**Table F-2. Study characteristics table for KQ 2**

| Study  Location | Population  Total N  Female : Male | Index Test(s) | Comparator(s) | Result | Quality |
| --- | --- | --- | --- | --- | --- |
| Andreassen, 200662  Europe | Adults with suspected chronic precapillary PH  N=61  42:19 | BNP  BNP | Cardiac index  Functional class  RHC-mPAP  RHC-PVR  RHC-sPAP  RAP  Mortality | Correlation  Odds ratio | Good |
| Badesch, 201263  Badesch 201164  US/Canada | Adults with PAH  N=224  156:68 | BNP |  | Mean change from baseline in response to treatment (ambrisentan) | Good |
| Barst, 199665  US/Canada | Adults with PPH  N=81  59:22 | mPAP |  | Change in mean from baseline in response to therapy (epoprostenol) | Good |
| Bendayan, 200266  Asia | Adults and children with PAH  N=29  25:4 | Uric acid | 6MWD (absolute)  Functional class  Mortality  RHC-CO  RHC-mPAP | Correlation | Good |
| Benza, 201067  US | Adults with PAH  N=2716  NR | BNP >180  BNP <50  Pericardial effusion | Mortality | HR | Good |
| Bernus, 200968  US | Children with PAH  N=78  42:26 | BNP | Cardiac index  Peak TRV  PCWP  RHC-mPAP  RHC-PVR  Right atrial pressure  RV size  TRV | Correlation | Good |
| Bharani, 200769  Asia | Adults and children with suspected or symptomatic PAH  N=8  4:4 | sPAP |  | Change in mean in response to therapy (tadalafil) | Fair |
| Borges, 200670  Europe | Chronic PAH  N=37  24:13 | RIMP/MPI/Tei index  TAPSE  TAPSE  RV size | 6MWD (absolute)  RHC-PVR | Correlation  Change in mean in response to therapy (bosentan ± beraprost or iloprost) | Good |
| Brierre, 201071  Europe | Adults with PAH  N=79  36:43 | mPAP  mPAP ≥ 49  Pericardial effusion  RIMP/MPI/Tei index  RIMP/MPI/Tei index ≥0.98  TAPSE | Mortality | HR | Good |
| Bustamante-Labarta, 200272  South America | Adults with PPH  N=25  19:6 | RA size | Survival free from lung transplant | HR | Good |
| Campana, 200473  Europe | Adults with pre-capillary PH  N=22  14:8 | BNP  Cardiac index  FAC  BNP  RV size  TAPSE | mPAP  Right atrial pressure  RVEF  TAPSE | Correlation  Changes in means in response to therapy (epoprostenol) | Good |
| Cella, 200974  Europe | Adults with PAH associated with CTD  N=18  13:5 | RVSP  Nitric oxide | 6MWD (change) | Correlation  Change in mean over time in response to therapy (bosentan) | Good |
| Channick, 200175  Badesch 200276  US/Europe | Adults with PPH or PAH associated with scleroderma  N=32  28:4 | mPAP |  | Change in mean from baseline in response to therapy (bosentan) | Good |
| Chin, 200777  US | Epoprostenol-treated patients with pulmonary hypertension  N=27  19:8 | BNP | 6MWD (absolute)  PCWP  RHC-CO  RHC-mPAP  RHC-PVR  Right atrial pressure | Correlation | Good |
| Dimitroulas, 200778  Europe | Adults with PAH associated with scleroderma  N=10  9:1 | BNP |  | Change in median over time in response to therapy (Bosentan) | Good |
| D’Alto, 201079  Europe | Adults with PAH due to CHD  N=32  18:14 | BNP |  | Change in mean in response to therapy (bosentan + sildenafil) | Fair |
| Dyer, 200680  US | Children with IPAH  N=12  NR | RIMP/MPI/Tei index | RHC-mPAP | Correlation | Fair |
| Elstein, 200481  Asia | Adults and children with Gaucher disease  N=47  27:20 | BNP | Tricuspid insufficiency | Correlation with stratified TI values | Good |
| Fahmy Elnoamany, 200782  Africa | Adults with arterial PH with different cardiac pathologies  N=53  8:45 | Endothelin-1  sPAP | RHC-sPAP  RIMP/MPI/Tei Index  RVEF  sPAP  RHC-sPAP | Correlation | Fair |
