

The Futures Initiative: the 10 Essential Public Health Services

A Psychometric Analysis of Accreditation Data

As the public health field commemorates the 25th anniversary of the Essential Public Health Services (EPHS) and considers potential revisions to that framework, it is helpful to consider data about how health departments engage in the provision of those services. The Public Health Accreditation Board (PHAB) Standards & Measures for the accreditation of state, Tribal, local, territorial, and army health departments are organized into 12 domains—the first ten of which are based on the Essential Public Health Services. Since PHAB accredited the first health department in 2013, PHAB has been compiling data on how health departments were assessed by a team of peer site visitors against these measures. As such, it is the only source of peer-reviewed data on health department capacity in these areas. This report uses PHAB data to better understand how well the components within each EPHS—as defined through the PHAB standards—relate to each other. In other words, do the specific PHAB requirements within one domain correlate strongly with each other to describe one core concept? It also examines how well the domains correlate with each other and with the overall capacity of the health department.

Key Findings

Based on the analyses described in the following pages, several key themes emerge:

- Collectively, the content described in the PHAB domains presents a cohesive picture of health department capacity. This is demonstrated through the factor analysis, showing one principal component. In addition, there are statistically significant correlations ($p < 0.000$) across all pairings of domains. This interconnectedness among these domains supports the idea that the domains (and, by extension, the EPHS) paint a coherent picture of public health capacity.
- While all the domains are significantly correlated, some are more strongly correlated than others. For example, Domain 3 (Inform and Educate about Public Health Issues and Functions) tends to have stronger correlations with other domains. In contrast, Domains 8 (Maintain a Competent Public Health Workforce) and 12 (Maintain Capacity to Engage the Public Health Governing Entity) have weaker correlations with other domains.
- Within each domain, the standards are correlated with each other. This suggests that overall each of the standards—or key components within the domain—represent concepts that are related to each other.
- The within-domain correlations are particularly strong for Domain 2 (Investigate Health Problems and Environmental Public Health Hazards to Protect the Community). On the other hand, Standard 5.4 (Maintain an all hazards emergency operations plan) has relatively weak correlations with the other standards within Domain 5 (Develop Public Health Policies and Plans).

This report begins with background information about PHAB and a description of the methodology. It is followed by findings related to the factor analysis and then correlations across domains and within domains.

Background

The national accreditation program, administered by the Public Health Accreditation Board, is designed to improve and protect the health of the public by advancing and ultimately transforming the quality and performance of governmental public health departments. With support from the Centers for Disease Control and Prevention (CDC) and the Robert Wood Johnson Foundation, PHAB developed a consensus set of standards for public health and launched the accreditation program in 2011.

Since February 2013, when the first health departments were accredited, through July 2019, PHAB has accredited:

- 36 state health departments;
- 229 local health departments;
- 3 Tribal health departments; and
- 1 integrated system (comprised of 67 local health departments in one centralized state).

Health departments' conformity with each measure is assessed in a Site Visit Report, which is prepared by peer reviewers and forms the basis of the Accreditation Committee's determination of accreditation status. The assessments reflect how well, in the professional judgement of volunteer reviewers, health departments are able to provide documentation of the specific requirements in the Standards & Measures (https://www.phaboard.org/wp-content/uploads/2019/01/PHABSM_WEB_LR1.pdf).

There are approximately 100 measures, which are organized into standards, and then into 12 domains. The domains are based on the 10 Essential Public Health Services (EPHS), plus administration and management and the health department's relationship with its governing entity. PHAB describes those concepts in this way: "Domains are groups of standards that pertain to a broad group of public health services....Standards are the required level of achievement that a health department is expected to meet. Measures provide a way of evaluating if the standard is met."¹ This analysis focuses on the domains because they are the representations of the EPHS, as well as on the standards as a means of exploring the connectiveness between the core components within those domains.

¹ https://www.phaboard.org/wp-content/uploads/2019/01/PHABSM_WEB_LR1.pdf, page 2

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Methodology

This analysis is based on 311 state and local health departments whose performance against the Standards and Measures had been assessed as of July 2019. (Note: some of the health departments in this analysis were still progressing through the accreditation process.)

Peer reviewers assess each of the measures as being Fully Demonstrated, Largely Demonstrated, Slightly Demonstrated, or Not Demonstrated. For the basis of this analysis, these assessments were translated into numeric values—with Fully Demonstrated assigned the value 4 and Not Demonstrated assigned the value 1. All of the assessments are at the measure level; however, to better understand the domains, those measure scores were aggregated in the following manner.

