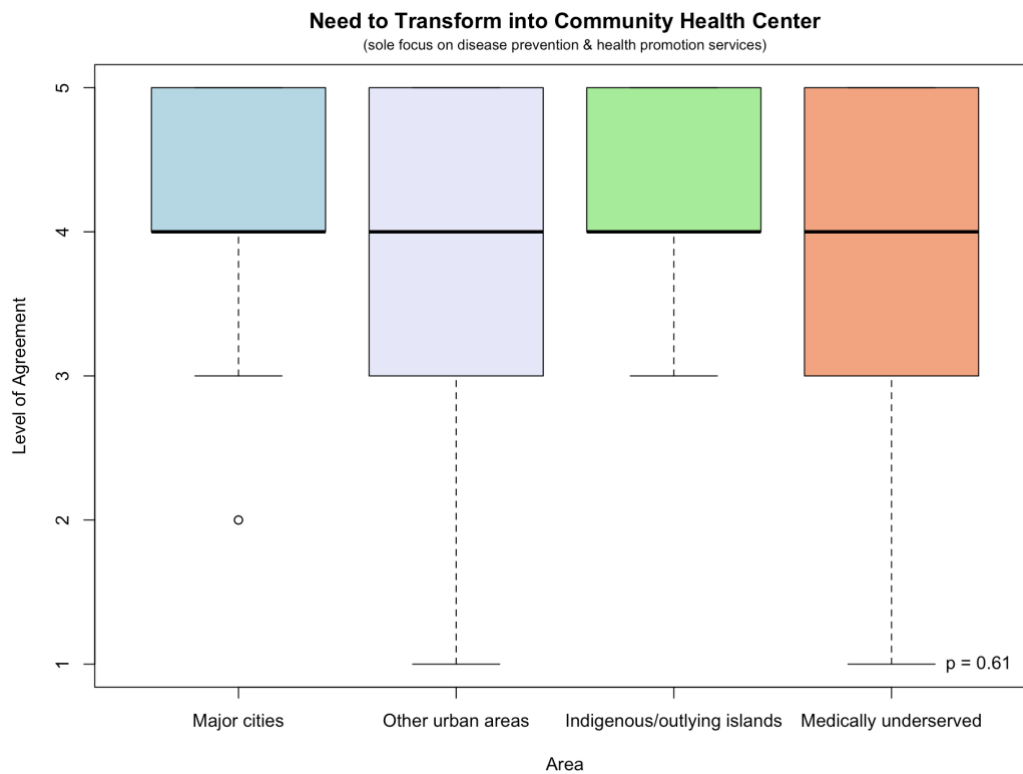**Part 0: Is PHC workers' support for transforming Public Health Centers (衛生所) into prevention & promotion-focused Community Health Centers (社區健康中心) associated with area?**

Need to Transform into Community Health Center
(sole focus on disease prevention & health promotion services)

There is no significant difference between areas. It seems like **PHC workers all across Taiwan, regardless of area, feel inclined to support a functional transformation of PHCs**.

➔ If area is not the main determining predictor, then what factors influence this perception?

Part 1: Exploratory Factor Analysis

4 hypothesized latent factors:

1. Stress-related: "fatigue_01", "fatigue_02", "fatigue_03", "fatigue_04","fatigue_05", "Job_Burnout", "KPI_Stress"

2. Working Environment: 'Responsibility_Clarity', 'Workload_Reasonable', 'Authority_Understanding', 'Opinion_Expression', 'cowork_help', 'boss_flex', 'talk_boss'

3. Functions of 衛生所: 'Health_Center_1', 'Health_Center_2', 'Health_Center_3', 'Health_Center_4', 'Health_Center_5', 'Health_Center_6', 'Health_Center_7'

4. Community collaborations: "CareSystem", "Understand_CommunityNeeds", "TailoredServices", "ResourceIntegration", "BuildCommunityTrust", "CooperationWithInstitutions", "CompetitionWithInstitutions"