| Feliciano, 200583  Europe | Adults with severe PAH  N=11  9:2 | RIMP/MPI/Tei index |  | Change in mean in response to therapy (bosentan or Iloprost) | Good |
| Fijalkowska, 200684  Europe | Adults with PH  N=55  43:12 | BNP  FAC  BNP  BNP  Pericardial effusion  RA size  RIMP/MPI/Tei index  RV size  Troponin T | 6MWD (absolute)  Cardiac index  Functional class  Peak TRV  Pericardial effusion  RHC-mPAP  RHC-PVR  Right atrial pressure  RIMP/MPI/Tei Index  RV size  Troponin  Mortality | Correlation  HR | Good |
| Filusch, 201085  Europe | Adults with PAH  N=55  33:22 | cTroponin T  hsTroponin T  BNP | Mortality  WHO class | Sensitivity  Specificity  NPV  PPV | Good |
| Forfia, 200686  US | Adults with PH  N=63  52:11 | TAPSE  TAPSE | RHC-PVR  Mortality | Correlation  HR | Good |
| Friedberg, 200687  US | Adults and children who had undergone RHC  N=112  48:64 | mPAP  BNP  sPAP | RHC-mPAP  RHC-sPAP | Correlation | Good |
| Galie, 200888  Oudiz 200989  Shapiro 201290  US/Europe/Mexico/ South America/ Australia/NZ | Adults with PAH  N=201  168:33 | BNP |  | Change in mean in response to therapy (ambrisentan) | Good |
| Gan, 200691  Europe | Adults with PH  N=30  22:8 | BNP | 6MWD (absolute)  Cardiac index  RHC-mPAP  RHC-PVR  Right atrial pressure  RVEF | Correlation | Good |
| Ghio, 201092  Europe | Adults with IPAH  N=59  37:22 | FAC  Pericardial effusion  RIMP/MPI/Tei index  sPAP  TAPSE | Mortality | HR | Good |
| Ghofrani, 200293  Europe | Adults with severe precapillary PH.  N=20 (36 tests)  NR | BNP  cGMP | RHC-PVR  Cyclic guanosine monophosphate  RHC-PVR | Correlation | Fair |
| Goto, 201094  Asia | Adults with PAH  N=46  34:12 | BNP  sPAP | RHC-mPAP  RHC-sPAP | Correlation | Good |
| Grapsa, 200795  UK | Adults with PH  N=93  50:43 | RIMP/MPI/Tei index | Pericardial effusion  RA size  TRV | Correlation | Good |
| Grubstein, 200896  Asia | Adults with PH  N=38  27:11 | sPAP | RHC-sPAP | Correlation | Fair |
| Haddad, 200997  US | Adults with PAH  N=51  35:16 | mPAP  sPAP | RHC-mPAP  RHC-sPAP | Correlation | Good |
| Halank, 201198  Europe | Adults with portopulmonary hypertension  N=14  9:5 | BNP | Median | Change in median over time in response to therapy (ambrisentan) | Fair |
| Hampole, 200999  US | Adults with PH  N=162  126:36 | BNP | Mortality | HR | Good |
| Heresi, 2012100  US | Adults with PAH  N=68  62:6 | cTnI (detectable vs. nondetectable) | BNP  NYHA class  RA size  6MWD | Correlation | Good |
| Heresi, 2010101  US | Adults with PPH  N=40  37:3 | BNP | 6MWD (absolute)  Cardiac index  RHC-mPAP  RHC-PVR  Right atrial pressure  Mortality | Correlation  HR | Good |
| Hinderliter, 1997102  Other | Adults with PPH  N=81  59:22 | FAC  Pericardial effusion  RV size  sPAP  RV size  FAC  TRV | 6MWD (absolute)  Cardiac index  RHC-mPAP  Right atrial pressure  6MWD (absolute)  Cardiac index (CI)  RHC-mPAP  Right atrial pressure  6MWD (absolute)  Cardiac index  RHC-mPAP  Right atrial pressure  RHC-sPAP | Correlation  Correlation  Correlation  Correlation  Change in mean from baseline in response to therapy (epoprostenol) | Fair |
| Hiramoto, 2009103  Asia | Adults with PAH  N=16  11:5 | BNP | Endothelin-1 | Changes in mean stratified by % change in ET-1 | Fair |
| Ho, 2009104  Asia | Adults with PAH  N=6  4:2 | RIMP/MPI/Tei Index  FAC  BNP  sPAP  RVEF |  | Changes in median in response to therapy (bosentan) | Good |
| Homma, 2001105  US | Adults with PH  N=8  5:3 | sPAP | RHC-sPAP | Correlation | Good |