- For each of the 12 domains, a domain score was generated for each health department by averaging its scores for all the measures within the domain.
- For each of the 32 standards, a standard score was generated for each health department by averaging its scores for all the measures within the standard.
- An overall performance score was generated for each health department by averaging its scores for all measures.

A factor analysis was conducted utilizing data from all domains. This analysis attempts to collapse variables by assessing their interdependencies (covariances) and using the strength of those relationships to infer underlying common concepts.

Next, several correlation matrices were generated.

- The correlation between each domain and the overall performance score. This further highlights the relationships between performance on a particular domain with the performance of the health department overall.
- A correlation matrix across the domains, showing how the performance of each domain relates to the performance of every other domain.
- For each domain, a correlation matrix for the standards within that domain. This illustrates how well the key facets within the domain align.

There are several limitations to consider related to these measure data. First, the assessments are based on the specific requirements in the Standards & Measures. Thus, it is possible that some of the variation in performance on these measures may be related to those requirements and how they are assessed rather than underlying capacities. PHAB is in the process of compiling recommendations that will inform a revision of the Standards & Measures. Second, the number of measures in each standard and the number of standards in each domain varies. If a domain has only two standards, for example, there is limited analysis on how the concepts within that domain relate to each other. Third, for some measures, there is limited variation in the distribution of assessments—for example, there are several measures where more than 90% of health departments were assessed as Fully Demonstrated. If a standard has a limited number of measures and health departments predominantly received the same assessment for those measures, it may be difficult to identify statistically significant correlations. When there is limited variation in a variable entered into a correlation matrix it may be harder to detect patterns in the relationships between that variable and other variables. Fourth, although the first 10 domains are based

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on the 10 EPHS, they are not identical to them. In particular, PHAB's Domain 9 has more of an emphasis on quality improvement and performance management than it does on evaluation, as stated in EPHS #9. Finally, these data are only from health departments that are seeking voluntary accreditation. As such, these results may not be generalizable to all health departments. Because these health departments have prepared for accreditation, there may be less variation in their assessments, which would affect the analysis of the relationships between the domains.

Results

Descriptive Statistics

Table 1 presents the 12 domains, along with the average score for all the measures within each domain. A score of 4 represents Fully Demonstrated. **When reviewing the score, it is important to note that this analysis is based on these initial assessments of conformity.** However, more than 40% of health departments are required to complete an Action Plan and demonstrate progress on these measures before they are accredited. As such, information on the initial assessment does not reflect the current capacity of accredited health departments. Instead, it reflects the areas in which health departments initially faced challenges.

Table 1. Mean scores for each domain

Domain	Mean Score
1: Conduct and disseminate assessments focused on population health status and public health Issues facing the community	3.5
2: Investigate Health Problems and Environmental Public Health Hazards to Protect the Community	3.6
3: Inform and Educate about Public Health Issues and Functions	3.5
4: Engage with the Community to Identify and Address Health Problems	3.6
5: Develop Public Health Policies and Plans	3.4
6: Enforce Public Health Laws	3.6
7: Promote Strategies to Improve Access to Health Care	3.5
8: Maintain a Competent Public Health Workforce	3.6
9: Evaluate and Continuously Improve Processes, Programs, and Interventions	3.4
10: Contribute to and Apply the Evidence Base of Public Health	3.5
11: Maintain Administrative and Management Capacity	3.7
12: Maintain Capacity to Engage the Public Health Governing Entity	3.6

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Table 2 presents the 32 standards, along with the average score for measures within each standard.