5 levels were suggested in the first screening:

```
> print(fa_test$loadings, cutoff = 0.3)

Loadings:
                            PA3    PA2    PA1    PA5    PA4
fatigue_01                 0.678
fatigue_02                 0.752
fatigue_03                 0.879
fatigue_04                 0.837
fatigue_05                 0.934
Job_Burnout                0.357              -0.409
KPI_Stress                               -0.440  0.379
Responsibility_Clarity                    0.552
Workload_Reasonable                       0.826
Authority_Understanding                   0.562
Opinion_Expression                        0.611
cowork_help                                     0.519
boss_flex                                 0.572
talk_boss                                              0.537
Health_Center_1                    0.490   0.391
Health_Center_2                    0.579
Health_Center_3                    0.533
Health_Center_4                    0.577
Health_Center_5                    0.748
Health_Center_6                    0.881
Health_Center_7                    0.637
CareSystem                  0.866
Understand_CommunityNeeds   0.799
TailoredServices            0.879
ResourceIntegration         0.863
BuildCommunityTrust         0.348
CooperationWithInstitutions 0.476
CompetitionWithInstitutions                            -0.373
```

Remove variables that load to >1 factors (KPI_Stress, Job_Burnout, Health_Center_1). Then 4 levels were suggested.

```
> print(fa_test$loadings, cutoff = 0.3)

Loadings:
                            PA3    PA1    PA2    PA4
fatigue_01                 0.763
fatigue_02                 0.823
fatigue_03                 0.870
fatigue_04                 0.799
fatigue_05                 0.958
Responsibility_Clarity                          0.435
Workload_Reasonable                             0.416
Authority_Understanding           0.446
Opinion_Expression                              0.584
cowork_help                                     0.345
boss_flex                                       0.584
talk_boss                                       0.415
Health_Center_2                   0.649
Health_Center_3                   0.516  0.307
Health_Center_4                   0.474
Health_Center_5                   0.823
Health_Center_6                   0.885
Health_Center_7                   0.530
CareSystem                               0.850
Understand_CommunityNeeds                0.757
TailoredServices                         0.832
ResourceIntegration                      0.782
BuildCommunityTrust               0.432
CooperationWithInstitutions              0.491
CompetitionWithInstitutions
```

Remove variables that don't load to any factor

(CompetitionWithInstitutions and cowork_help)

```
Loadings:
                            PA3    PA2    PA1    PA4
fatigue_01                 0.762
fatigue_02                 0.817
fatigue_03                 0.853
fatigue_04                 0.795
fatigue_05                 0.956
Responsibility_Clarity                          0.463
Workload_Reasonable                             0.603
Authority_Understanding                  0.327   0.351
Opinion_Expression                              0.662
boss_flex                                       0.589
talk_boss                                       0.309
Health_Center_2                          0.621
Health_Center_3                          0.561
Health_Center_4                          0.520
Health_Center_5                          0.862
Health_Center_6                          0.942
Health_Center_7                          0.582
CareSystem                  0.872
Understand_CommunityNeeds   0.776
TailoredServices            0.850
ResourceIntegration         0.812
BuildCommunityTrust                             0.392
CooperationWithInstitutions        0.483
```

Remove the variable with the lowest loading (talk_boss)

```
Loadings:
                            PA3    PA2    PA1    PA4
fatigue_01                 0.722
fatigue_02                 0.791
fatigue_03                 0.845
fatigue_04                 0.799
fatigue_05                 0.949
Responsibility_Clarity                          0.537
Workload_Reasonable                             0.707
Authority_Understanding                         0.448
Opinion_Expression                              0.638
boss_flex                                       0.589
Health_Center_2                   0.603
Health_Center_3                   0.543
Health_Center_4                   0.534
Health_Center_5                   0.835
Health_Center_6                   0.937
Health_Center_7                   0.589
CareSystem                  0.875
Understand_CommunityNeeds   0.789
TailoredServices            0.865
ResourceIntegration         0.835
BuildCommunityTrust         0.304           0.356
CooperationWithInstitutions 0.477
```

