

ONLINE SUPPLEMENT

HYPERTENSION TREATMENT RATES AND HEALTH CARE WORKER DENSITY:

AN ANALYSIS OF WORLDWIDE DATA

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Supplemental Tables.

Full multivariable regression results for the four models described in the paper: total health care worker density (S1); physician density (S2); nurse density (S3); and disaggregated physician and nurse density (S4).

Full regression analyses, stratified by country-level income classification (low, lower-middle, upper-middle, high): total health care worker density (S5); physician density (S6); nurse density (S7); and disaggregated physician and nurse density (S8).

Full regression analyses, stratified by year of study (1990-1999 vs. 2000-2010): total health care worker density (S9); physician density (S10); nurse density (S11); and disaggregated physician and nurse density (S12).

S1.

Total Density (Aggregate Physician and Nurse Density); R² = 0.160		
Independent Variable	β (CI)	P-value
Total Health Worker Density	0.33 (-0.10, 0.76)	0.133
GDP per Capita	0.36 (-0.02, 0.73)	0.062
Land Area	-0.04 (-0.18, 0.10)	0.551
Population	0.06 (-0.06, 0.19)	0.329
2004 DALY Estimates	0.12 (-0.18, 0.43)	0.418
Hospital Beds	-0.04 (-0.33, 0.26)	0.796
Access to an Improved Water Source	-0.10 (-0.23, 0.03)	0.118
Private (% of GDP)	0.05 (-0.25, 0.35)	0.732

S2.

Physician Density (separate regression); R² = 0.145		
Independent Variable	β (CI)	P-value
Physician Density	-0.03 (-0.36, 0.30)	0.849
GDP per Capita	0.45 (0.09, 0.82)	0.016
Land Area	-0.01 (-0.17, 0.14)	0.861
Population	0.05 (-0.10, 0.21)	0.473
2004 DALY Estimates	0.06 (-0.30, 0.43)	0.721
Hospital Beds	0.06 (-0.22, 0.34)	0.671
Access to an Improved Water Source	-0.07 (-0.21, 0.06)	0.291
Private (% of GDP)	0.05 (-0.25, 0.34)	0.753

S3.

Nurse Density (Separate Regression); R² = 0.167		
Independent Variable	β (CI)	P-value
Nurse Density	0.29 (-0.01, 0.58)	0.055
GDP per Capita	0.35 (-0.001, 0.71)	0.051
Land Area	-0.05 (-0.19, 0.10)	0.522
Population	0.07 (-0.06, 0.20)	0.261
2004 DALY Estimates	0.07 (-0.23, 0.37)	0.653
Hospital Beds	-0.03 (-0.31, 0.25)	0.818
Access to an Improved Water Source	-0.12 (-0.27, 0.02)	0.087
Private (% of GDP)	0.05 (-0.24, 0.34)	0.717

S4.

Physician Density (Disaggregate)/Nurse (Disaggregate); $R^2 = 0.169$		
Independent Variable	β (CI)	P-value
Physician Density	-0.07 (-0.41, 0.27)	0.678
Nurse Density	0.30 (-0.001, 0.60)	0.050
GDP per Capita	0.36 (0.001, 0.72)	0.049
Land Area	-0.05 (-0.20, 0.10)	0.521
Population	0.08 (-0.06, 0.23)	0.267
2004 DALY Estimates	0.03 (-0.34, 0.40)	0.868
Hospital Beds	-0.02 (-0.30, 0.26)	0.879
Access to an Improved Water Source	-0.13 (-0.28, 0.02)	0.095
Private (% of GDP)	0.05 (-0.25, 0.34)	0.745

S5.

