



Assessing Critical Access Hospital (CAH) Assets and Capabilities for Recruiting and Retaining Physicians: The North Dakota CAH Community Apgar Program

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Executive Summary

Community factors play a key role in the recruitment and retention of physicians. While prior workforce studies often investigated characteristics of the candidate-physician, the initial Critical Access Hospital Community Apgar Questionnaire (CAH CAQ) study identified community factors at Idaho critical access hospitals (CAHs) which help determine the success of achieving and maintaining an adequate local physician workforce. The goals of the current study are to identify opportunities for improvement in physician retention and recruitment in North Dakota's CAH systems and to develop a better understanding of the community factors in this dynamic process.

Just as the Apgar score is used to quantify resources and capabilities of the newborn that are indicative of current functioning, the CAH CAQ seeks to serve the same purpose for physician recruitment to communities. It should be noted that the Apgar score of a newborn is not necessarily prognostic of the longer-term outcome and similarly, the CAH CAQ is designed to function as a real-time measure. This study utilized factors important in recruitment and retention that were identified by literature reviews, site visits to critical access hospitals and in discussions with physicians and administrators working at CAHs. Factors were categorized into one of the following five classes: geographic, economic, scope of practice, medical support, or hospital and community support. Each class contains ten factors for a total of 50 factors which were used to comprise the CAH CAQ. A series of three open-ended questions were also

administered to validate the selected factors and identify any factor seen as significant but not addressed within the CHC CAQ tool.

The CAH CAQ was administered in a structured interview to provide consistency of interpretation of the questions among the respondents. A training model was utilized and Aaron Ortiz, Workforce Specialist, Center for Rural Health, The University of North Dakota, School of Medicine and Health Sciences was the North Dakota research consultant. Mr. Ortiz was coached by Dr. David Schmitz, Family Medicine Residency of Idaho, for both interview technique and presentation at three hospital sites. A total of 16 North Dakota CAH communities participated. Across these 16 communities, 15 physicians, one nurse practitioner and 16 administrators participated in the survey for a total respondent sample size of 32. The nurse practitioner was interviewed in place of a physician in one community as the facility did not have a physician available to participate in the study and this nurse practitioner was identified as the lead recruiting provider for an interviewing candidate physician. In the remainder of this document, the clinician respondents will be referred to as “physicians” for simplicity. In each community, the hospital administrator and also the physician identified to have recruiting responsibilities participated individually in the interview process. In some ways this interview protocol was similar to that which would occur with a physician-applicant, including the contact with the lead informants at each community site. CAH CAQ scoring used a method of assigning quantitative values to community strengths and challenges for each factor and then weighing these factors for perceived importance as judged by the respondent. In this way, the most important factors in physician

recruitment, be it an advantage or disadvantage for that community, were weighed for their relative importance and combined to create a Community Apgar score.

The primary limitation of this study is that the communities and respondents that participated in the North Dakota CAH CAP research may not represent the entire eligible respondent classes which may limit the ability to generalize the findings. North Dakota has 36 CAHs of which 16 (36%) were selected to participate in this study. This sample of 16 CAHs was chosen to represent the variety of physician recruitment and retention success and challenge experiences in the entire sample of 36 CAHs. Consequently, the results from the sample of 16 CAHs most likely presents a representative view of the entire population. Another possible limitation is that because factors were limited to 50, other factors may exist that also impact physician workforce. This limitation was accounted for by asking open-ended questions to give each respondent the opportunity to identify any significant missing parameters. Notably, these discussions typically identified factors already contained within the CHC CAQ with the exception of a housing question which will be added in the CAH CAQ 2.0 version of the instrument.

In these 16 communities, results regarding community advantages and challenges identified internet access followed by perception of quality, transfer arrangements, income guarantee and loan repayment as the highest community advantages. Climate, spousal satisfaction, shopping and other services, mental health and access to larger community were identified as the greatest challenges. Some differences between CAH administrator and physician response were noted, particularly in the scope of practice and geographic classes with physician scores for some factors being higher than administrator scores.

The respondent communities identified spousal satisfaction, perception of quality, call and practice coverage, physician workforce stability, loan repayment, and physical plant/equipment as the highest areas of importance. Differences in importance ratings for individual factors occurred between administrators and physicians to a lesser degree. An example was the higher importance rating for social networking among CEOs compared to physician respondents.

The overall rank ordering of classes by mean Community Apgar score in these North Dakota communities was as follows: economic, hospital and community support, medical support, scope of practice, and geographic. Overall, the highest individual factor Community Apgar scores were seen for perception of quality, transfer arrangements, internet access, and loan repayment. The overall lowest individual Community Apgar scores were seen for climate, spousal satisfaction, shopping and other services, mental health and access to larger community. These factors in addition to housing issues were amongst the most frequently mentioned greatest barriers in the open-ended responses. Physicians had higher scores than administrators in the classes of scope of practice and geographic. Examples of differences between administrators and physicians among individual factors include higher administrator scores for nursing workforce and employment status. Physicians had higher scores for competition and emergency room coverage.

As in the case of the original Idaho CAH study and the Wyoming CAH study, the North Dakota CAH CAQ seems to discriminate between communities with greater assets and capabilities and those with lesser assets and capabilities. The 16 communities exhibited cumulative Community Apgar scores ranging from a high of 421 to a low score

of 18 which suggests that the tool had sufficient sensitivity. The CAH CAQ is being used by these communities to assess their relative advantages and challenges, each factor's relative importance, and to gain a better understanding of which factors are seen as most important from the physician point-of-view. This assessment allows for identification of both modifiable and non-modifiable factors and also may suggest which factors are most important for a community to address with limited available resources. The CAH CAQ may have a role in a North Dakota's community's self-evaluation, prioritization of improvement plans, advertising considerations and negotiation strategy for successful recruitment and retention of physicians.

The North Dakota CAH CAQ may also be used to share successful strategies that communities have used to overcome disadvantages which may be difficult to modify. In Idaho, the "Community Apgar Solutions" project allows the sharing of developed best practices across CAHs. Wyoming is also developing a shared "best practices" model. In addition, statewide legislative, policy and research initiatives can be developed from these data to address common problems. The CHC CAQ can also be used to track a community's progress over time. The year two CHC CAQ North Dakota study will demonstrate the impact of this longitudinal assessment as an intervention tool. Finally, the North Dakota CAH CAQ project will add to the national Community Apgar Project as the third state to contribute data to the repository. In conjunction with the initial Idaho research and others to follow, this repository will contribute to the analysis of workforce trends at a broader level over time.