Remove the variable that load to >1 factors (`BuildCommunityTrust`)

```
Loadings:
                             PA3    PA2    PA1    PA4
fatigue_01                  0.724
fatigue_02                  0.795
fatigue_03                  0.844
fatigue_04                  0.797
fatigue_05                  0.951
Responsibility_Clarity                           0.537
Workload_Reasonable                              0.702
Authority_Understanding                          0.446
Opinion_Expression                               0.641
boss_flex                                        0.590
Health_Center_2                    0.606
Health_Center_3                    0.540
Health_Center_4                    0.531
Health_Center_5                    0.805
Health_Center_6                    0.920
Health_Center_7                    0.582
CareSystem                  0.868
Understand_CommunityNeeds   0.777
TailoredServices            0.855
ResourceIntegration         0.819
CooperationWithInstitutions 0.477
```
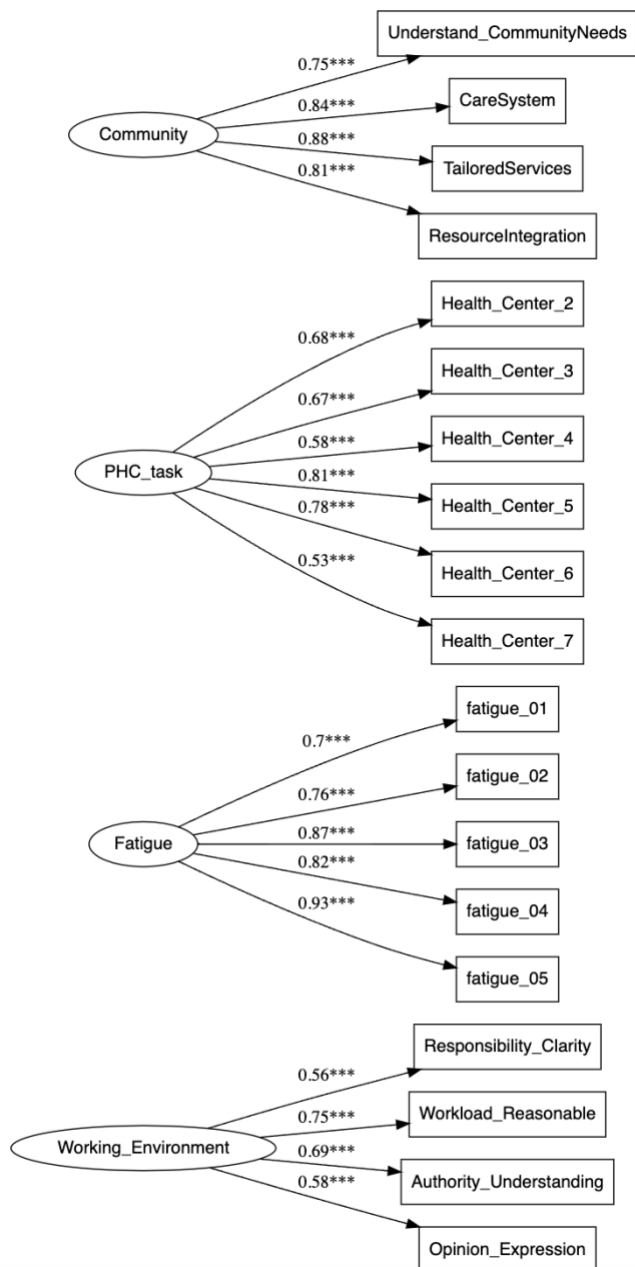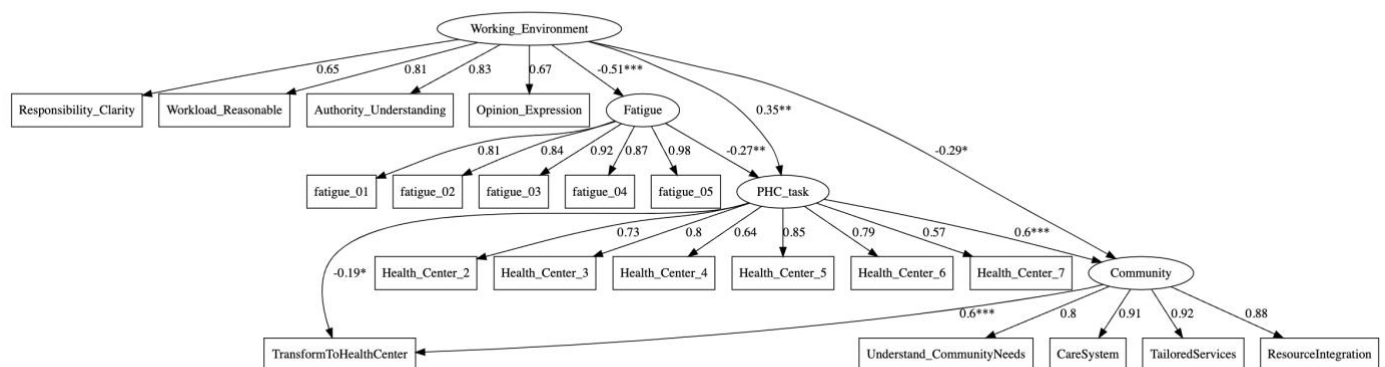
➔ Cleaned. We can use these latent factors to calculate alphas.