Total Density (Aggregate Physician and Nurse Density)								
Independent Variable	Low-Income n = 33; R ² = 0.257		Lower-Middle n = 30; R ² = 0.294		Upper-Middle n = 26; R ² = 0.456		High n = 65; R ² = 0.356	
	β (CI)	P-value	β (CI)	P-value	β (CI)	P-value	β (CI)	P-value
Total Health Worker Density	0.44 (-0.40, 1.28)	0.287	0.22 (-1.40, 1.84)	0.772	0.03 (-1.18, 1.24)	0.952	0.28 (-0.90, 1.47)	0.627
GDP per Capita	0.64 (-0.42, 1.70)	0.221	0.69 (-0.87, 2.26)	0.358	-0.64 (-2.94, 1.64)	0.558	0.82 (-0.09, 1.74)	0.074
Land Area	0.12 (-0.48, 0.73)	0.678	-0.23 (-0.60, 0.14)	0.199	0.18 (-0.38, 0.74)	0.511	-0.004 (-0.14, 0.13)	0.952
Population	-0.14 (-0.60, 0.32)	0.528	0.33 (-0.10, 0.76)	0.120	-0.39 (-0.99, 0.21)	0.187	0.11 (-0.05, 0.28)	0.163
2004 DALY Estimates	0.02 (-0.62, 0.65)	0.958	0.45 (-0.32, 1.23)	0.232	-0.18 (-0.71, 0.35)	0.480	0.32 (-0.40, 1.03)	0.370
Hospital Beds	-0.17 (-0.51, 0.18)	0.323	0.40 (-0.95, 1.75)	0.535	0.60 (-0.25, 1.45)	0.154	-0.15 (-0.61, 0.31)	0.511
Access to an Improved Water Source	-0.11 (-0.67, 0.44)	0.672	-0.65 (-1.13, -0.17)	0.012	0.12 (-0.32, 0.56)	0.566	-0.13 (-0.35, 0.10)	0.251
Private (% of GDP)	0.23 (-0.61, 1.08)	0.568	0.06 (-0.79, 0.91)	0.882	0.57 (-0.08, 1.23)	0.081	-0.15 (-0.64, 0.34)	0.535

S6.

Physician Density (separate regression)								
Independent Variable	Low-Income n = 33; R² = 0.232		Lower-Middle n = 30; R² = 0.314		Upper-Middle n = 26; R² = 0.465		High n = 70; R² = 0.480	
	β (CI)	P-value	β (CI)	P-value	β (CI)	P-value	β (CI)	P-value
Physician Density	-0.11 (-0.84, 0.62)	0.752	-0.45 (-1.27, 0.37)	0.261	-0.23 (-0.78, 0.32)	0.392	0.27 (-0.77, 1.32)	0.595
GDP per Capita	1.01 (-0.04, 2.06)	0.058	0.60 (-0.76, 1.96)	0.359	-0.86 (-2.81, 1.10)	0.367	1.16 (0.10, 2.23)	0.033
Land Area	0.26 (-0.44, 0.97)	0.441	-0.05 (-0.63, 0.53)	0.855	0.22 (-0.26, 0.71)	0.337	0.08 (-0.11, 0.27)	0.406
Population	-0.19 (-0.71, 0.32)	0.446	0.16 (-0.47, 0.79)	0.598	-0.40 (-0.94, 0.13)	0.129	0.12 (-0.06, 0.31)	0.183
2004 DALY Estimates	-0.17 (-0.94, 0.60)	0.649	0.25 (-0.32, 0.82)	0.367	-0.27 (-0.82, 0.29)	0.325	0.27 (-0.45, 0.99)	0.451
Hospital Beds	-0.09 (-0.34, 0.16)	0.459	0.62 (-0.13, 1.37)	0.098	0.68 (0.07, 1.30)	0.030	-0.21 (-0.64, 0.22)	0.332
Access to an Improved Water Source	-0.01 (-0.57, 0.54)	0.960	-0.56 (-1.04, -0.09)	0.023	0.17 (-0.15, -0.49)	0.283	-0.12 (-0.28, 0.04)	0.144
Private (% of GDP)	0.32 (-0.47, 1.10)	0.412	0.28 (-0.92, 1.50)	0.621	0.65 (-0.10, 1.39)	0.083	-0.05 (-0.72, 0.62)	0.887

S7.