Assessing Critical Access Hospital (CAH) Assets and Capabilities for Recruiting and Retaining Physicians: The North Dakota CAH Community Apgar Program

Introduction

Despite the substantial amount of effort spent to increase the number of physicians in rural communities in the United States, recently published reports indicate the rural physician shortage continues.^{1,2} The Matriculating Student Questionnaire (MSQ) is a survey that is distributed to all first-year medical students in the United States prior to starting medical school.³ Career plans reported on the MSQ are shown to be a significant predictor of practice type and location.⁴ Findings from the 2008 MSQ revealed that only 2.3% of the responding students were planning to serve in a rural or unincorporated area.⁵ The number of physicians per rural resident is also expected to become more of an issue as baby boomers start to age and require more medical attention. The United States Census Bureau predicted that the United States population of age 65 years or older will grow by 60% between 2000 and 2030.⁶

The recruitment and retention of physicians in rural areas is affected by many factors. These factors can be conceptualized into five classes which are geographic, economic, scope of practice, medical support and hospital and community support. Geographic class factors include spousal satisfaction in the community which has been identified as one of the most important factors impacting physician recruitment and retention in rural areas.⁷⁻¹⁰ Another important geographic factor is proximity to extended family.^{7,10} Climate or geographic features as well as recreational facilities had a positive influence on physician practice location.⁷ Other geographic characteristics that influence

practice location choices include access to a variety of social activities, close proximity to larger cities, cultural opportunities, shopping, being raised in a rural area and the education system.^{7,8,11-13}

Economic class issues affect physicians' decisions on their practice location. In one study, over 70% of the responding medical students indicated that guaranteed income is important, and nearly 35% responded that long-term earning potential is one of their top three priorities when deciding whether to enter rural practice.¹⁰ The mixture of payors influences physicians' current and potential income and is a factor influencing physician practice in rural areas.^{8,11,14,15} Financial incentive programs such as federal loan waivers and bonus reimbursements are often available to physicians who choose to practice in rural areas, especially in health professional shortage areas.¹¹ Other significant economic factors predicting location of practice include employment status and part-time opportunities.^{7,11,16}

Scope of practice class factors influence medical practice locations in rural areas. Type of practice was rated a very high priority among family physicians.⁷ Physicians practicing in rural areas tend to provide a broad scope of practice.^{17,18} This broad scope of practice may include practice differences from their more urban counterparts.¹⁹⁻²¹ Rural practice also provides less competition and more clinical independence.¹⁴ Other significant factors related to scope of practice include teaching opportunities, supervision of other health professionals, and emergency room coverage.^{7,11,14,17}

Medical support class factors are important when physicians decide where to locate their practice. Working hours required for practice was identified as one of the top 10 most influential factors of current practice location and it was significantly more

important to female physicians.⁷ A connection between rural practice location and long working hours is also reported in numerous studies.^{11,13,15,17} Call responsibilities have also been identified as an important factor.^{8,9,21,22} Specialist and other health professional availability is another factor influencing choice of a practice location.^{7,8,11,12} Other medical support factors reported in previous studies include familiarity with medical community and resources, recruitment by colleagues, vacation and leisure time, and competent medical staff.^{7,11,14}

Hospital and community support class factors influence choice of practice location. Professional development opportunity is an important factor for physician decisions on practice location.^{7,10} Funded learner-driven continuing medical education (CME) is also important to recruiting and retaining more physicians in rural communities.^{9,10} Perceived medical need in a community has also been recognized as an important factor.^{7,10,14} Technology, hospital equipment and facilities are other important factors for physicians' practice location preference.^{7,9,12} Other hospital and community support factors identified in previous studies are the hospital's proactive vision for the future, flexibility of the hospital, relationship with patients and colleagues, number of beds, housing allocation, and plans for capital investment.^{10-12,23}

The number of published reports that documented successful case studies and/or strategies regarding rural physician recruitment is limited. Many previous studies extensively explored ways to increase the overall number of rural physicians; however, these studies' results may not be applicable in terms of increasing physician workforce in a particular rural community. As a result, many hospitals and communities still rely on expensive physician recruitment firms and/or their own experience-based recruitment

strategies. Without having an opportunity to identify their communities' assets and capabilities of physician recruitment and retention, rural hospitals and communities with a historical challenge in recruitment and retention of physicians continue to experience physician shortage problems. Comparative analysis with peers can be difficult and addressing biases within the community or between physicians and administrator views can be unintentional barriers.

The Critical Access Hospital Community Apgar Questionnaire (CAH CAQ)²⁴ was developed to help rural communities address these challenges. Just as the Apgar score is used to quantify resources and capabilities of the newborn that are indicative of current functioning, the CAH CAQ seeks to serve the same purpose for physician recruitment to individual communities. It should be noted that the Apgar score of a newborn is not necessarily prognostic of the longer-term outcome and similarly, the CAH CAQ is designed to function as a real-time measure.

Developers of the CAH CAQ identified factors important in recruitment and retention through research, site visits to critical access hospitals and in discussions with physicians, administrators and other professionals working to improve health care in rural communities. Factors were categorized into one of the following five classes: geographic, economic, scope of practice, medical support, or hospital and community support. With each class containing ten factors, a total of 50 factors were used to comprise the CAH CAQ. A series of three open-ended questions were also administered to validate the factors and identify any factor seen as significant but not addressed within the CAH CAQ factors. The CAH CAQ is provided in Appendix A and Appendix B provides a glossary of terms for the 50 factors in the CAH CAQ.

The CAH CAQ was field tested in Idaho in 2008. The results of this testing indicated that the CAH CAQ could discriminate between critical access hospitals who were more successful in recruiting physicians and those that were less successful in recruiting physicians to their communities. In addition, the CAH CAQ provided strategic information to decision makers who could then allocate resources based on comparative data in order to improve their physician recruitment efforts. The CAH CAQ also provided information helpful in marketing of critical access hospital strengths. Based on these positive results, the Critical Access Hospital Community Apgar Program (CAH CAP) was launched in Idaho in 2009. The CAH CAP is now deployed in Idaho, Wyoming, North Dakota, Wisconsin and Alaska.

The CAH CAP produces a comparative database of information for a group of critical access hospitals that can be used to identify strengths and areas of improvement related to physician recruitment both on the aggregate level and on the individual hospital level. The process includes an initial data collection activity using the CAH CAQ to develop the year one comparative database. A group analysis is constructed and individual critical access hospital reports are created. The aggregate results of the year one data are presented to the group of critical access hospitals and the individual site results are shared with the Board of Directors of each critical access hospital. The aggregate level analysis can be used by the group of critical access hospitals to determine legislative and policy strategies that focus on helping the group of critical access hospitals. The individual site analyses are used to develop action plans for each individual facility. A second data collection activity occurs in the second year of the

CAH CAP and the results are again shared with the Board of Directors of the facility to assess progress towards the year one action plan goals.

North Dakota is the third state in the nation to implement the CAH CAP.

Participation in the CAH CAP may help rural North Dakota hospitals and communities to find improvement opportunities for physician recruitment and retention strategies. The purpose of this technical report is to detail North Dakota state level findings based on year one CAQ assessments for critical access hospitals in North Dakota. The results may assist North Dakota policy makers to identify state level legislative and/or policy initiatives that can be useful for North Dakota critical access hospitals as a whole. These results may also identify other aggregate level research questions that can be addressed through further studies. Additional information related to the North Dakota CAH CAP will be presented at the Dakota Conference on Rural and Public Health in May of 2012. This information will include an update on individual critical access hospital site visits.

Methods

Human Subjects Review and Approval

The research methods described in this section as well as the Critical Access Hospital Community Apgar Questionnaire (CAH CAQ) were reviewed and approved by the Boise State University Human Subjects Institutional Review Board. Drs. Baker and Schmitz were identified as the co-principal investigators for the research and are responsible for the conduct of the study.