Table 2. Mean scores for each standard

Standard	Mean Score
1.1: Participate in or lead a collaborative process resulting in a comprehensive community health assessment	3.5
1.2: Collect and maintain reliable, comparable, and valid data that provide information on conditions of public health importance and on the health status of the population	3.5
1.3: Analyze public health data to identify trends in health problems, environmental public health hazards, and social and economic factors that affect the public's health	3.5
1.4: Provide and use the results of health data analysis to develop recommendations regarding public health policies, processes, programs, or interventions	3.6
2.1: Conduct timely investigations of health problems and environmental public health hazards	3.6
2.2: Contain/mitigate health problems and environmental public health hazards	3.5
2.3: Ensure access to laboratory and epidemiological/environmental public health expertise and capacity to investigate and contain/mitigate public health problems and environmental public health hazards	3.6
2.4: Maintain a plan with policies and procedures for urgent and non-urgent communications	3.6
3.1: Provide health education and health promotion policies, programs, processes, and interventions to support prevention and wellness	3.3
3.2: Provide information on public health issues and public health functions through multiple methods to a variety of audiences	3.7
4.1: Engage with the public health system and the community in identifying and addressing health problems through collaborative processes	3.5
4.2: Promote the community's understanding of and support for policies and strategies that will improve the public's health	3.7
5.1: Serve as a primary and expert resource for establishing and maintaining public health policies, practices, and capacity	3.6
5.2: Conduct a comprehensive planning process resulting in a Tribal/state/community health improvement plan	3.3
5.3: Develop and implement a health department organizational strategic plan	3.4
5.4: Maintain an all hazards emergency operations plan	3.4
6.1: Review existing laws and work with governing entities and elected/appointed officials to update as needed	3.4
6.2: Educate individuals and organizations on the meaning, purpose, and benefit of public health laws and how to comply	3.8
6.3: Conduct and monitor public health enforcement activities and coordinate notification of violations among appropriate agencies	3.5
7.1: Assess health care service capacity and access to health care services	3.4
7.2: Identify and implement strategies to improve access to health care services	3.6
8.1: Encourage the development of a sufficient number of qualified public health workers	3.8

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8.2: Ensure a competent workforce through the assessment of staff competencies, the provision of individual training and professional development, and the provision of a supportive work environment	3.6
9.1: Use a performance management system to monitor achievement of organizational objectives	3.4
9.2: Develop and implement quality improvement processes integrated into organizational practice, programs, processes, and interventions	3.3
10.1: Identify and use the best available evidence for making informed public health practice decisions	3.7
10.2: Promote understanding and use of the current body of research results, evaluations, and evidence-based practices with appropriate audiences	3.6
11.1: Develop and maintain an operational infrastructure to support the performance of public health functions	3.6
11.2: Establish effective financial management system	3.8
12.1: Maintain current operational definitions and statements of public health roles, responsibilities, and authorities	3.9
12.2: Provide information to the governing entity regarding public health and the official responsibilities of the health department and of the governing entity	3.6
12.3: Encourage the governing entity's engagement in the public health department's overall obligations and responsibilities	3.3

Factor Analysis

The factor analysis, conducted using data from the 12 domains, indicates a strong, single factor that underlies all of the variance in the data. In fact, this single factor is responsible for 50% of the variance across the resulting scores from the 12 domains. The next factor identified is only tied to 7%. This large difference indicates that the data is measuring one component across all health departments. Further, this result supports the concept that the domains represent one coherent concept of health department capacity.

Analysis Across the Domains

Looking across the domains, the aggregate score for each domain is highly correlated with the health department's overall score. As shown in the last row of Table 3, the Pearson's R ranges from 0.527 for Domain 5 (Develop Public Health Policies and Plans) to 0.798 for Domain 3 (Inform and Educate about Public Health Issues and Functions). In total, eight of the 12 domains (Domains 1,2,3,4,5,6,9,11) have a correlation of at least 0.7 with the overall score, suggesting that the concepts in those domains are well linked to the health departments' overall assessment of capacity.

Each domain is also statistically significantly correlated ($p < 0.000$) with every other domain, although there is considerably more variation in the strength of that correlation. The most highly correlated ($r = 0.606$) pair of domains is Domain 2 (Investigate Health Problems and Environmental Public Health Hazards to Protect the Community) and Domain 6 (Enforce Public Health Laws). Whereas Domain 6 and Domain 8 (Maintain a Competent Public Health Workforce) have the weakest correlation ($r = 0.267$). In general, Domain 3 has strong correlations with many other domains, which may suggest that the

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function of informing and educating the public may have particularly strong overlap with other functions. On the other hand, Domains 8 and 12 (12: Maintain Capacity to Engage the Public Health Governing Entity) have weaker correlations with the other domains.