Nurse Density (Separate Regression)								
Independent Variable	Low-Income n = 33; R ² = 0.266		Lower-Middle n = 30; R ² = 0.310		Upper-Middle n = 26; R ² = 0.456		High n = 70; R ² = 0.479	
	β (CI)	P-value	β (CI)	P-value	β (CI)	P-value	β (CI)	P-value
Nurse Density	0.43 (-0.26, 1.12)	0.209	0.40 (-0.78, 1.58)	0.485	0.002 (-0.97, 1.98)	0.996	0.16 (-0.58, 0.91)	0.656
GDP per Capita	0.65 (-0.30, 1.60)	0.169	0.57 (-1.22, 2.37)	0.505	-0.66 (-2.71, 1.38)	0.501	1.00 (-0.004, 2.00)	0.051
Land Area	0.10 (-0.46, 0.67)	0.703	-0.23 (-0.57, 0.10)	0.161	0.18 (-0.31, 0.68)	0.444	0.04 (-0.10, 0.18)	0.580
Population	-0.11 (-0.54, 0.32)	0.584	0.34 (-0.05, 0.74)	0.085	-0.39 (-0.97, 0.18)	0.168	0.12 (-0.04, 0.28)	0.131
2004 DALY Estimates	-0.09 (-0.71, 0.53)	0.767	0.37 (-0.72, 1.46)	0.477	-0.18 (-0.68, 0.32)	0.451	0.24 (-0.45, 0.94)	0.476
Hospital Beds	-0.16 (-0.50, 0.17)	0.318	0.26 (-1.06, 1.57)	0.681	0.61 (-0.12, 1.34)	0.096	-0.25 (-0.70, 0.20)	0.259
Access to an Improved Water Source	-0.15 (-0.72, 0.42)	0.588	-0.68 (-1.15, -0.22)	0.007	0.13 (-0.26, 0.52)	0.503	-0.13 (-0.36, 0.11)	0.272
Private (% of GDP)	0.24 (-0.57, 1.04)	0.546	0.09 (-0.72, 0.89)	0.486	0.57 (-0.12, 1.26)	0.486	0.03 (-0.44, 0.50)	0.884

S8.

Physician Density (Disaggregate)/Nurse (Disaggregate)								
Independent Variable	Low-Income n = 33; R ² = 0.302		Lower-Middle n = 30; R ² = 0.371		Upper-Middle n = 26; R ² = 0.466		High n = 70; R ² = 0.330	
	β (CI)	P-value	β (CI)	P-value	β (CI)	P-value	β (CI)	P-value
Physician Density	-0.49 (-1.47, 0.48)	0.307	-0.80 (-1.75, 0.15)	0.093	-0.24 (-0.87, 0.40)	0.441	0.40 (-0.83, 1.63)	0.504
Nurse Density	0.71 (-0.14, 1.57)	0.097	0.74 (-0.35, 1.83)	0.167	0.03 (-0.98, 1.05)	0.943	0.27 (-0.58, 1.11)	0.520
GDP per Capita	0.89 (-0.13, 1.91)	0.083	0.25 (-1.37, 1.87)	0.743	-0.85 (-2.90, 1.19)	0.390	1.10 (0.02, 2.18)	0.045
Land Area	0.16 (-0.33, 0.66)	0.497	-0.02 (-0.54, 0.50)	0.938	0.23 (-0.28, 0.73)	0.354	0.07 (-0.12, 0.26)	0.471
Population	-0.08 (-0.53, 0.36)	0.691	0.16 (-0.35, 0.66)	0.509	-0.40 (-0.95, 0.14)	0.138	0.11 (-0.07, 0.29)	0.226
2004 DALY Estimates	-0.49 (-1.46, 0.48)	0.303	-0.02 (-0.97, 0.94)	0.973	-0.27 (-0.85, 0.30)	0.327	0.40 (-0.34, 1.14)	0.273
Hospital Beds	-0.22 (-0.60, 0.16)	0.246	0.24 (-0.93, 1.42)	0.665	0.67 (-0.03, 1.38)	0.060	-0.15 (-0.60, 0.30)	0.505
Access to an Improved Water Source	-0.17 (-0.74, -0.41)	0.549	-0.66 (-1.16, -0.16)	0.012	0.16 (-0.22, - 0.55)	0.379	-0.17 (-0.42, 0.08)	0.164
Private (% of GDP)	0.32 (-0.43, 1.07)	0.389	0.42 (-0.58, 1.42)	0.387	0.67 (-0.20, 1.54)	0.120	-0.14 (-0.87, 0.60)	0.703

S9.