Selection and Recruitment of North Dakota Critical Access Hospitals and Respondents

The target communities for this project were critical access hospitals (CAHs) in North Dakota. North Dakota has 36 CAHs of which 16 (36%) were selected to participate in this study. This sample of 16 CAHs was chosen to represent the variety of physician recruitment and retention success and challenge experiences in the entire sample of 36 CAHs. Consequently, the results from the sample of 16 CAH most likely presents a representative view of the entire population. The target respondent population for the North Dakota CAH CAP was (1) the CAH administrator and (2) physician leaders in these CAHs who had responsibilities for recruitment and retention activities. The physician leaders were selected in consultation with the CAH administrator. There were 16 CAH administrators, 15 CAH physicians and one nurse practitioner in the final sample for a total of 32 respondents. The nurse practitioner was interviewed in place of the physician in one community as the facility did not have a physician available to participate in the study. As stated in the Executive Summary, the clinician responders are referred to as “physicians” for simplicity throughout the report.

Survey Administration Process

The CAH administrators and physicians who agreed to participate in the study were mailed the CAH CAQ and a consent form after agreeing to participate in the study. One hour interviews were scheduled for each participant. CAH administrators and physicians were interviewed separately and in private locations. Prior to the interviews, the consent form was reviewed with and executed by the participants. David Schmitz, MD and/or Mr. Adam Ortiz reviewed the consent form with participants and conducted the interviews. The CAH CAQ was completed during these structured interviews.

Data Processing, Analysis and Storage

The completed CAH CAQs were processed at Boise State University by researchers who entered these data into the CAH CAQ database. The qualitative questions were reviewed by the co-principal investigators and these responses are summarized in the Results Section. These data have been stored in locked files and password protected hard drives at the Center for Health Policy at the Linda and Ron Yanke Family Research Park, Boise State University and the Family Medicine Residency of Idaho. Access to the raw data has been limited to the principal investigators and the research support team.

Results

The results for this study are organized into four sections. The first section details Critical Access Hospital Community Apgar Questionnaire (CAH CAQ) class and factor findings describing North Dakota critical access hospitals (CAH) advantages and challenges. Second, North Dakota CAH importance ratings for CAH CAQ classes and factors are detailed. Third, the Apgar scores are presented by CAH CAQ classes and factors for North Dakota CAHs. And fourth, the North Dakota qualitative results from the three open-ended questions of the CAH CAQ are described. The tables and figures supporting these results are found in the Tables and Figures sections of the report.

North Dakota CAH CAQ Advantages and Challenges Findings

The qualitative ratings of the North Dakota CAH CAQ advantages and challenges section were converted to numerical scores based on the following:

Major advantage = +2;
Minor advantage = +1;
Minor challenge = - 1;
Major challenge = - 2.

Average advantages and challenges scores were calculated for the 50 factors and five classes of the CAH CAQ. The average scores for factors within and across each class were rank ordered and differences between CAH administrator and physician scores were calculated. The top 10 North Dakota CAH Community Advantages and top 10 North Dakota CAH Community Challenges across all 50 factors were identified. These analyses are provided below by class and across classes.

Geographic

Table 1 and Figure 1 show the advantages and challenges mean scores for the ten factors in the geographic class. Each table/figure also provides scores for administrator and physician mean ratings. Schools were identified as the highest community advantage followed by recreational opportunities and perception of community. Climate was identified as the greatest community challenge followed by spousal satisfaction and shopping/other services. The largest differences in ratings by administrators and physicians were found in religious/cultural opportunities, social networking, perception of community, schools, access to larger community, and spousal satisfaction.

Economic

Table 2 and Figure 2 show the advantages and challenges mean scores for the ten factors in the economic class. Each table/figure also provides scores for administrator and physician mean ratings. Income guarantee was identified as the highest community advantage followed by loan repayment, start-up/marketing costs, part-time opportunities and moving allowance. Payor mix was identified as the greatest community challenge followed by competition and revenue flow. The largest differences in ratings by administrators and physicians were found in competition, employment status, part-time opportunities and moving allowance.

Scope of Practice

Table 3 and Figure 3 show the advantages and challenges mean scores for the ten factors in the scope of practice class. Each table/figure also provides scores for administrator and physician mean ratings. Inpatient care was identified as the highest

community advantage followed by obstetrics and nursing home. Mental health was identified as the greatest community challenge followed by emergency room coverage and mid-level supervision. The largest differences in ratings by administrators and physicians were found in emergency room coverage, mental health and mid-level supervision.

Medical Support

Table 4 and Figure 4 show the advantages and challenges mean scores for the ten factors in the medical support class. Each table/figure also provides scores for administrator and physician mean ratings. Perception of quality was identified as the highest community advantage followed by transfer arrangements and ancillary staff workforce. Allied mental health workforce was identified as the greatest community challenge followed by call/practice coverage and physician workforce stability. The largest differences in ratings by administrators and physicians were found in nursing workforce, specialist availability and physician workforce stability.

Hospital and Community Support

Table 5 and Figure 5 show the advantages and challenges mean scores for the ten factors in the hospital and community support class. Each table/figure also provides scores for administrator and physician mean ratings. Internet access was identified as the highest community advantage followed by community need/physician support and hospital leadership. Electronic medical records was identified as the greatest community challenge followed by physical plant/equipment and welcome/recruitment. The largest differences in ratings by administrators and physicians were found in community

volunteer opportunities, welcome/recruitment, plans for capital investment and physical plant/equipment.

Advantages and Challenges Findings Across Classes

Table 6 and Figures 6 and 7 show the advantages and challenges mean scores for the five classes within the CAH CAQ and for an overall mean score across CAH CAQ classes. Each table/figure also provides scores for administrator and physician mean ratings as well as difference scores across the administrator and physician ratings. Class scores were calculated by summing scores across all ten factors in a class. The summary score across classes was constructed by summing the class scores in the CAH CAQ. The economic class was identified as the highest community advantage followed by hospital/community support, medical support, scope of practice and geographic classes. The largest differences in ratings by administrators and physicians were found (by order of the greatest difference) in scope of practice, geographic, economic, hospital/community support and medical support.

Top 10 Community Advantages and Challenges

Tables 7 and 8 and Figures 8 and 9 show the top 10 advantages and top 10 challenges mean scores across the 50 factors contained in the CAH CAQ. The top 10 advantages are those factors with the 10 highest mean scores across all 50 factors and the top 10 challenges are those factors with the 10 lowest mean scores across all 50 factors. Each table/figure also provides scores for administrator and physician mean ratings as well as difference scores across the administrator and physician ratings. The top 10 advantages are (listed in order from the highest score): internet access, perception of

quality, transfer arrangements, income guarantee, loan repayment, community need/physician support, ancillary staff workforce, hospital leadership, schools, start-up/marketing costs, recreational opportunities, part-time opportunities, and moving allowance. Note that there are 13 factors listed above due to tie scores. The top 10 challenges are (listed in order from the lowest score): climate, spousal satisfaction, shopping/other services, mental health, access to larger community, allied mental health workforce, emergency room coverage, social networking, demographic/patient mix, call/practice coverage, and electronic medical records. Note that there are 11 factors listed above due to tie scores.

