The main question of this work was to determine the prognostic accuracy of the ECG for prediction of hemodynamic collapse or death in hospital for patients with acute PE. We will include any study with objectively confirmed PE that included an ECG done within 12 hours of diagnosis and data for outcomes.

**Literature search**

In December 2014, we performed a systematic search of MEDLINE, the Cochrane library, and EMBASE for studies that examined ED samples of patients evaluated for suspected PE that also had 12 lead ECG performed. The methods were/will be registered at [http://www.crd.york.ac.uk/PROSPERO/](http://www.crd.york.ac.uk/PROSPERO/). We first established a search strategy likely to find relevant studies of PE diagnosis. We used sequential search strategies in MEDLINE using Pubmed, designed to capture studies of diagnosis, diagnostic accuracy, and outcomes. We used the following independent search strategies, abbreviated here for clarity: PE and: prognosis, electrocardigraphy, electrocardiogram, ECG, EKG. With assistance from a medical librarian, we searched EMBASE using three concept groups: PE, electrocardigraphy, and risk/accuracy/predictive value/prognosis while precluding entry of duplicate citations. The details of these search strategies are shown in Supplemental box 1.

Other sources included a search of the Cochrane library database using the term *embolism*. We also searched the bibliographies of meta-analyses and book chapters on topics relevant to PE diagnosis and prognosis: clinical prediction rules{Lucassen, 2011 4259 /id; SQUIZZATO, 2012 4402 /id; Tamariz, 2004 2261 /id}, clinical pathways and guidelines{Fesmire, 2011 4230 /id; Leung, 2011 4616 /id; Roy, 2005
and other diagnostic methods (Manara, 2013; Quiroz, 2005; Chan, 2009). In addition, we queried www.clinicaltrials.gov for studies involving possible ECG data in PE studies emailed known researchers in the field to find so-called grey-zone or fugitive literature.

Two authors will review the results of the search for relevance and independently read the titles and abstracts of all retrieved citations. The inclusion criteria were: studies of symptomatic patients who underwent objective diagnostic testing proving PE, which included data on risk factors for VTE. Diagnosis of PE requires pulmonary vascular imaging demonstrating a filling defect on a contrast enhanced study or unmatched perfusion defects on scintillation lung scan, or autopsy. We will assess inter-observer reliability with Cohen’s kappa. The same two authors will independently read the retained full-length articles for the following criteria: Evidence of inclusion of patients undergoing testing with 12 lead ECG; evidence of a prospective or retrospective selection algorithm with a predefined reference standard for PE that included at least either pulmonary vascular imaging or mixed-objective testing plus clinical outcomes assessed until at least hospital discharge. Exclusion criteria included the written statement that hemodynamically unstable patients were excluded; those studies that clearly indicated the data were non-additive (i.e., redundant with previously published data), including secondary analyses of other published data. Hemodynamic collapse is defined as systolic blood pressure <90 mm Hg requiring or associated with use of vasopressors, need for endotracheal intubation, catheter or surgical thrombectomy, any use of thrombolytics, cardiopulmonary resuscitation, extracorporeal perfusion, or death. Hemodynamic collapse can be assessed up until day of discharge but not beyond; death will be reported up to 90 days post PE diagnosis. Discordances will be resolved by consensus with a third author as arbiter. The primary data for analysis are the total number of patients with PE and the number with each outcome. When necessary, we will email the corresponding authors for these data up to three times.
We will grade study quality using the Quality Assessment of Diagnostic Accuracy Studies tool (QUADAS-2), using a standard form. [Whiting, 2011 4679 /id] Each study will be graded as “low risk,” “high risk,” or “unclear risk” for bias in terms of selection of patients and reference standard. For patient selection, we considered a study low risk if it enrolled patients under conditions similar to what an physician is likely to experience in evaluating a patient with diagnosed PE in the absence of other influences. We considered patient selection bias at high risk if the paper or personal communication with the author indicated that patients were pre-selected or excluded for either more or less severity in terms of presentation (e.g., positive biomarker such as troponin or echocardiography). We considered the reference standard at low risk of bias all patients were included who had positive pulmonary vascular imaging and had outcomes followed until hospital discharge. Studies without these criteria had a high-risk reference standard. Studies lacking sufficient criteria to understand patient selection or reference standard had an unclear risk.

**Statistical analysis**

For included studies, we will generate a table of total number of PE+ patients the number that had each outcome and the true positive and false negative rate for each ECG finding (heart rate > 100 beats/min, each component of the S1 Q3 T3 pattern and the composite, incomplete and complete right bundle branch block, T wave inversion in V1-V4 and each lead as provided, ST elevation in AVR, atrial fibrillation) and the Daniel score <8. The mean Daniel score for patients without either outcome and with either outcome will be reported. We will assess for heterogeneity between studies using Cochran’s Q test (P<0.05) or the inconsistency index (I2). We will screen for publication bias using the test of Egger for asymmetry of the funnel plot with outcome variables as independent predictors.(Song, 2002 4612 /id) We will also report odds ratios for each variable from the random effects model, and the fixed
effects OR only if heterogeneity is low ($I^2<25\%$). {DerSimonian, 1986 438 /id} Unless otherwise stated, all reported confidence intervals (CI) are from the random effects model.

We will perform subgroup/sensitivity analyses: 1. Assess prognostic ability for death attributable directly to PE  2. Compare studies drawn from American versus populations from other countries, because prior work found a significantly higher mortality rates for PE in European populations with suspected PE than the United States. {Penaloza, 2012 4488 /id} 3. Remove studies with loss to follow up or unclear follow-up