| Jacobs, 2009106  Europe | Adults with idiopathic PAH  N=16  13:3 | BNP |  | Change in mean in response to therapy | Fair |
| Kaya, 2012107  NR | Adults and children with Eisenmenger syndrome  N=23  13:10 | RV size  RA size  sPAP  s-prime |  | Change in mean over time in response to therapy (bosentan) | Good |
| Keogh, 2011108  Australia/NZ | Adults with PAH  N=112  89:23 | sPAP |  | Change in mean in response to therapy (monotherapy vs. combination therapy) | Fair |
| Knirsch, 2011109  Europe | Children with heart disease  N=103  NR | BNP |  | Changes in mean in response to therapy (standardized protocol) | Good |
| Kopec, 2012110  Europe | Adults with Eisenmenger syndrome  N=7  4:3 | BNP  ET-1 |  | Change in median over time in response to therapy (bosentan) | Fair |
| Lammers, 2009111  UK | Children with PH  N=50  18:32 | BNP | 6MWD (absolute)  Functional class | Correlation | Good |
| Langleben, 1999112  US/Canada | Patients with PPH  N=18  NR | Endothelin-1 |  | Change in mean in response to therapy | Good |
| Leuchte, 2005113  Europe | Adults with PAH  N=30  18:12 | Change in BNP  BNP | 6MWD (absolute)  Cardiac index  RHC-CO  RHC-mPAP  RHC-PVR  Right atrial pressure | Correlation  Changes in mean levels over time (no specific therapy) | Good |
| Lorenzen, 2011114  Europe | Adults with PAH  N=70  48:22 | BNP  Uric acid | Mortality | HR | Good |
| Machado, 200629  US | Patients with sickle cell disease  N=230  138:92 | BNP  BNP  ≥160, unadjusted  ≥160, adjusted  log10, adjusted  log10, unadjusted | 6MWD (absolute)  mPAP  PCWP  RA size  RHC-CO  RHC-dPAP  RHC-PVR  RHC-sPAP  RV size  TRV  Mortality | Correlation  HR | Poor |
| Machado, 2004115  US | Patients with PAH  N=17  17:0 | Nitric oxide  sPAP | mPAP  RHC-sPAP | Correlation | Fair |
| Mahapatra, 2006116  US | Adults with PH  N=54  41:13 | RIMP/MPI/Tei Index  RVSP | Mortality | HR | Fair |
| Mathai, 2011117  US | Adults with known or suspected PAH  N=50  49:1 | FAC  Peak TRV  Pericardial effusion  RA size  TAPSE | Mortality | HR | Fair |
| Mauritz, 2011118  Europe | Adults with PAH  N=198  149:49 | BNP |  | Baseline means only | Good |
| McLaughlin, 2010119  Frantz, 2012120  US/Europe | Adults with PH  N=235  191:44 | BNP |  | Median change from baseline in response to treatment (treprostinil) | Good |
| Michelakis, 2002121  Canada | Adults with PH  N=13  9:4 | cGMP |  | Acute change in mean levels after dose of various vasodilators (iNO, sildenafil, iNO + sildenafil) | Fair |
| Minniti, 2009122  US | Adults with SCD and PH  N=14  10:4 | BNP  TRV |  | Change in mean in response to therapy (ambrisentan) | Poor |
| Montani, 2007123  Europe | Adults with PAH  N=33  21:12 | Endothelin-1 | Cardiac index  RHC-PVR  Right atrial pressure | Correlation | Fair |
| Morishita, 2009124  Asia | Adults and children with PAH  N=7  6:1 | Pericardial effusion  RA size  RA size  BNP | Functional class  BNP | Correlation  Changes in mean in response to therapy (epoprostenol) | Good |
| Mukerjee, 2003125  Europe | Adults with systemic sclerosis  N=23  21:2 | BNP | RHC-mPAP  RHC-PVR | Correlation | Good |
| Nagaya, 2000126  Asia | Patients with PPH  N=60  42:18 | ANP  ANP  BNP  BNP | PCWP  RHC-CO  RHC-mPAP  Right atrial pressure  Mortality  PCWP  RHC-CO  RHC-mPAP  RHC-mPAP  RHC-PVR  Right atrial pressure  RV size  Mortality | Correlation  HR  Correlation  HR | Good |
| Nakayama, 2007127  Asia | Children with IPAH  N=31  15:16 | BNP |  | Change in mean in response to therapy (epoprostenol) | Fair |