North Dakota CAH CAQ Importance Findings

The qualitative ratings of the North Dakota CAH CAQ importance section were converted to numerical scores based on the following:

Very important	= + 4;
Important	= + 3;
Unimportant	= + 2;
Very unimportant	= + 1.

Average importance scores were calculated for the 50 factors and five classes of the CAH CAQ. The average importance scores for factors within and across each class were rank ordered and differences between CAH administrator and physician scores were calculated. The top 10 North Dakota CAH Community Importance factors across all 50 factors were identified. These analyses are provided below by class and across classes.

Geographic

Table 9 and Figure 10 show the importance mean scores for the ten factors in the geographic class. Each table/figure also provides scores for administrator and physician mean ratings. Spousal satisfaction was identified as the highest area of importance for the communities followed by schools, perception of community and access to larger community. Demographic/patient mix was identified as the lowest area of importance for the communities followed by religious/cultural opportunities and climate. The largest differences in ratings by administrators and physicians were found in social networking, recreational opportunities, perception of community and demographic/patient mix.

Economic

Table 10 and Figure 11 show the importance mean scores for the ten factors in the economic class. Each table/figure also provides scores for administrator and physician mean ratings. Loan repayment was identified as the highest area of importance for the communities followed by employment status and income guarantee. Payor mix was identified as the lowest area of importance for the communities followed by start-up/marketing costs and part-time opportunities. The largest differences in ratings by administrators and physicians were found in employment status, part-time opportunities, start-up/marketing costs, payor mix and revenue flow.

Scope of Practice

Table 11 and Figure 12 show the importance mean scores for the ten factors in the scope of practice class. Each table/figure also provides scores for administrator and physician mean ratings. Emergency room coverage was identified as the highest area of

importance for the communities followed by inpatient care and obstetrics. Mid-level supervision was identified as the lowest area of importance for the communities followed by nursing home and teaching. The largest differences in ratings by administrators and physicians were found in mental health, nursing home and endoscopy/surgery.

Medical Support

Table 12 and Figure 13 show the importance mean scores for the ten factors in the medical support class. Each table/figure also provides scores for administrator and physician mean ratings. Perception of quality, call/practice coverage and physician workforce stability were identified as the highest areas of importance for the communities. Allied mental health workforce was identified as the lowest area of importance for the communities followed by mid-level provider workforce and ancillary staff workforce. The largest differences in ratings by administrators and physicians were found in allied mental health workforce, perception of quality, and physician workforce stability.

Hospital and Community Support

Table 13 and Figure 14 show the importance mean scores for the ten factors in the hospital and community support class. Each table/figure also provides scores for administrator and physician mean ratings. Physician plant/equipment was identified as the highest area of importance for the communities followed by community need/physician support and plans for capital investment. Community volunteer opportunities was identified as the lowest area of importance for the communities followed by televideo support and hospital leadership. The largest differences in ratings by

administrators and physicians were found in hospital sponsored CME, hospital leadership, internet access and welcome/recruitment.

Importance Findings Across Classes

Table 14 and Figures 15 and 16 show the importance mean scores for the five classes within the CAH CAQ and for an overall mean score across CAH CAQ classes. Each table/figure also provides scores for administrator and physician mean ratings as well as difference scores across the administrator and physician ratings. Class scores were calculated by summing scores across all ten factors in a class. The summary score across classes was constructed by summing the class scores in the CAH CAQ. Medical support was identified as the highest area of importance for the communities followed by economic, geographic, hospital/community support and scope of practice classes. The largest differences in ratings by administrators and physicians were found (by order of the greatest difference) in hospital/community support, scope of practice, geographic, medical support and economic classes.

Top 10 Community Importance Factors

Table 15 and Figure 17 show the top 10 importance mean scores across the 50 factors contained in the CAH CAQ. The top 10 importance factors are those factors with the 10 highest mean scores across all 50 factors. Each table/figure also provides scores for administrator and physician mean ratings as well as difference scores across the administrator and physician ratings. The top 10 importance factors are (listed in order from the highest score): spousal satisfaction, perception of quality, call/practice coverage,

physician workforce stability, loan repayment, physical plant/equipment, transfer arrangements, emergency room coverage, employment status, and income guarantee.

North Dakota CAH CAQ Community Apgar Scores

The numerically converted qualitative ratings of the North Dakota CAH CAQ advantages/challenges and importance sections were used in the following algorithm:

(Community advantage/challenge score)*(community importance score) = Community Apgar Score.

This algorithm creates a community asset and capability measure derived from a community advantage/challenge score weighted by importance metric.

Average Community Apgar scores were calculated for the 50 factors and five classes of the CAH CAQ. The average scores for factors within and across each class were rank ordered and differences between CAH administrator and physician scores were calculated. The top 10 North Dakota CAH Apgar scores and bottom 10 North Dakota CAH Apgar scores across all 50 factors were identified. In addition, a Cumulative North Dakota CAH Community Apgar score was calculated across all CAHs in the North Dakota sample. These analyses are provided below by class and across classes.

Geographic

Table 16 and Figure 18 show the mean Community Apgar scores for the ten factors in the geographic class. Each table/figure also provides scores for administrator and physician mean ratings. The factor schools was identified as the most significant community asset and capability followed by recreational opportunities and perception of community. Climate was identified as the least developed community asset and

capability followed by spousal satisfaction and shopping/other services. The largest differences in ratings by administrators and physicians were found in religious/cultural opportunities, schools, and access to larger community.

Economic

Table 17 and Figure 19 show the mean Community Apgar scores for the ten factors in the economic class. Each table/figure also provides scores for administrator and physician mean ratings. Loan repayment was identified as the most significant community asset and capability followed by income guarantee and employment status. Payor mix was identified as the least developed community asset and capability followed by competition and revenue flow. The largest differences in ratings by administrators and physicians were found in competition, employment status and moving allowance.

Scope of Practice

Table 18 and Figure 20 show the mean Community Apgar scores for the ten factors in the scope of practice class. Each table/figure also provides scores for administrator and physician mean ratings. Obstetrics was identified as the most significant community asset and capability followed by inpatient care and C-section. Mental health was identified as the least developed community asset and capability followed by emergency room coverage and mid-level supervision. The largest differences in ratings by administrators and physicians were found in emergency room coverage, mental health and teaching.

Medical Support

Table 19 and Figure 21 show the mean Community Apgar scores for the ten factors in the medical support class. Each table/figure also provides scores for administrator and physician mean ratings. Perception of quality was identified as the most significant community asset and capability followed by transfer arrangements and ancillary staff workforce. Allied mental health workforce was identified as the least developed community asset and capability followed by call/practice coverage and physician workforce stability. The largest differences in ratings by administrators and physicians were found in nursing workforce, physician workforce stability and call/practice coverage.

Hospital and Community Support

Table 20 and Figure 22 show the mean Community Apgar scores for the ten factors in the hospital and community support class. Each table/figure also provides scores for administrator and physician mean ratings. Internet access was identified as the most significant community asset and capability followed by community need/physician support and hospital leadership. Electronic medical records was identified as the least developed community asset and capability followed by physical plant/equipment and welcome/recruitment. The largest differences in ratings by administrators and physicians were found in welcome/recruitment, community volunteer opportunities and hospital leadership.