Alphas

Latent factor	Raw alpha	Recommendation	New alpha
Fatigue	0.9067	-	0.9067
Working Environment	0.7125	Drop `boss_flex`	0.7396
PHC Functions	0.8309	-	0.8309
Community Participation	0.8580	Drop `CooperationWithInstitutions`	0.8883
References	0.70-0.79 = acceptable, 0.80-0.89 = good, >=0.90 = excellent		

Part 2: Confirmatory Factor Analysis

Goodness of Fit Indices

	χ²	df	χ²/df	χ² p	CFI	TLI	RMSEA (90% CI)	SRMR
Model	256.79	146	1.76	< 0.001	0.915	0.901	0.075 (0.059-0.090)	0.065
Recommendations	–	–	< 2	> 0.05	> 0.9	> 0.9	< 0.05 = good, < 0.08 = acceptable	< 0.08

```
> AVE(fit_cfa) # > 0.36 = acceptable
Working_Environment            Fatigue
             0.424               0.679
          PHC_task          Community
             0.473               0.669
```

➔   Goodness of fit indicators and AVEs all look good. Proceed to SEM.

Part 3: Structural Equation Modeling

Earlier steps are not included for conciseness. See R code for the full testing process.

```
sem_test4 <- '

  Working_Environment =~ Responsibility_Clarity + Workload_Reasonable + Authority_Understanding + Opinion_Expression

  Fatigue =~ fatigue_01 + fatigue_02 + fatigue_03 + fatigue_04 + fatigue_05

  PHC_task =~ Health_Center_2 + Health_Center_3 + Health_Center_4 + Health_Center_5 + Health_Center_6 + Health_Center_7

  Community =~ Understand_CommunityNeeds + CareSystem + TailoredServices + ResourceIntegration


  Fatigue ~ Working_Environment

  PHC_task ~ Working_Environment + Fatigue

  TransformToHealthCenter ~ PHC_task + Community


  PHC_task ~~ Community

  Community ~~ Fatigue

'
```

Goodness of Fit Indices

	χ²	*df*	χ²/*df*	χ² *p*	CFI	TLI	RMSEA (90% CI)	SRMR
Model	219.946	164	1.34	0.002	0.995	0.994	0.050 (0.031-0.067)	0.078
Recommendations	–	–	< 2	> 0.05	> 0.9	> 0.9	< 0.05 = good, < 0.08 = acceptable	< 0.08

R^2 for TransformToHealthCenter: 0.290 → The model explained **29% of the variance** in PHC workers' support for the transformation of PHCs into prevention & promotion-focused community health centers.
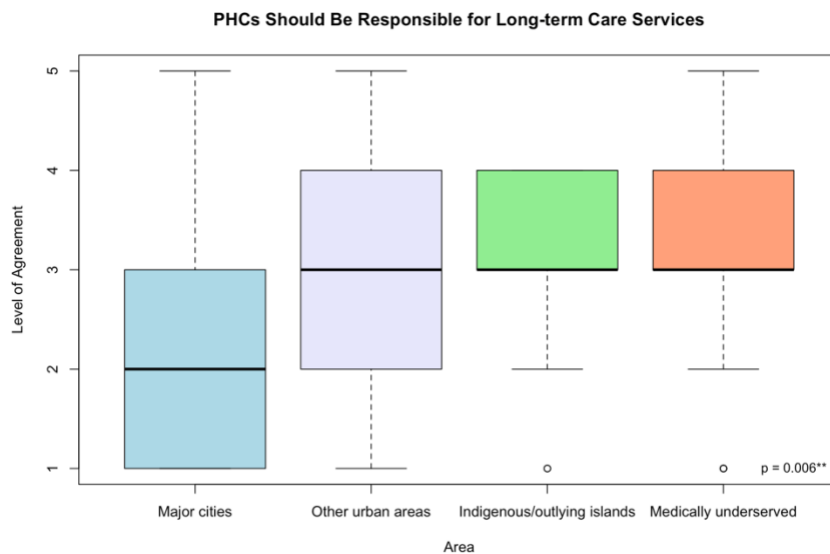
Interpretation