| Nath, 2005128  US | Adults with PPH  N=20  16:4 | Peak TRV  RIMP/MPI/Tei Index  RV size  RIMP/MPI/Tei Index  RV size  sPAP  TRV | Functional class | Correlation  Mean changes over time in response to therapy (epoprostenol) | Good |
| Nickel, 2012129  NR | Adults with IPAH  N=109  85:24 | BNP  Uric acid | Mortality | HR | Fair |
| Nickel, 2008130  Europe | Adults with IPAH  N=76  52:24 | BNP  Uric acid | Composite outcome (death or lung transplantation) | HR | Fair |
| Njaman, 2007131  Asia | Adults with PH  N=90  77:13 | Uric acid | Mortality | HR stratified by uric acid levels | Good |
| Ogawa, 2012132  Asia | Adults with pulmonary veno-occlusive or pulmonary capillary hemangiomatosis  N=8  4:4 | BNP |  | Change in mean over time in response to therapy (epoprostenol) | Fair |
| Park, 2004133  US | Adults with PAH  N=20  16:4 | sPAP  BNP | Clinical event | Mean levels at baseline and over time stratified by patients with event vs patients without event | Fair |
| Pyxaras, 2011134  Europe | Adults and children with PAH  N=60  36:24 | sPAP  mPAP | RHC-sPAP  RHC-mPAP | Correlation | Good |
| Raymond, 2002135  Not reported/Unclear | Adults with PPH  N=81  59:22 | FAC  Peak TRV  Pericardial effusion  RA size | Mortality  Composite outcome (death or transplantation) | HR | Fair |
| Rhodes, 2011136  Europe | Adults with IPAH  N=139  98:41 | BNP | 6MWD (absolute)  Cardiac index  PCWP  RHC-PVR  Right atrial pressure  Mortality | Correlation  HR | Good |
| Sadushi-Kolici, 2012137  NR | Adults with PH  N=111  77:39 | Pericardial effusion | Mortality | HR | Fair |
| Schumann, 2010138  Europe | Adults with PH  N=36  17:19 | BNP | sPAP | BNP levels stratified by different levels of disease severity | Good |
| Sebbag, 2001139  Canada | Adults and children with PPH  N=16  13:3 | RIMP/MPI/Tei Index  SPAP |  | Changes in mean in response to therapy (epoprostenol) | Good |
| Shimony, 2012140  Canada | Adults with PAH  N=154  129:25 | Pericardial effusion (prevalent v incident) | Mortality | % patients with outcome | Fair |
| Simeoni, 200849  Europe | Adults with systemic sclerosis and PH  N=20  18:2 | BNP |  | Changes in mean in response to therapy (bosentan) | Good |
| Soon, 2011141  UK | Adults with PH  N=63  42:21 | BNP |  | Determination of most accurate log transformed dichotomous BNP variables to predict events | Good |
| Souza, 2007142  Not reported/Unclear | Adults with IPAH  N=42  10:32 | BNP | 6MWD (absolute)  Cardiac index  Functional class  RHC-mPAP  RHC-PVR  Right atrial pressure | Correlation | Good |
| Taguchi, 2012143  Asia | Adults and children with IPAH  N=65  51:14 | BNP |  | Change in mean over time in response to combination therapy | Good |
| Takatsuki, 2012144  US | Children with PAH  N=33  22:11 | TRJv  RV size  BNP |  | Change in mean over time in response to therapy (tadalafil) | Good |
| Takatsuki, 2012145  US | Children with PAH  N=38  19:19 | BNP |  | Change in mean over time in response to therapy (transition to or addition of ambrisentan) | Good |
| Takatsuki, 2012146  US | Children with PAH  N=88  46:42 | BNP (BNP and NT-proBNP) | 6MWD  RHC-mPAP  RHC-RAP  RHC-PVR  RHC-CI  TRJv | Correlation | Good |
| Takeda, 2010147  Asia | Adults with PAH  N=37  29:8 | BNP | Mortality | HR | Good |
| Torbicki, 2003148  Europe | Adults with PAH  N=56  43:13 | FAC  BNP  Pericardial effusion  RA size  Troponin T | Mortality | HR | Good |
| Utsunomiya, 2011149  Asia | Adults with PH  N=50  39:11 | BNP  RA size  RIMP/MPI/Tei Index | Mortality | HR | Fair |
