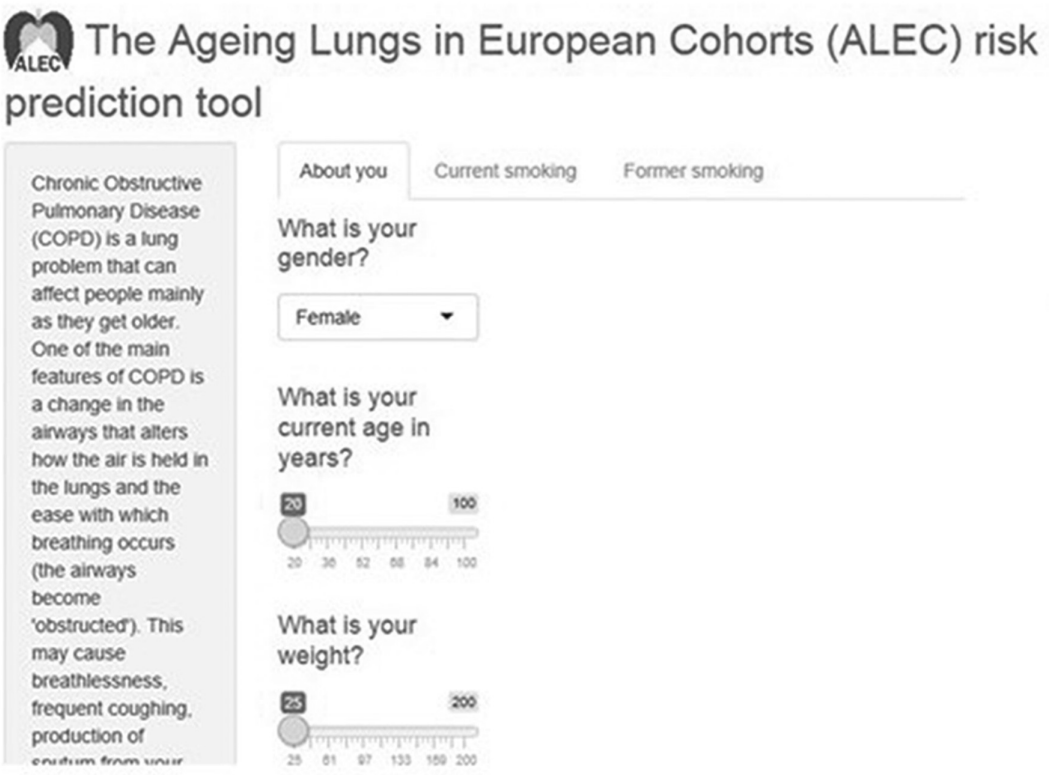

Abstract P116 Figure 1 Example screenshot of prototype risk prediction tool

repeated measures of spirometry several years apart. Using these data, ALEC aims to identify risk factors for spirometrically defined COPD, and to develop an online risk prediction tool for use by the public/physicians. Our systematic review of available risk prediction tools (Matheson *et al* IJCOPD 2018;13:1927–35) showed previous attempts had used numerous variables (most commonly smoking, sex and age), but current models could not accurately rule in nor rule out future risk of COPD.

Method Using Bayesian statistical methods we developed a model to predict a subject's lifetime risk of developing COPD (FEV1/FVC<LLN). This model can use information from all cohorts even when some predictors of interest have not been collected within a cohort. Compared with existing approaches to deal with variables missing across studies, our Bayesian approach performs well and is flexible. Furthermore, it allows inclusion in the model of evidence from elsewhere on the effect of specific predictors if available and appropriate. Using R Shiny, we developed an online prototype interface that implements our prediction model allowing users to answer questions on their physical characteristics and lifestyle to generate a personalised risk of COPD. This prototype online prediction tool was reviewed by a group of researchers and clinicians.

Results R shiny provides a technically suitable web-based interface for input of personal information and linkage to model outputs. Feedback from potential users was cautiously positive with concerns expressed regarding presentation of risk, provision of information to patients directing them for further health advice, limitation of underlying data to white Caucasian populations, interpretation/management of 'low risk of COPD' in those who smoked, and absence of risk prediction of exacerbations in those with established disease.

Conclusion Using appropriate statistical methods, it is possible to develop a risk prediction model by combining data across cohorts even when they have not all collected exactly the same information. R Shiny provides a user-friendly means to create online disease risk prediction tools; however many challenges remain regarding full-scale implementation. These are common to many risk prediction tools.

P117 RATE OF FEV1 DECLINE IN A PRIMARY CARE UK CHRONIC OBSTRUCTIVE PULMONARY DISEASE (COPD) POPULATION

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Background The rate of decline of FEV_1 in people with COPD is important as it has been associated with increased dyspnoea, decreased quality of life, and mortality. To date, the majority of lung function decline studies in people with COPD have occurred in sub-specific or randomised control trial populations, which have extensive inclusion and exclusion criteria. Therefore, it is unclear how generalizable results are to a wider population of COPD patients.