Table 3. Correlation matrix for 12 domains

Pearson Correlation Coefficients, N = 311
Prob > |r| under H0: Rho=0

	dom1	dom2	dom3	dom4	dom5	dom6	dom7	dom8	dom9	dom10	dom11	dom12	overallscore
dom1	1.000	0.510 0.000	0.581 0.000	0.576 0.000	0.582 0.000	0.455 0.000	0.500 0.000	0.372 0.000	0.507 0.000	0.456 0.000	0.549 0.000	0.381 0.000	0.786 0.000
dom2	0.510 0.000	1.000	0.571 0.000	0.545 0.000	0.396 0.000	0.606 0.000	0.413 0.000	0.315 0.000	0.379 0.000	0.385 0.000	0.469 0.000	0.367 0.000	0.740 0.000
dom3	0.581 0.000	0.571 0.000	1.000	0.584 0.000	0.549 0.000	0.527 0.000	0.522 0.000	0.414 0.000	0.563 0.000	0.490 0.000	0.516 0.000	0.435 0.000	0.798 0.000
dom4	0.576 0.000	0.545 0.000	0.584 0.000	1.000	0.456 0.000	0.447 0.000	0.438 0.000	0.392 0.000	0.437 0.000	0.470 0.000	0.502 0.000	0.321 0.000	0.709 0.000
dom5	0.582 0.000	0.396 0.000	0.549 0.000	0.456 0.000	1.000	0.455 0.000	0.453 0.000	0.364 0.000	0.554 0.000	0.435 0.000	0.521 0.000	0.385 0.000	0.754 0.000
dom6	0.455 0.000	0.606 0.000	0.527 0.000	0.447 0.000	0.455 0.000	1.000	0.454 0.000	0.267 0.000	0.457 0.000	0.365 0.000	0.544 0.000	0.363 0.000	0.728 0.000
dom7	0.500 0.000	0.413 0.000	0.522 0.000	0.438 0.000	0.453 0.000	0.454 0.000	1.000	0.318 0.000	0.409 0.000	0.394 0.000	0.514 0.000	0.306 0.000	0.676 0.000
dom8	0.372 0.000	0.315 0.000	0.414 0.000	0.392 0.000	0.364 0.000	0.267 0.000	0.318 0.000	1.000	0.442 0.000	0.339 0.000	0.369 0.000	0.298 0.000	0.527 0.000
dom9	0.507 0.000	0.379 0.000	0.563 0.000	0.437 0.000	0.554 0.000	0.457 0.000	0.409 0.000	0.442 0.000	1.000	0.349 0.000	0.462 0.000	0.428 0.000	0.721 0.000
dom10	0.456 0.000	0.385 0.000	0.490 0.000	0.470 0.000	0.435 0.000	0.365 0.000	0.394 0.000	0.339 0.000	0.349 0.000	1.000	0.404 0.000	0.343 0.000	0.601 0.000
dom11	0.549 0.000	0.469 0.000	0.516 0.000	0.502 0.000	0.521 0.000	0.544 0.000	0.514 0.000	0.369 0.000	0.462 0.000	0.404 0.000	1.000	0.426 0.000	0.736 0.000
dom12	0.381 0.000	0.367 0.000	0.435 0.000	0.321 0.000	0.385 0.000	0.363 0.000	0.306 0.000	0.298 0.000	0.428 0.000	0.343 0.000	0.426 0.000	1.000	0.581 0.000
overallscore	0.786 0.000	0.740 0.000	0.798 0.000	0.709 0.000	0.754 0.000	0.728 0.000	0.676 0.000	0.527 0.000	0.721 0.000	0.601 0.000	0.736 0.000	0.581 0.000	1.000

Each cell presents the Pearson's R correlation coefficient above the p value. All p values less than 0.05 are highlighted in blue. For each row, the strongest correlation is highlighted in green and the weakest correlation is highlighted in yellow.

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Analysis Within the Domains

A correlation matrix was generated for each domain to describe the relationships of standards within that domain. The number of standards within each domain ranges from 2 (which means that there is only 1 pair of standards in the correlation matrix) to 4 (which means there are 6 pairs in the correlation matrix). The set of correlation matrices is available in the Appendix.

In all cases, the correlations between standards within each domain is statistically significant ($p < 0.000$) and the correlation is at least 0.200.

Table 4 provides an overview of the strength of the correlations within each domain. It shows the number of pairs within each domain that have correlations within several ranges. The cells that are color coded represent the most common correlation. For example, Domain 2 has a total of six pairs, five of which are very highly correlated; the remaining standard pair is more moderately correlated.