| Utsunomiya, 2009150  Asia | Adults with chronic PH  N=50  39:11 | RA size | Right atrial pressure  RIMP/MPI/Tei Index | Correlation | Good |
| Van Albada, 2008151  Europe | Children with PAH  N=29  18:11 | BNP  Uric acid | 6MWD (absolute) 6MWD (change)  Functional class  Mortality  Cardiac index  RHC-mPAP  RHC-PVR  Mortality | Correlation | Good |
| Vizza, 2012152  Europe | Adults with IPAH  N=44  37:7 | ET-1  BNP | WHO FC  BNP  RHC-mPAP  RHC-CI  RHC-PVR  Clinical worsening  Clinical worsening | Correlation  OR | Good |
| Vizza, 2008153  Europe | Adults with PAH associated with CTD  N=25  21:4 | Endothelin-1 | BNP | Correlation | Good |
| Voelkel, 2000154  US | Patients with PH  N=191  NR | Uric acid | RHC-mPAP  Right atrial pressure | Correlation | Good |
| Williams, 200661  UK | Adults with systemic sclerosis  N=109  88:21 | BNP  BNP  10-fold increase from baseline levels  10-fold increase in baseline levels | Cardiac index  RHC-mPAP  RHC-PVR  Right atrial pressure  Mortality | Correlation  HR | Fair |
| Wilkins, 2005155  UK | Adults with IPAH or PAH associated with CTD  N=26  21:5 | RV size  Cardiac index  RIMP/MPI/Tei Index  RA size  BNP |  | Change in mean from baseline in response to therapy (bosentan) | Good |
| Yamada, 2012156  Asia | Adults and children with IPAH  N=41  29:12 | BNP  Uric acid | Mortality  Hospitalization | HR | Good |
| Yanagisawa, 2012157  Asia | Adults with PAH  N=46  38:8 | BNP | Mortality | HR | Good |
| Yang, 2012158  Asia | Adults and children with Eisenmenger syndrome  N=12  9:3 | RV size  mPAP |  | Change in mean over time in response to therapy (iloprost) | Fair |
| Yoshida, 2012159  Asia | Adults with PAH  N=21  18:3 | BNP  mPAP |  | Mean change from baseline in response to treatment (ambrisentan) | Fair |
| Zafrir, 2007160  Asia | Adults with PPH +/- collagen vascular disease  N=29  22:7 | RA size  RIMP/MPI/Tei Index  RVEF | 6MWD (absolute)  Functional class  6MWD (absolute)  Functional class | Correlation | Good |
| Zeng, 2011161  Asia | Adults and children with IPAH  N=95  61:34 | BNP |  | Means stratified by survivor/  nonsurvivor | Good |
| Zhao, 2012162  Asia | Adults and children with IPAH  N=76  56:20 | Uric acid | Mortality | HR | Good |

Abbreviations: 6MWD=6-minute walk distance; BNP=brain natriuretic peptide; CHD=congenital heart disease; CHF=congestive heart failure; CI=cardiac index; CTD=connective tissue disease; CTEPH=chronic thromboembolic pulmonary hypertension; CVD=collagen vascular disease; DLCO=diffusion capacity of the lung for carbon monoxide; FAC=fractional area change; HR=hazard ratio; IPAH=idiopathic pulmonary arterial hypertension; mPAP=mean pulmonary artery pressure; MPI=myocardial performance index; NPV=negative predictive value; NT-proBNP=N-terminal pro-B-type natriuretic peptide; NYHA=New York Heart Association; PAH=pulmonary arterial hypertension; PH=pulmonary hypertension; PPH=primary pulmonary hypertension; PPV=positive predictive value; PVR=pulmonary vascular resistance; RA=right atrium; RHC=right heart catheterization; RIMP=right index of myocardial performance; RV=right ventricle; S’=tricuspid lateral annular systolic velocity; RVEF= right ventricular ejection fraction ; sPAP=systolic pulmonary artery pressure; SSc=systemic sclerosis; TAPSE=tricuspid annular plane systolic excursion; TDI=tissue Doppler imaging; TRV=tricuspid regurgitant jet velocity; VSD=ventricular septal defect; VTIRVOT=velocity-time integral of right ventricular outflow tract