Community Apgar Scores Across Classes

Table 21 and Figures 23 and 24 show the Community Apgar mean scores for the five classes within the CAH CAQ and for an overall mean score across CAH CAQ classes. Each table/figure also provides scores for administrator and physician mean ratings as well as difference scores across the administrator and physician ratings. Class scores were calculated by summing scores across all ten factors in a class. The summary score across classes was constructed by summing the class scores in the CAH CAQ. The economic class was identified as the most significant community asset and capability followed by hospital/community support, medical support, scope of practice and geographic classes. The largest differences in ratings by administrators and physicians were found (by order of the greatest difference) in scope of practice, geographic, hospital/community support, economic and medical support.

Top and Bottom 10 Community Apgar Scores

Tables 22 and 23 and Figures 25 and 26 show the top 10 Community Apgar factors and bottom 10 Community Apgar factors across the 50 factors contained in the CAH CAQ. The top 10 Community Apgar factors are those factors with the 10 highest mean scores across all 50 factors and the bottom 10 Community Apgar factors are those factors with the 10 lowest mean scores across all 50 factors. Each table/figure also provides scores for administrator and physician mean ratings as well as difference scores across the administrator and physician ratings. The top 10 Community Apgar factors are (listed in order from the highest score): perception of quality, transfer arrangements, internet access, loan repayment, income guarantee, community need/physician support, ancillary staff workforce, employment status, moving allowance and schools. The

bottom 10 Community Apgar factors are (listed in order from the lowest score): climate, spousal satisfaction, shopping/other services, mental health, access to larger community, emergency room coverage, demographic/patient mix, social networking, allied mental health workforce, and electronic medical records.

Cumulative Community Apgar Scores Across Critical Access Hospitals

Table 24 and Figure 27 show the cumulative Community Apgar score for each of the participating North Dakota CAHs. The cumulative Community Apgar score was derived by adding all Community Apgar scores for each of the 50 factors of the CAH CAQ for each CAH. The cumulative Community Apgar scores range from 421 to 18. Higher scores indicate greater community assets and capabilities for a particular CAH.

Qualitative Results

The Critical Access Hospital (CAH) CAQ contains three open-ended questions. These questions are listed below and a summary of respondent answers are provided for each question.

1. What are your greatest barriers to recruitment and retention of Family Medicine physicians?

Overall, the responses to open-ended questions were consistent with the respondents' answers during the personal interviews within the fifty factors with the exception of housing issues which were not infrequently reported. Climate in addition to spousal satisfaction continued to be dominant challenge factors, as did issues related to geographic isolation.

2. What can be done to overcome these barriers?

Housing challenges were reported at least at a regional level and suggestions were made regarding provision of temporary or more permanent housing solutions with regard to both availability and affordability. Examples included the suggestion of hospital controlled rental housing being available to new physicians. Medical education for both students and residents was seen as a key step in workforce development for these communities in addition to loan repayment opportunities. Community engagement of the spouse was also seen as important.

3. What reasons has a successful physician candidate given for not accepting a position in the community? What did that person ultimately do instead (if you know)?

Issues reported most frequently related to geographic isolation for the spouse of the physician and/or the physician.

Discussion

Research Limitations

The primary limitation of the research is that the communities and respondents that participated in the North Dakota Critical Access Hospital Community Apgar Program (CAH CAP) research may not represent the entire eligible respondent classes which may limit the generalizability of the findings to other hospitals in North Dakota or other communities in the United States. North Dakota has 36 CAHs of which 16 (36%) were selected to participate in this study. This sample of 16 CAHs was chosen to represent the variety of physician recruitment and retention success and challenge experiences in the entire sample of 36 CAHs. Consequently, the results from the sample of 16 CAH most likely presents a representative view of the entire population. The researchers are actively investigating whether the results from the sample of North Dakota CAHs generalize to other areas of the country as they expand the CAH CAP to communities in other states. A second possible limitation of the research is that the number of CAH CAQ factors was limited to 50. It is possible that other factors that affect physician workforce may exist but were not included in the CAH CAQ. Researchers accounted for this limitation by asking open-ended questions to give each respondent the opportunity to identify any parameters that were not in the CAH CAQ but were perceived to be significant. Notably, the discussions prompted by open-ended questions revealed factors already contained within the CAH CAQ with the exception of a housing question which will be added in the CAH CAQ 2.0 version of the instrument.

North Dakota CAH CAQ Community Advantages and Challenges Scores

North Dakota CAH CAQ advantages results identified internet access followed by perception of quality, transfer arrangements, income guarantee and loan repayment as some of the highest community advantages. These factors are found in the hospital/community support, medical support and economic classes and appear to reflect a set of recruitment advantages that are intercommunity or more globally applied beyond the local community environment alone. For example, loan repayment is derived as a local recruitment benefit of a program which extends beyond the community itself and internet access is a service based on a more regional level rather than on individual communities or facilities. Similarly, the positive recruitment advantage of transfer arrangements is dependent upon inter-facility arrangements and resource networking. Perception of quality may be related to the access to transfer of care when necessary, alleviating the common experience of medial service isolation otherwise encountered.

Climate, spousal satisfaction, shopping/other services, mental health and access to a larger community were identified as the greatest challenges. These factors are linked to geographic isolation. Examples of issues with spousal satisfaction were typically related to lack of resources or amenities more commonly found in urban or non-rural settings. Climate was a predominate factor mentioned as a challenge. Mental health in North Dakota was also reported as a challenge similar to findings in Idaho and Wyoming which is related to the shortage of supply of mental health providers relative to patient care needs. Further analysis demonstrated some differences between the responses provided by the CAH administrators and physicians. This was particularly noted among factors in the scope of practice and geographic classes with physician scores being higher than

administrator scores. Examples of individual factor differences between CAH administrators and physicians included administrator responses being higher for nursing workforce while physicians reported higher response scores for competition.

North Dakota CAH CAQ Community Importance Scores

Similar to the previous results of the Idaho and Wyoming CAH studies, spousal satisfaction was identified as one of the more important factors in physician recruitment and retention in North Dakota. Perception of quality, physician workforce stability and physical plant/equipment were also scored among the most important factors. This appears indicative of the importance of physician satisfaction in the practice of quality care in an environment adequate to retain such physicians. Call/practice coverage may also play a key role in physician retention while loan repayment was also reported as among the most important factors.

North Dakota CAH Community Apgar Scores

The overall rank ordering of classes by mean Community Apgar scores in the North Dakota study were as follows: economic, hospital/community support, medical support, scope of practice, and geographic. Overall, the scope of practice class, geographic class and hospital/community support class received higher scores from physicians than from administrators. The economic class received higher scores from administrators than physicians. Among the highest rated individual factor Community Apgar scores were perception of quality, transfer arrangements, internet access and loan repayment. Notably, it appears that the highest individual scores were demonstrated among factors beyond a singular community level. Transfer arrangements occur between

facilities which is similar to internet access which extends beyond the community itself. Perception of quality of care may be related to medical resources locally accessed via internet access and transfer arrangements again alleviating the issue of isolation in rural medical service environments. Additionally, income guarantee, community need/physician support and ancillary staff workforce were amongst the highest scoring individual factors.