In total, there are 11 within-domain standard pairs that have a correlation of at least 0.500. Standards generally have stronger correlations with other standards in their domain than with standards in other domains. In a correlation matrix that includes all 32 standards (not shown), no between-domain pair of standards is correlated at the 0.500 level. In addition, approximately one-quarter of the between-domain pairs are not significantly correlated or are correlated at levels below 0.200. That is not the case for any of the within-domain pairs.

Table 4. Summary of strength of correlations between pairs of standards within each domain

Domain	Number of pairs of standards with correlations between....				# of pairs in domain
	0.200 & 0.299	0.300 & 0.399	0.400 & 0.499	0.500 & 0.599	
Domain 1		1	2	3	6
Domain 2			1	5	6
Domain 3				1	1
Domain 4			1		1
Domain 5		5		1	6
Domain 6		1	2		3
Domain 7			1		1
Domain 8	1				1
Domain 9				1	1
Domain 10		1			1
Domain 11		1			1
Domain 12	3				3

Domains 2, 3, 4, 7, and 9 have consistently moderate/strong correlations within the domains. This suggests that health departments who are assessed highly in one of the standards, are also assessed highly in the other standards within the domain. This supports the idea that the domain is capturing one core concept.

Below are additional details about the remaining seven domains:

- Domain 1: All but one of the six pairs has a moderate or strong correlation. The one relatively weaker correlation is between Standards 1.1&1.4; however, even that pair has a correlation of $r = 0.381$, suggesting relative consistency in the assessments of the standards throughout this domain.
- Domain 5: Although the correlation between Standards 5.2&5.3 is strong ($r=0.533$), the remaining pairs have lower correlations (ranging between 0.303 & 0.394). In particular, Standard 5.4 has lower correlations with the other three standards in the domain. This may suggest that while health departments generally perform similarly on a range of tasks related to policies and plans, their performance on the standard related to emergency preparedness may be a little different. One hypothesis is that the investment in preparedness funding over the years has affected health departments ability to plan within that particular area more than their general policy work, their community health improvement planning, or strategic planning.

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- Domain 6: Standards 6.1&6.2 have a moderately weak correlation (0.362). Standard 6.2 has one of the highest average scores, so this finding may be related, in part, to limited variation in the assessments for that standard.
 - Domain 8: Standards 8.1&8.2 (the only pair in this domain), have the weakest correlation (0.203) of all the within-domain pairs. However, it is important to note that Standard 8.1 is one of only two standards with just one measure in it. In addition, health departments performed particularly well on this measure—with a mean score of 3.8, it is the second highest mean score of all the standards. As such, the lack of statistical significance may be more related to the consistently high performance on this measure.
 - Domain 10: Standards 10.1&10.2 (the only pair in this domain) have a relatively weak correlation of 0.332. Standard 10.1 is the other standard that has only one measure for local health departments.
 - Domain 11: Standards 11.1&11.2 (the only pair in this domain) has a similar correlation of 0.316. Domain 11 is not one of the EPHS. It contains an assortment of measures related to administration & management, including information systems, financial systems, ethics, among others.
- Domain 12: The correlations between the three standards in Domain 12 range from 0.230 to 0.293. This is the other domain that does not correspond with any of the EPHS. These measures pertain to the relationship between the health department and its governing entity. Standard 12.1 has the highest mean score of all the measures. As such, the lack of statistical significance may be related to the consistently high performance on this measure. In addition, it should be explored whether performance on this measure is correlated strongly with type of governing entity. In which case, it's possible the type of governing entity is driving the variation in performance on this measure, which would have less of an effect in other domains.

Conclusion

This analysis suggests that collectively the concepts represented by the EPHS (as operationalized in the PHAB domains) present a coherent picture of health department capacity. There are strong correlations between many of these domains, particularly between Domain 3 (Inform and Educate about Public Health Issues and Functions) and the other domains.

In addition, the concepts within each of the domains are well aligned. Standards within the same domain tend to have stronger correlations with each other than with the standards in other domains. One standard, which has slightly weaker correlations with the other standards in its domain relates to emergency preparedness planning. This raises the question about where emergency preparedness most closely fits within the EPHS and PHAB frameworks. Because the EPHS do not specifically call out emergency preparedness as its own service, PHAB also does not have one domain dedicated to preparedness. Instead, requirements about preparedness are spread throughout the domains, with this planning standard representing only one of the places in PHAB framework where health departments demonstrate relevant capacities.

