, including:

- Smoking cessation

- Physical activity
- Nutrition and weight management
- Alcohol support

A high number of interventions are available for people who will be diagnosed with COPD as a result of this proposal. Most of these interventions are included in the NICE guidance for COPD. Some further studies are listed below.

Smoking cessation remains one of the most important interventions for everyone diagnosed with COPD.[xxv] A systematic review performed in 2010 showed that smoking cessation interventions were effective and cost-effective for people with COPD.[xxvi] Smoking cessation should also be recommended as a matter of course to all smokers at the point of the Health Check.

A pneumococcal vaccination and an annual influenza vaccination are recommended by the Chief Medical Officer for all patients with COPD. Studies show that up to 64% of COPD exacerbations are preceded by colds and 16% are caused by influenza, suggesting that these periods of acute ill health are mostly initiated by viruses.[xxvii] Access to a free vaccination, will therefore also have some effect on morbidity and mortality.

Pulmonary rehabilitation is a COPD treatment recommended by NICE and it should be offered to "all appropriate people with COPD, including those who have had a recent hospitalisation for an exacerbation and those who consider themselves functionally disabled by COPD (usually MRC grade 3 and above)".[xxviii] A Cochrane review of the effectiveness of pulmonary rehabilitation concluded that it "relieves dyspnoea and fatigue, improves emotional function and enhances the sense of control that individuals have over their condition.

Pharmacological interventions, such as the use of bronchodilators, are also a significant intervention for COPD patients, as these improve lung capacity, reduce the number of exacerbations and improve quality of life and mortality rates. The UPLIFT study was a double-blind, randomised, international, placebo-controlled clinical trial, which demonstrated these outcomes.[xxix xxx xxxi xxxii] Studies also show that the use of pharmacological interventions is more effective in the early stages of COPD. [xxxiii] Given that an admission to hospital for a COPD patient has an associated mortality rate of 13.9% within 3 months of the admission,[xxxiv] pharmacological interventions are particularly important at managing COPD effectively and are therefore prescribed to nearly every COPD patient who is diagnosed with the condition.

10. Please state whether you feel the change will have a negative, neutral or positive impact on health inequalities and on the nine protected characteristic groups and why.
[please tick, *max 200 words*]

☐ Negative ☐ Neutral x Positive

Overall, we would expect the effect on health inequalities to be a positive one.

The BLF's *Battle for Breath* is one of various publications that have explored the link between lung disease and levels of social deprivation, identifying inequalities in a range of lung conditions. Overarching observations show that lung cancer and COPD are more than twice as common in the most deprived communities, due to their association with smoking. Additionally, outdoor air pollution, which is generally higher in deprived urban areas, is known to worsen symptoms of lung disease and can cause lung disease to develop - diesel is a classified carcinogen.[xxxv]

Furthermore, men aged 20-64 employed in unskilled manual occupations are around 14 times more likely to die from COPD than men employed in professional roles.[xxxvi] Diagnosing respiratory disease, such as COPD appreciably earlier and raising awareness of the symptoms via the Health Check is likely to have a positive effect on health inequalities.

By identifying people at risk of premature mortality, particularly from cardiovascular causes, our proposals will reduce the socioeconomic inequalities in this area. Mortality from cardiovascular disease is 50% higher in the most deprived quintile compared to the least deprived.[xxxvii]

9 protected areas:

- Age – some positive impact by identifying lung disease in a timelier way. In particular, COPD predominantly affects the older age group: 1 in 8 people over the age of 35 are living with COPD.[xxxviii]
- Disability – some positive impact by enabling COPD patients to find out they have a chronic condition, which will lead to further disability, and enabling patients to get treatment earlier.
- gender reassignment - neutral
- marriage and civil partnership - neutral
- pregnancy and maternity - neutral
- race - neutral
- religion or belief - neutral
- sex – neutral
- sexual orientation - neutral

11. Please name a local authority that has already adopted this proposed change to their delivery of the NHS Health Check programme.