The overall lowest individual Community Apgar scores were found for climate, spousal satisfaction, shopping/other services, mental health and access to larger community. These factors are related to geographic isolation from typical urban or non-rural resources and amenities. With the exception of mental health which was similarly identified as a top challenge in the prior Idaho study, these factors were predominately non-medical. Examples of individual factor differences between CAH administrators and physicians included administrator responses being higher for nursing workforce and employment status, each being factors related to their area of responsibility; while physicians reported higher response scores for competition and emergency room coverage, which are directly relate to inter-physician dynamics and physician-patient services.

CAH CAQ Utility as a Community Development Tool

North Dakota is the third state in the nation to implement the CAH CAP. Participation in the CAH CAP may help rural North Dakota hospitals and communities to find improvement opportunities for physician recruitment and retention strategies. Individual community strategic action plan development using the findings from the CAH CAP provides a contrasting picture of each individual community with tailored

attention to gap analysis, sharing of best practices and obstacle elimination. The aggregate results may assist North Dakota policy makers to identify state level legislative and/or policy initiatives that can be useful for North Dakota critical access hospitals as a whole. These results may also identify other aggregate level research questions that can be addressed through further studies.

CAH CAQ as a National Tool for Rural Physician Recruitment and Retention

The development of an aggregate CAH CAQ national database composed of multiple state data sets will allow for comparison and contrast of factors important to physician recruitment and retention both within and between states. For example, it may be useful to assess across states or within regions the differential impact of (1) the common finding of unmet mental health needs, (2) how schools effect physician recruitment to rural communities, and (3) the changes regarding internet availability and electronic medical records. The results of these studies could inform regional and national policy makers as they craft legislative or other approaches to addressing physician shortages to rural communities.

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Tables

Table 1
 Geographic Class CAH Community Advantages and Challenges Mean Scores
 Rank Order by Overall Score

Geographic Factors	Overall Score [N=32]	Administrator Score [N=16]	Physician Score [N=16]	Difference [Admin-Phys]
Schools	1.19	1.38	1.00	0.38
Recreational opportunities	1.16	1.31	1.00	0.31
Perception of community	0.56	0.38	0.75	-0.38
Religious, cultural opportunities	0.41	0.06	0.75	-0.69
Demographic, patient mix	0.16	0.06	0.25	-0.19
Social networking	0.16	-0.13	0.44	-0.56
Access to larger community	-0.13	-0.31	0.06	-0.38
Shopping and other services	-0.63	-0.63	-0.63	0.00
Spousal satisfaction	-0.69	-0.88	-0.50	-0.38
Climate	-1.06	-1.19	-0.94	-0.25

Table 2
Economic Class CAH Community Advantages and Challenges Mean Scores
Rank Order by Overall Score

Economic Factors	Overall Score [N=32]	Administrator Score [N=16]	Physician Score [N=16]	Difference [Admin-Phys]
Income guarantee	1.31	1.50	1.13	0.38
Loan repayment	1.31	1.19	1.44	-0.25
Start-up, marketing costs	1.16	1.19	1.13	0.06
Part-time opportunities	1.16	1.38	0.94	0.44
Moving allowance	1.16	1.38	0.94	0.44
Employment status	1.09	1.44	0.75	0.69
Signing bonus	1.03	1.19	0.88	0.31
Revenue flow	1.00	1.00	1.00	0.00
Competition	0.59	0.19	1.00	-0.81
Payor mix	0.56	0.56	0.56	0.00

Table 3
Scope of Practice Class CAH Community Advantages and Challenges Mean Scores
Rank Order by Overall Score

Scope of Practice Factors	Overall Score [N=32]	Administrator Score [N=16]	Physician Score [N=16]	Difference [Admin-Phys]
Inpatient care	1.00	1.13	0.88	0.25
Obstetrics	0.97	0.94	1.00	-0.06
Nursing home	0.94	0.75	1.13	-0.38
Administration	0.91	0.88	0.94	-0.06
C-section	0.88	0.81	0.94	-0.13
Endoscopy, surgery	0.84	0.75	0.94	-0.19
Teaching	0.56	0.38	0.75	-0.38
Mid-level supervision	0.34	0.13	0.56	-0.44
Emergency room coverage	0.16	-0.13	0.44	-0.56
Mental health	-0.38	-0.63	-0.13	-0.50

Table 4
Medical Support Class CAH Community Advantages and Challenges Mean Scores
Rank Order by Overall Score

Medical Support Factors	Overall Score [N=32]	Administrator Score [N=16]	Physician Score [N=16]	Difference [Admin-Phys]
Perception of quality	1.44	1.44	1.44	0.00
Transfer arrangements	1.34	1.19	1.50	-0.31
Ancillary staff workforce	1.28	1.25	1.31	-0.06
Mid-level provider workforce	1.00	0.94	1.06	-0.13
Emergency medical services	0.91	1.00	0.81	0.19
Nursing workforce	0.78	1.19	0.38	0.81
Specialist availability	0.56	0.31	0.81	-0.50
Physician workforce stability	0.38	0.63	0.13	0.50
Call, practice coverage	0.22	0.00	0.44	-0.44
Allied mental health workforce	0.09	-0.06	0.25	-0.31

Table 5

Hospital and Community Support Class CAH Community Advantages and Challenges Mean Scores Rank Order by Overall Score

Hospital and Community Support Factors	Overall Score [N=32]	Administrator Score [N=16]	Physician Score [N=16]	Difference [Admin-Phys]
Internet access	1.50	1.50	1.50	0.00
Community need, physician support	1.31	1.31	1.31	0.00
Hospital leadership	1.22	1.13	1.31	-0.19
Community volunteer opportunities	0.91	0.69	1.13	-0.44
Plans for capital investment	0.91	0.75	1.06	-0.31
Hospital sponsored CME	0.91	0.94	0.88	0.06
Televideo support	0.84	0.94	0.75	0.19
Welcome and recruitment	0.75	0.56	0.94	-0.38
Physical plant and equipment	0.47	0.31	0.63	-0.31
Electronic medical records	0.22	0.31	0.13	0.19

Table 6
Class CAH Community Advantages and Challenges Cumulative Scores
Rank Order by Cumulative Score

Class Questions	Overall Score [N=32]	Administrator Score [N=16]	Physician Score [N=16]	Difference [Admin-Phys]
Economic	10.38	11.00	9.75	1.25
Hospital and Community Support	9.03	8.44	9.63	-1.19
Medical Support	8.00	7.88	8.13	-0.25
Scope of Practice	6.22	5.00	7.44	-2.44
Geographic	1.13	0.06	2.19	-2.13
Sum of Mean Scores Across Classes	34.75	32.38	37.13	-4.75