Method We used UK Clinical Practice Research Datalink (primary care) linked to Hospital Episode Statistics. We identified patients diagnosed with COPD, aged 35 years or older, who were smokers or ex-smokers, and who had at least 2 FEV_1 measurements at least 6 months apart. Follow-up started from first FEV_1 after the 1st April 2004 until censoring at death, leaving the database, or the 29th February 2016. Mixed effects

Abstract P117 Table 1 Rate of FEV_1 decline and its association with smoking status, AECOPD frequency, airflow obstruction and MRC

	Crude change of FEV_1 in ml/year (95%CI)	p-value	p-value for trend	Adjusted* change of FEV_1 in ml/year (95%CI)	p-value	p-value for trend
COPD cohort (N=33,392)	-13.2 (-14.7 to-11.7)	n/a	n/a	-11.4 (-13.0 to -9.9)	n/a	n/a
Excluding patients with a history of asthma (N=22,542)	-14.2 (-16.1 to -12.3)	n/a	n/a	-12.5 (-14.4 to -10.5)	n/a	n/a
	Rate of FEV_1 decline by covariates					
Smoking status						
Ex-smoker	-8.0 (-10.1 to -5.9)	Ref	n/a	-6.2 (-8.4 to -4.0)	Ref	n/a
Current smoker	-18.3 (-23.4 to -13.2)	<0.001		-16.6 (-21.9 to -11.4)	<0.001	
AECOPD frequency						
0	-13.2 (-15.5 to -10.8)	Ref	0.39	-11.1 (-13.6 to -8.7)	Ref	0.36
1	-11.7 (-17.9 to -5.5)	0.452		-9.9 (-16.3 to -3.5)	0.546	
≥2	-14.4 (-20.2 to -8.6)	0.473		-12.8 (-16.3 to -6.8)	0.363	
Airflow obstruction						
≥80% predicted	-86.1 (-89.1 to -83.1)	Ref	<0.001	-85.3 (-88.4 to -82.3)	Ref	
50-80% predicted	-3.3 (-9.9 to 3.4)	<0.001		-2.7 (-9.4 to 4.0)	<0.001	<0.001
30-50% predicted	29.1 (21.9 to 36.4)	<0.001		30.4 (23.4 to 37.7)	<0.001	
<30% predicted	59.0 (48.2 to 69.7)	<0.001		59.4 (48.6 to 70.3)	<0.001	
MRC dyspnoea score						
1	-16.7 (-19.9 to -13.4)	Ref	0.28	-13.8 (-17.4 to -10.2)	Ref	0.35
2	-12.5 (-19.6 to -5.3)	0.037		-9.0 (-17.1 to -0.9)	0.034	
3	-12.5 (-20.1 to -4.8)	0.063		-10.9 (-19.5 to -2.4)	0.250	
4	-13.4 (-22.1 to -4.6)	0.243		-11.7 (-21.5 to -1.9)	0.501	
5	-12.1 (-27.9 to 3.8)	0.473		-12.3 (-29.7 to 5.1)	0.827	

*Adjusted for baseline covariates: FEV_1 predicted $^{\phi}$, AECOPD frequency$^{\phi}$, smoking status $^{\phi}$, sex, age, inhaled corticosteroids, MI, stroke, heart failure, lung cancer, bronchiectasis, GORD, anxiety, depression, BMI, white blood cell count, neutrophil count, and asthma$^{\pm}$. $^{\phi}$Unless used as interaction term in model. $^{\pm}$Not adjusted in model excluding asthma.

linear regression was used to describe the rate of FEV_1 decline. Further models investigated the association between baseline smoking status, exacerbation of COPD (AECOPD) frequency in first year of follow-up, baseline airflow obstruction, and baseline MRC dyspnoea score and rate of FEV_1 decline.

Results 33,392 COPD patients with complete data were included and median follow-up time was 6.6 years (IQR 4.4–9.0).

Conclusion Amongst a primary care COPD population, the average FEV1 decline was 13.2 ml/year. Decline was faster in current smokers and COPD patients with milder airflow obstruction. The increase in FEV1 change in patients with less <50% FEV1% predicted was likely to be due to survival bias.

Please refer to page A267 for declarations of interest related to this abstract.

P118 REACHING THE 'UNREACHABLE'

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Introduction COPD is a heterogeneous and frequently debilitating respiratory, the majority of patients diagnosed with COPD have a history of nicotine smoking. There is less evidence regarding the prevalence of COPD amongst those with a history of crack/heroin smoking despite it being associated with early onset severe COPD. A screening pilot in Liverpool drug services in 2016 showed 47% of the patients had obstruction on spirometry, compatible with a diagnosis of COPD. Within Knowsley, a comprehensive respiratory assessment programme was set up within the local drug service as it is well known that this patient group engages poorly with non-emergency medical services.

Method Between January 2018 and June 2018 diagnostic spirometry with reversibility was offered within two venues of the local drug service (CGL) in Knowsley, (CAT scores, smoking history and MRC were measured in addition), to those at risk of COPD. Patients with abnormal spirometry or abnormal CAT (>10) were offered a medical appointment to clarify diagnosis, optimise medication and arrange further tests as required.

Results The service has seen 100 patients so far, these accounts for 20% of the service users who are likely to require assessment.

100 (100%) of the patients reviewed were current/ex nicotine smokers, 80 (80%) were current/ex heroin/crack smokers and 10 (10%) were current/ex cannabis smokers. 75 patient have had a confirmed diagnosis of COPD.