We are not aware of any local authority that has adopted this proposal to date, however we would be very happy to work with a local authority or body such as the LGA to trial our proposal.

12. Please list any relevant references

A full list of references is found at the end of this document. An overview of the study we have used to make the case for respiratory questions as a way to indicate all cause premature mortality - *Spirometry and survival in large UK population samples of lifelong non-smokers* - is attached. This work is currently unpublished but we will be seeking to publish later in the year.

For completion by the ESCAP secretariat

13. Describe the current approach		
14. Summary of views from NICE/UK NSC		
15. ESCAP agreed to progress to stage 2?		
☐ Yes ☐ No		
16. Rational for outcome		
17. Stage 2 requires the completion of		
	Yes	No
A) Cost effectiveness review	☐	☐
B) Clinical effectiveness review	☐	☐
C) Health equality impact assessment	☐	☐

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ESCAP secretariat
Email: nhshealthcheck.mailbox@phe.gov.uk

Section 2

18. Please detail the clinical effectiveness of the proposed change.
19. Please detail the evidence of cost effectiveness of the proposed change.
20. Please provide a summary of your full health equality impact assessment. [please tick, *max 500 words*]
The proposal will have a ☐ Negative ☐ Neutral ☐ Positive impact on health inequality and the nine protected characteristic groups. [*Why…*]
21. Please list any additional relevant references

For completion by the ESCAP secretariat

22. Date considered by ESCAP
23. ESCAP agreed to progress to stage 3?
☐ Yes ☐ No
24. Rational for outcome

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Section 3

25. Please provide a brief summary of how you conducted the feasibility study.
26. Please provide a summary of the operating requirements of the proposed change.
27. Please detail the benefits and costs associated with implementing the proposed change
28. Please provide a summary of the risks and mitigations of implementing the proposed change.
29. Options
30. Recommendations

For completion by the ESCAP secretariat

31. Date considered by ESCAP
32. ESCAP agreed to recommend the change for implementation?
☐ Yes ☐ No
33. Rational for outcome

[i] See attached paper: *Spirometry and Survival in Large UK Population Samples of Lifelong Non-Smokers,* Strachan, D, and Gupta, R (2016) St George's University of London

[ii] *An Outcomes Strategy for COPD and Asthma* (2011), Department of Health

[iii] Curkendall, S, et al (2006) *Cardiovascular Disease in Patients with Chronic Obstructive Pulmonary Disease*

http://www.sciencedirect.com/science/article/pii/S1047279705001055

[iv] *An Outcomes Strategy for COPD and Asthma* (2011), Department of Health

[v] http://onlinelibrary.wiley.com/doi/10.1093/eurjhf/hfs016/abstract

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[vi] Daly RJ et al (1996) *Self-reported smoking in vascular disease: the need for biochemical confirmation* http://www.ncbi.nlm.nih.gov/pubmed/8914347

[vii] Pell JP et al. (2008) *Validity of self-reported smoking status: comparison of patients admitted to hospital with acute coronary syndrome and the general population* http://www.ncbi.nlm.nih.gov/pubmed/18569760

[viii] ASH Factsheet on Smoking Statistics http://ash.org.uk/files/documents/ASH_107.pdf

[ix] Robson, J et al (2016) *The NHS Health Check in England: an evaluation of the first four years* *http://bmjopen.bmj.com/content/6/1/e008840*

[x] British Lung Foundation (2016) *The Battle for Breath: the impact of lung disease in the UK*

[xi] APPG on Respiratory Health (2014) *Inquiry into respiratory deaths*

[xii] ONS mortality data (2015)

[xiii] Tinkelman, DG et al (2006) *COPD screening efforts in primary care: what is the yield?* http://www.ncbi.nlm.nih.gov/pubmed/17297526

[xiv] http://informahealthcare.com/doi/abs/10.3109/15412555.2012.727923 [Calculation: patients with moderate(II) or severe(III) stages=49; total patients with COPD=70]

[xv] Calculation based on 2million people living with COPD undiagnosed - 20% of those is 400,000 people.