Table 7
Top 10 CAH Community Advantages Mean Scores
Rank Order by Overall Score

Advantages Factors	Overall Score [N=32]	Administrator Score [N=16]	Physician Score [N=16]	Difference [Admin-Phys]
Internet access	1.50	1.50	1.50	0.00
Perception of quality	1.44	1.44	1.44	0.00
Transfer arrangements	1.34	1.19	1.50	-0.31
Income guarantee	1.31	1.50	1.13	0.38
Loan repayment	1.31	1.19	1.44	-0.25
Community need, physician support	1.31	1.31	1.31	0.00
Ancillary staff workforce	1.28	1.25	1.31	-0.06
Hospital leadership	1.22	1.13	1.31	-0.19
Schools	1.19	1.38	1.00	0.38
Start-up, marketing costs	1.16	1.19	1.13	0.06
Recreational opportunities	1.16	1.31	1.00	0.31
Part-time opportunities	1.16	1.38	0.94	0.44
Moving allowance	1.16	1.38	0.94	0.44

Table 8
Top 10 CAH Community Challenges Mean Scores
Rank Order by Overall Score

Challenges Factors	Overall Score [N=32]	Administrator Score [N=16]	Physician Score [N=16]	Difference [Admin-Phys]
Climate	-1.06	-1.19	-0.94	-0.25
Spousal satisfaction	-0.69	-0.88	-0.50	-0.38
Shopping and other services	-0.63	-0.63	-0.63	0.00
Mental health	-0.38	-0.63	-0.13	-0.50
Access to larger community	-0.13	-0.31	0.06	-0.38
Allied mental health workforce	0.09	-0.06	0.25	-0.31
Emergency room coverage	0.16	-0.13	0.44	-0.56
Social networking	0.16	-0.13	0.44	-0.56
Demographic, patient mix	0.16	0.06	0.25	-0.19
Call, practice coverage	0.22	0.00	0.44	-0.44
Electronic medical records	0.22	0.31	0.13	0.19

Table 9
Geographic Class CAH Community Importance Mean Scores
Rank Order by Overall Score

Geographic Factors	Overall Score [N=32]	Administrator Score [N=16]	Physician Score [N=16]	Difference [Admin-Phys]
Spousal satisfaction	3.78	3.75	3.81	-0.06
Schools	3.44	3.50	3.38	0.13
Perception of community	3.34	3.25	3.44	-0.19
Access to larger community	3.34	3.38	3.31	0.06
Recreational opportunities	3.22	3.31	3.13	0.19
Social networking	3.22	3.50	2.94	0.56
Shopping and other services	3.09	3.06	3.13	-0.06
Climate	2.97	2.94	3.00	-0.06
Religious, cultural opportunities	2.91	2.88	2.94	-0.06
Demographic, patient mix	2.84	2.94	2.75	0.19

Table 10
 Economic Class CAH Community Importance Mean Scores
 Rank Order by Overall Score

Economic Factors	Overall Score [N=32]	Administrator Score [N=16]	Physician Score [N=16]	Difference [Admin-Phys]
Loan repayment	3.56	3.56	3.56	0.00
Employment status	3.50	3.63	3.38	0.25
Income guarantee	3.47	3.44	3.50	-0.06
Revenue flow	3.44	3.50	3.38	0.13
Competition	3.41	3.38	3.44	-0.06
Signing bonus	3.41	3.38	3.44	-0.06
Moving allowance	3.34	3.38	3.31	0.06
Part-time opportunities	3.16	3.06	3.25	-0.19
Start-up, marketing costs	3.06	3.00	3.13	-0.13
Payor mix	2.88	2.81	2.94	-0.13

Table 11
 Scope of Practice Class CAH Community Importance Mean Scores
 Rank Order by Overall Score

Scope of Practice Factors	Overall Score [N=32]	Administrator Score [N=16]	Physician Score [N=16]	Difference [Admin-Phys]
Emergency room coverage	3.50	3.44	3.56	-0.13
Inpatient care	3.28	3.19	3.38	-0.19
Obstetrics	3.28	3.25	3.31	-0.06
C-section	3.22	3.13	3.31	-0.19
Administration	3.16	3.06	3.25	-0.19
Endoscopy, surgery	3.13	3.00	3.25	-0.25
Mental health	3.03	3.19	2.88	0.31
Teaching	2.97	2.94	3.00	-0.06
Nursing home	2.94	2.81	3.06	-0.25
Mid-level supervision	2.84	2.88	2.81	0.06

Table 12
 Medical Support Class CAH Community Importance Mean Scores
 Rank Order by Overall Score

Medical Support Factors	Overall Score [N=32]	Administrator Score [N=16]	Physician Score [N=16]	Difference [Admin-Phys]
Perception of quality	3.72	3.94	3.50	0.44
Call, practice coverage	3.59	3.69	3.50	0.19
Physician workforce stability	3.56	3.75	3.38	0.38
Transfer arrangements	3.53	3.44	3.63	-0.19
Nursing workforce	3.44	3.31	3.56	-0.25
Emergency medical services	3.44	3.44	3.44	0.00
Specialist availability	3.34	3.31	3.38	-0.06
Ancillary staff workforce	3.25	3.38	3.13	0.25
Mid-level provider workforce	3.16	3.13	3.19	-0.06
Allied mental health workforce	3.03	2.81	3.25	-0.44

Table 13
Hospital and Community Support Class CAH Community Importance Mean Scores
Rank Order by Overall Score

Hospital and Community Support Factors	Overall Score [N=32]	Administrator Score [N=16]	Physician Score [N=16]	Difference [Admin-Phys]
Physical plant and equipment	3.56	3.50	3.63	-0.13
Community need, physician support	3.38	3.38	3.38	0.00
Plans for capital investment	3.31	3.38	3.25	0.13
Internet access	3.22	3.13	3.31	-0.19
Electronic medical records	3.22	3.25	3.19	0.06
Welcome and recruitment	3.22	3.13	3.31	-0.19
Hospital sponsored CME	3.19	3.00	3.38	-0.38
Hospital leadership	3.16	3.00	3.31	-0.31
Televideo support	2.97	2.94	3.00	-0.06
Community volunteer opportunities	2.63	2.63	2.63	0.00

Table 14
 Class CAH Community Importance Cumulative Scores
 Rank Order by Cumulative Score

Survey Classes	Overall Score [N=32]	Administrator Score [N=16]	Physician Score [N=16]	Difference [Admin-Phys]
Medical Support	34.06	34.19	33.94	0.25
Economic	33.22	33.13	33.31	-0.19
Geographic	32.16	32.50	31.81	0.69
Hospital and Community Support	31.84	31.31	32.38	-1.06
Scope of Practice	31.34	30.88	31.81	-0.94
Sum of Mean Scores Across Classes	162.63	162.00	163.25	-1.25

Table 15
 Top 10 CAH Community Importance Mean Scores
 Rank Order by Overall Score

Importance Factors	Overall Score [N=32]	Administrator Score [N=16]	Physician Score [N=16]	Difference [Admin-Phys]
Spousal satisfaction	3.78	3.75	3.81	-0.06
Perception of quality	3.72	3.94	3.50	0.44
Call, practice coverage	3.59	3.69	3.50	0.19
Physician workforce stability	3.56	3.75	3.38	0.38
Loan repayment	3.56	3.56	3.56	0.00
Physical plant and equipment	3.56	3.50	3.63	-0.13
Transfer arrangements	3.53	3.44	3.63	-0.19
Emergency room coverage	3.50	3.44	3.56	-0.13
Employment status	3.50	3.63	3.38	0.25
Income guarantee	3.47	3.44	3.50	-0.06