Total Density (Aggregate Physician and Nurse Density)				
Independent Variable	2000-2010 N = 108; R² = 0.223		1990-1999 n = 46; R² = 0.159	
	β (CI)	P-value	β (CI)	P-value
Total Health Worker Density	0.45 (-0.09, 0.99)	0.099	-0.11 (-0.78, 0.57)	0.742
GDP per Capita	0.26 (-0.22, 0.74)	0.277	0.10 (-0.38, 0.57)	0.680
Land Area	0.03 (-0.19, 0.24)	0.798	-0.05 (-0.18, 0.09)	0.477
Population	-0.004 (-0.19, 0.18)	0.969	0.04 (-0.12, 0.19)	0.611
2004 DALY Estimates	0.06 (-0.29, 0.41)	0.734	0.24 (-0.18, 0.66)	0.248
Hospital Beds	-0.14 (-0.48, 0.20)	0.419	0.42 (0.04, 0.81)	0.033
Access to an Improved Water Source	-0.07 (-0.25, 0.11)	0.420	-0.03 (-0.21, 0.14)	0.707
Private (% of GDP)	0.06 (-0.31, 0.44)	0.732	0.11 (-0.44, 0.65)	0.691

S10.

Physician Density (Disaggregate)/Nurse (Disaggregate)				
Independent Variable	2000-2010 N = 108; R² = 0.244		1990-1999 n = 46; R² = 0.185	
	β (CI)	P-value	β (CI)	P-value
Physician Density	-0.12 (-0.52, 0.27)	0.543	-0.30 (-0.71, 0.11)	0.142
Nurse Density	0.42 (0.05, 0.80)	0.028	0.07 (-0.43, 0.58)	0.768
GDP per Capita	0.27 (-0.20, 0.74)	0.257	0.02 (-0.44, 0.48)	0.920
Land Area	0.03 (-0.20, 0.26)	0.782	-0.06 (-0.20, 0.07)	0.318
Population	0.02 (-0.20, 0.23)	0.863	0.06 (-0.09, 0.21)	0.446
2004 DALY Estimates	-0.08 (-0.50, 0.33)	0.688	0.14 (-0.32, 0.59)	0.545
Hospital Beds	-0.12 (-0.44, 0.21)	0.475	0.46 (0.06, 0.86)	0.026
Access to an Improved Water Source	-0.10 (-0.31, 0.10)	0.318	-0.06 (-0.26, 0.14)	0.560
Private (% of GDP)	0.06 (-0.31, 0.43)	0.747	0.13 (-0.42, 0.67)	0.638

S11.