[xvi] Scores range between 0-10, with 5 points and over being indicative of possible COPD. An example of the questions is available at: http://www.copdfoundation.org/Screener.aspx

[xvii] Tsukuya, G et al (2015) *Validation of a COPD screening questionnaire and establishment of diagnostic cut-points in a Japanese general population: The Hisayama study*, Allergol Int. 2015

[xviii] Martinex, FZ et al (2008) *Development and initial validation of a self-scored COPD Population Screener Questionnaire (COPD-PS)*, https://www.ncbi.nlm.nih.gov/pubmed/18415807

[xix] Raghaven, N et al (2012) *Components of the COPD Assessment Test (CAT) associated with a diagnosis of COPD in a random population sample,* http://www.ncbi.nlm.nih.gov/pubmed/22409441

[xx] Jones, PW et al (2009) *Development and first validation of the COPD Assessment Test* http://www.ncbi.nlm.nih.gov/pubmed/19720809

[xxi] British Lung Foundation *(2017) Estimating the economic burden of respiratory illness in the UK*

[xxii] https://www.gov.uk/government/publications/long-term-conditions-compendium-of-information-third-edition

[xxiii] http://www.hegalaxy.com/doctors-missing-chances-diagnose-copd-early-85-cases

[xxiv] NICE guidelines on cardiovascular disease prevention

[xxv] van der Meer RM et al (2001) *Smoking cessation for chronic obstructive pulmonary disease*,

[xxvi] Hoogendoorn, M et al (2010) *Long-term effectiveness and cost-effectiveness of smoking cessation interventions in patients with COPD* http://thorax.bmj.com/content/65/8/711.full

[xxvii] Mallia, P, and Johnson, S (2007) *Influenza infection and COPD* http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2692119/

[xxviii] NICE pathway for the treatment of COPD

[xxix] Corhay, JL, and Louis, R (2006) *Understanding Potential Long-term Impacts on Function with Tiotropium* http://www.ncbi.nlm.nih.gov/pubmed/19317104

[xxx] Celli, B et al (2009) *Mortality in the 4-Year Trial of Tiotropium (UPLIFT) in Patients with Chronic Obstructive Pulmonary Disease* http://www.atsjournals.org/doi/full/10.1164/rccm.200906-0876OC#.VQmurI6sWSo

[xxxi] Welte T et al (2015) *COPD: early diagnosis and treatment to slow disease progression* http://www.ncbi.nlm.nih.gov/pubmed/25363328

[xxxii] Effectiveness and safety of inhalers containing the drug aclidinium bromide for managing patients with stable COPD, Cochrane review of evidence in 2014 http://www.cochrane.org/CD010509/AIRWAYS_effectiveness-and-safety-of-inhalers-containing-the-drug-aclidinium-bromide-for-managing-patients-with-stable-copd

[xxxiii] Jenkins, C et al (2011) *Efficacy of salmeterol/fluticasone propionate by GOLD stage of chronic obstructive pulmonary disease: analysis from the randomised, placebo-controlled TORCH study* http://respiratory-research.com/content/10/1/59

[xxxiv] Royal College of Physicians, National COPD Audit Programme

[xxxv] WHO fact sheet (2016) *Ambient Outdoor Air Quality and Human Health*

[xxxvi] British Thoracic Society (2006) *The Burden of Lung Disease*

[xxxvii] Heart UK (2013) *Bridging the gaps: Tackling inequalities in cardiovascular disease*

[xxxviii] Shahab, L et al (2006) *Prevalence, diagnosis and relation to tobacco dependence of chronic obstructive pulmonary disease in a nationally representative population sample* http://thorax.bmj.com/content/61/12/1043.full