Path	Std. Estimate	p-value	Interpretation
Working_Environment → Fatigue	-0.510	<0.001	Better working environment is strongly associated with lower fatigue.
Fatigue → PHC_task	-0.270	0.002	Higher fatigue is associated with lower agreement with defined PHC tasks.
Working_Environment → PHC_task	0.355	0.006	Better working environment predict higher agreement with defined PHC tasks.
Working_Environment → Community	-0.286	0.015	Better working environment is linked to lower community orientation. *(unexpected direction)*
PHC_task → Community	0.603	<0.001	Higher agreement with defined PHC tasks is strongly associated with stronger community orientation.
PHC_task → TransformToHealthCenter	-0.190	0.017	Higher agreement with defined PHC tasks is linked with less likelihood to support transformation.
Community → TransformToHealthCenter	0.598	< 0.001	Stronger community orientation is a significant positive predictor of support for transformation.

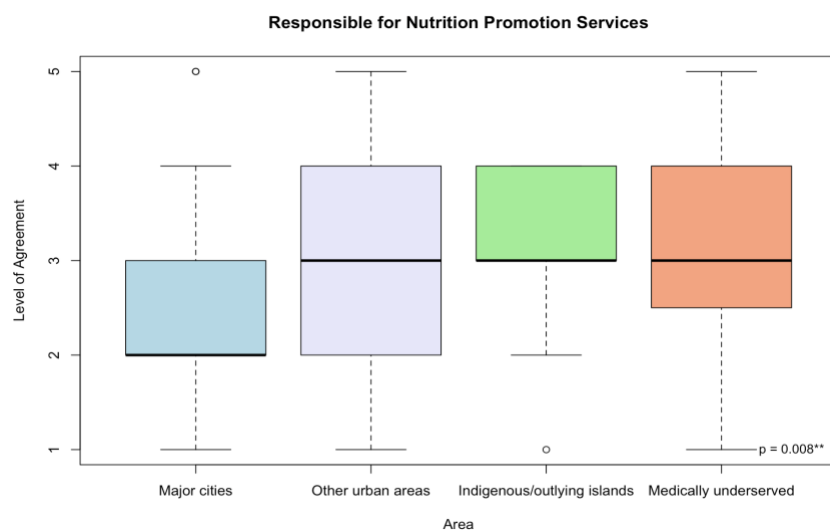# Part 4: Between-area differences for specific PHC functions

Kruskal-Wallis test *p*-values

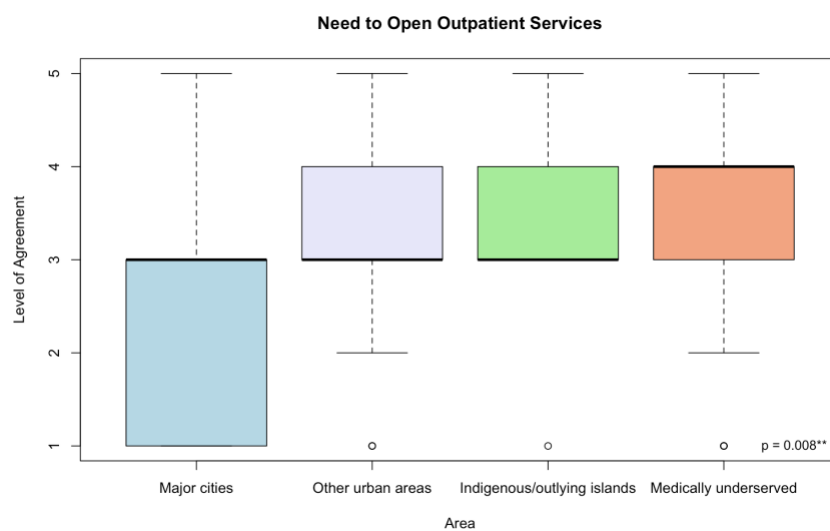$Health_Center_1 $Health_Center_2 $Health_Center_3 $Health_Center_4 $Health_Center_5 $Health_Center_6 $Health_Center_7
[1] 0.08122356   [1] 0.006044878   [1] 0.1758404   [1] 0.3415671   [1] 0.07343838   [1] 0.008343586   [1] 0.007907299

PHCs Should Be Responsible for Long-term Care Services

→ Less support in major cities.

Responsible for Nutrition Promotion Services

→ Less support in major cities.

Need to Open Outpatient Services

→ More support in medically underserved areas.