Because the PHAB is based on the EPHS framework, these findings may provide insights for consideration in the revisiting of the EPHS.

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Appendix

Below are the correlation matrices for standards within each of the domains.

Domain 1

Pearson Correlation Coefficients, N = 311
Prob > |r| under H0: Rho=0

	1.1	1.2	1.3	1.4
<i>Standard 1.1</i>	1.000	0.450 0.000	0.428 0.000	0.381 0.000
<i>Standard 1.2</i>	0.450 0.000	1.000	0.583 0.000	0.523 0.000
<i>Standard 1.3</i>	0.428 0.000	0.583 0.000	1.000	0.568 0.000
<i>Standard 1.4</i>	0.381 0.000	0.523 0.000	0.568 0.000	1.000

Domain 2

Pearson Correlation Coefficients, N = 311
Prob > |r| under H0: Rho=0

	2.1	2.2	2.3	2.4
<i>Standard 2.1</i>	1.000	0.528 0.000	0.592 0.000	0.450 0.000
<i>Standard 2.2</i>	0.528 0.000	1.000	0.503 0.000	0.564 0.000
<i>Standard 2.3</i>	0.592 0.000	0.503 0.000	1.000	0.544 0.000
<i>Standard 2.4</i>	0.450 0.000	0.564 0.000	0.544 0.000	1.000

Domain 3

Pearson Correlation Coefficients, N = 311
Prob > |r| under H0: Rho=0

	3.1	3.2
<i>Standard 3.1</i>	1.000	0.571 0.000
<i>Standard 3.2</i>	0.571 0.000	1.000

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Domain 4

Pearson Correlation Coefficients, $N = 311$
 Prob $> |r|$ under $H_0: \text{Rho}=0$

	4.1	4.2
Standard 4.1	1.000	0.401 0.000
Standard 4.2	0.401 0.000	1.000

Domain 5

Pearson Correlation Coefficients, $N = 311$
 Prob $> |r|$ under $H_0: \text{Rho}=0$

	5.1	5.2	5.3	5.4
Standard 5.1	1.000	0.390 0.000	0.394 0.000	0.326 0.000
Standard 5.2	0.390 0.000	1.000	0.533 0.000	0.303 0.000
Standard 5.3	0.394 0.000	0.533 0.000	1.000	0.346 0.000
Standard 5.4	0.326 0.000	0.303 0.000	0.346 0.000	1.000

Domain 6

Pearson Correlation Coefficients, $N = 311$
 Prob $> |r|$ under $H_0: \text{Rho}=0$

	6.1	6.2	6.3
Standard 6.1	1.000	0.362 0.000	0.474 0.000
Standard 6.2	0.362 0.000	1.000	0.438 0.000
Standard 6.3	0.474 0.000	0.438 0.000	1.000

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Domain 7

Pearson Correlation Coefficients, N = 311

Prob > |r| under H0: Rho=0

	7.1	7.2
Standard 7.1	1.000	0.476 0.000
Standard 7.2	0.476 0.000	1.000

Domain 8

Pearson Correlation Coefficients, N = 311

Prob > |r| under H0: Rho=0

	8.1	8.2
Standard 8.1	1.000	0.203 0.000
Standard 8.2	0.203 0.000	1.000

Domain 9

Pearson Correlation Coefficients, N = 311

Prob > |r| under H0: Rho=0

	9.1	9.2
Standard 9.1	1.000	0.544 0.000
Standard 9.2	0.544 0.000	1.000

Domain 10

Pearson Correlation Coefficients, N = 311

Prob > |r| under H0: Rho=0

	10.1	10.2
Standard 10.1	1.000	0.332 0.000
Standard 10.2	0.332 0.000	1.000

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Domain 11

Pearson Correlation Coefficients, $N = 311$

Prob $> |r|$ under $H_0: \rho=0$

	11.1	11.2
Standard 11.1	1.000	0.316 0.000
Standard 11.2	0.316 0.000	1.000

Domain 12

Pearson Correlation Coefficients, $N = 311$

Prob $> |r|$ under $H_0: \rho=0$

	12.1	12.2	12.3
Standard 12.1	1.000	0.230 0.000	0.277 0.000
Standard 12.2	0.230 0.000	1.000	0.293 0.000
Standard 12.3	0.277 0.000	0.293 0.000	1.000