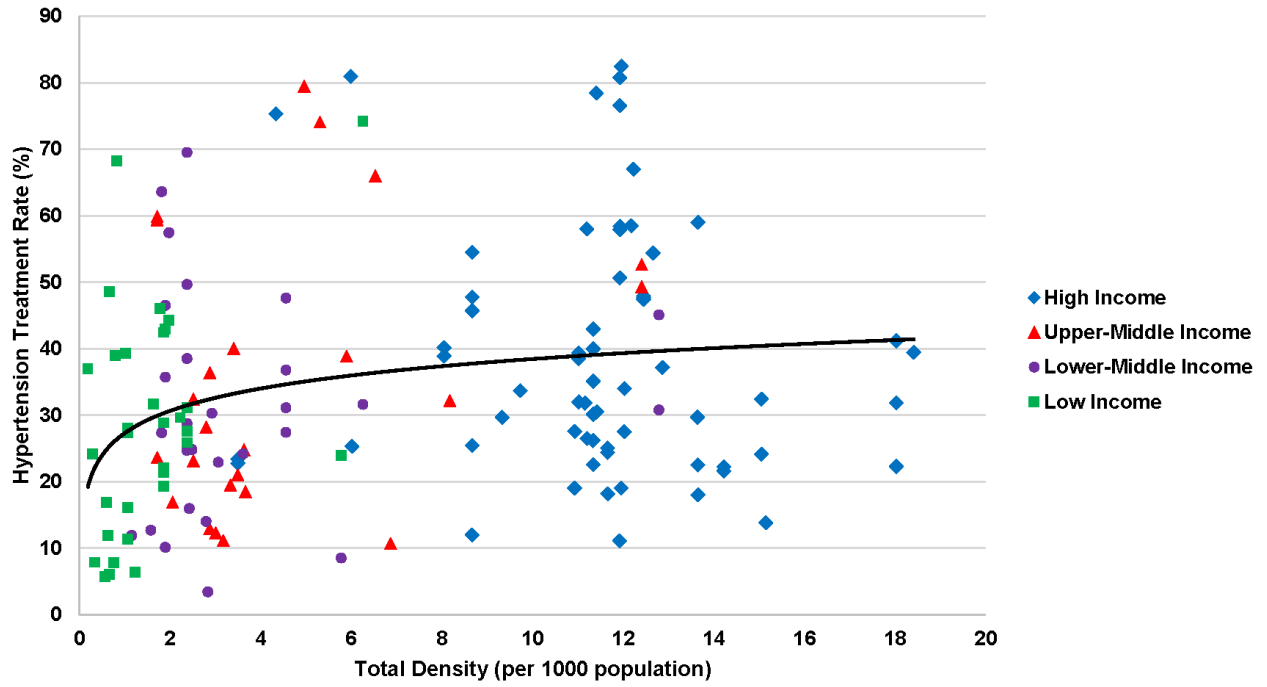
Physician Density (separate regression)				
Independent Variable	2000-2010 N = 108; R² = 0.200		1990-1999 n = 46; R² = 0.183	
	β (CI)	P-value	β (CI)	P-value
Physician Density	-0.09 (-0.48, 0.30)	0.645	-0.28 (-0.72, 0.17)	0.212
GDP per Capita	0.41 (-0.08, 0.89)	0.098	0.06 (-0.38, 0.50)	0.778
Land Area	0.07 (-0.17, 0.32)	0.544	-0.06 (-0.16, 0.05)	0.292
Population	-0.01 (-0.25, 0.22)	0.899	0.05 (-0.09, 0.19)	0.464
2004 DALY Estimates	-0.03 (-0.45, 0.38)	0.879	0.15 (-0.28, 0.58)	0.468
Hospital Beds	0.003 (-0.34, 0.34)	0.985	0.47 (0.10, 0.84)	0.014
Access to an Improved Water Source	-0.02 (-0.20, 0.17)	0.866	-0.05 (-0.23, 0.13)	0.574
Private (% of GDP)	0.07 (-0.29, 0.42)	0.701	0.12 (-0.42, 0.65)	0.653

S12.

Nurse Density (Separate Regression)				
Independent Variable	2000-2010 N = 108; R² = 0.240		1990-1999 n = 46; R² = 0.156	
	β (CI)	P-value	β (CI)	P-value
Nurse Density	0.41 (0.04, 0.78)	0.029	-0.04 (-0.59, 0.50)	0.874
GDP per Capita	0.25 (-0.20, 0.70)	0.273	0.08 (-0.37, 0.54)	0.711
Land Area	0.03 (-0.19, 0.25)	0.793	-0.05 (-0.19, 0.09)	0.458
Population	0.01 (-0.19, 0.20)	0.941	0.04 (-0.12, 0.20)	0.607
2004 DALY Estimates	-0.02 (-0.36, 0.32)	0.908	0.26 (-0.17, 0.69)	0.233
Hospital Beds	-0.13 (-0.46, 0.20)	0.419	0.41 (0.03, 0.79)	0.036
Access to an Improved Water Source	-0.10 (-0.30, 0.10)	0.311	-0.03 (-0.23, 0.16)	0.727
Private (% of GDP)	0.07 (-0.30, 0.43)	0.712	0.11 (-0.43, 0.65)	0.684

Supplemental Figure.

S1.



Relationship between total health care worker density and hypertension treatment rates worldwide, with countries of different income classification indicated. Solid curve is derived from the fully adjusted model.