Table 16
 Geographic Class CAH Community Apgar Mean Scores
 Rank Order by Overall Score

Geographic Factors	Overall Score [N=32]	Administrator Score [N=16]	Physician Score [N=16]	Difference [Admin-Phys]
Schools	4.00	4.69	3.31	1.38
Recreational opportunities	3.94	4.50	3.38	1.13
Perception of community	1.94	1.38	2.50	-1.13
Religious, cultural opportunities	1.41	0.31	2.50	-2.19
Demographic, patient mix	0.50	0.13	0.88	-0.75
Social networking	0.50	-0.13	1.13	-1.25
Access to larger community	-0.28	-0.94	0.38	-1.31
Shopping and other services	-2.13	-2.06	-2.19	0.13
Spousal satisfaction	-2.78	-3.38	-2.19	-1.19
Climate	-3.28	-3.69	-2.88	-0.81

Table 17
 Economic Class CAH Community Apgar Mean Scores
 Rank Order by Overall Score

Economic Factors	Overall Score [N=32]	Administrator Score [N=16]	Physician Score [N=16]	Difference [Admin-Phys]
Loan repayment	4.88	4.31	5.44	-1.13
Income guarantee	4.63	5.31	3.94	1.38
Employment status	4.19	5.38	3.00	2.38
Moving allowance	4.09	4.81	3.38	1.44
Signing bonus	3.72	4.19	3.25	0.94
Part-time opportunities	3.69	4.38	3.00	1.38
Start-up, marketing costs	3.66	3.56	3.75	-0.19
Revenue flow	3.50	3.56	3.44	0.13
Competition	2.34	1.13	3.56	-2.44
Payor mix	1.59	1.44	1.75	-0.31

Table 18
 Scope of Practice Class CAH Community Apgar Mean Scores
 Rank Order by Overall Score

Scope of Practice Factors	Overall Score [N=32]	Administrator Score [N=16]	Physician Score [N=16]	Difference [Admin-Phys]
Obstetrics	3.44	3.25	3.63	-0.38
Inpatient care	3.44	3.63	3.25	0.38
C-section	3.06	2.75	3.38	-0.63
Administration	2.91	2.88	2.94	-0.06
Nursing home	2.91	2.25	3.56	-1.31
Endoscopy, surgery	2.88	2.31	3.44	-1.13
Teaching	1.94	1.19	2.69	-1.50
Mid-level supervision	0.94	0.38	1.50	-1.13
Emergency room coverage	0.47	-0.63	1.56	-2.19
Mental health	-1.22	-2.25	-0.19	-2.06

Table 19
 Medical Support Class CAH Community Apgar Mean Scores
 Rank Order by Overall Score

Medical Support Factors	Overall Score [N=32]	Administrator Score [N=16]	Physician Score [N=16]	Difference [Admin-Phys]
Perception of quality	5.38	5.69	5.06	0.63
Transfer arrangements	4.94	4.44	5.44	-1.00
Ancillary staff workforce	4.44	4.56	4.31	0.25
Mid-level provider workforce	3.28	2.94	3.63	-0.69
Emergency medical services	3.00	3.44	2.56	0.88
Nursing workforce	2.59	4.00	1.19	2.81
Specialist availability	2.19	1.25	3.13	-1.88
Physician workforce stability	1.69	2.69	0.69	2.00
Call, practice coverage	0.97	0.00	1.94	-1.94
Allied mental health workforce	0.56	0.13	1.00	-0.88

Table 20
 Hospital and Community Support Class CAH Community Apgar Mean Scores
 Rank Order by Overall Score

Hospital and Community Support Factors	Overall Score [N=32]	Administrator Score [N=16]	Physician Score [N=16]	Difference [Admin-Phys]
Internet access	4.91	4.75	5.06	-0.31
Community need, physician support	4.63	4.63	4.63	0.00
Hospital leadership	3.97	3.44	4.50	-1.06
Plans for capital investment	3.28	2.88	3.69	-0.81
Hospital sponsored CME	3.09	3.06	3.13	-0.06
Televideo support	2.59	2.88	2.31	0.56
Community volunteer opportunities	2.53	1.88	3.19	-1.31
Welcome and recruitment	2.47	1.69	3.25	-1.56
Physical plant and equipment	1.97	1.50	2.44	-0.94
Electronic medical records	0.91	1.19	0.63	0.56

Table 21
 Class CAH Community Apgar Cumulative Scores
 Rank Order by Cumulative Score

Survey Classes	Overall Score [N=32]	Administrator Score [N=16]	Physician Score [N=16]	Difference [Admin-Phys]
Economic	36.28	38.06	34.50	3.56
Hospital and Community Support	30.34	27.88	32.81	-4.94
Medical Support	29.03	29.13	28.94	0.19
Scope of Practice	20.75	15.75	25.75	-10.00
Geographic	3.81	0.81	6.81	-6.00
Sum of Mean Scores Across Classes	120.22	111.63	128.81	-17.19

Table 22
 Top 10 CAH Community Apgar Mean Scores
 Rank Order by Overall Score

Apgar Factors	Overall Score [N=32]	Administrator Score [N=16]	Physician Score [N=16]	Difference [Admin-Phys]
Perception of quality	5.38	5.69	5.06	0.63
Transfer arrangements	4.94	4.44	5.44	-1.00
Internet access	4.91	4.75	5.06	-0.31
Loan repayment	4.88	4.31	5.44	-1.13
Income guarantee	4.63	5.31	3.94	1.38
Community need, physician support	4.63	4.63	4.63	0.00
Ancillary staff workforce	4.44	4.56	4.31	0.25
Employment status	4.19	5.38	3.00	2.38
Moving allowance	4.09	4.81	3.38	1.44
Schools	4.00	4.69	3.31	1.38

Table 23
 Bottom 10 CAH Community Apgar Mean Scores
 Rank Order by Overall Score

Apgar Factors	Overall Score [N=32]	Administrator Score [N=16]	Physician Score [N=16]	Difference [Admin-Phys]
Climate	-3.28	-3.69	-2.88	-0.81
Spousal satisfaction	-2.78	-3.38	-2.19	-1.19
Shopping and other services	-2.13	-2.06	-2.19	0.13
Mental health	-1.22	-2.25	-0.19	-2.06
Access to larger community	-0.28	-0.94	0.38	-1.31
Emergency room coverage	0.47	-0.63	1.56	-2.19
Demographic, patient mix	0.50	0.13	0.88	-0.75
Social networking	0.50	-0.13	1.13	-1.25
Allied mental health workforce	0.56	0.13	1.00	-0.88
Electronic medical records	0.91	1.19	0.63	0.56

Table 24
Cumulative CAH Community Apgar Scores
Rank Order by Cumulative Score

Location Code ID	Apgar Score
3	421
13	406
8	370
1	331
16	327
12	320
7	311
6	268
4	246
11	228
10	173
5	159
9	154
2	80
15	35
14	18

Figures

Figure 1
Geographic Class CAH Community Advantages and Challenges Mean Scores
Rank Order by Overall Score

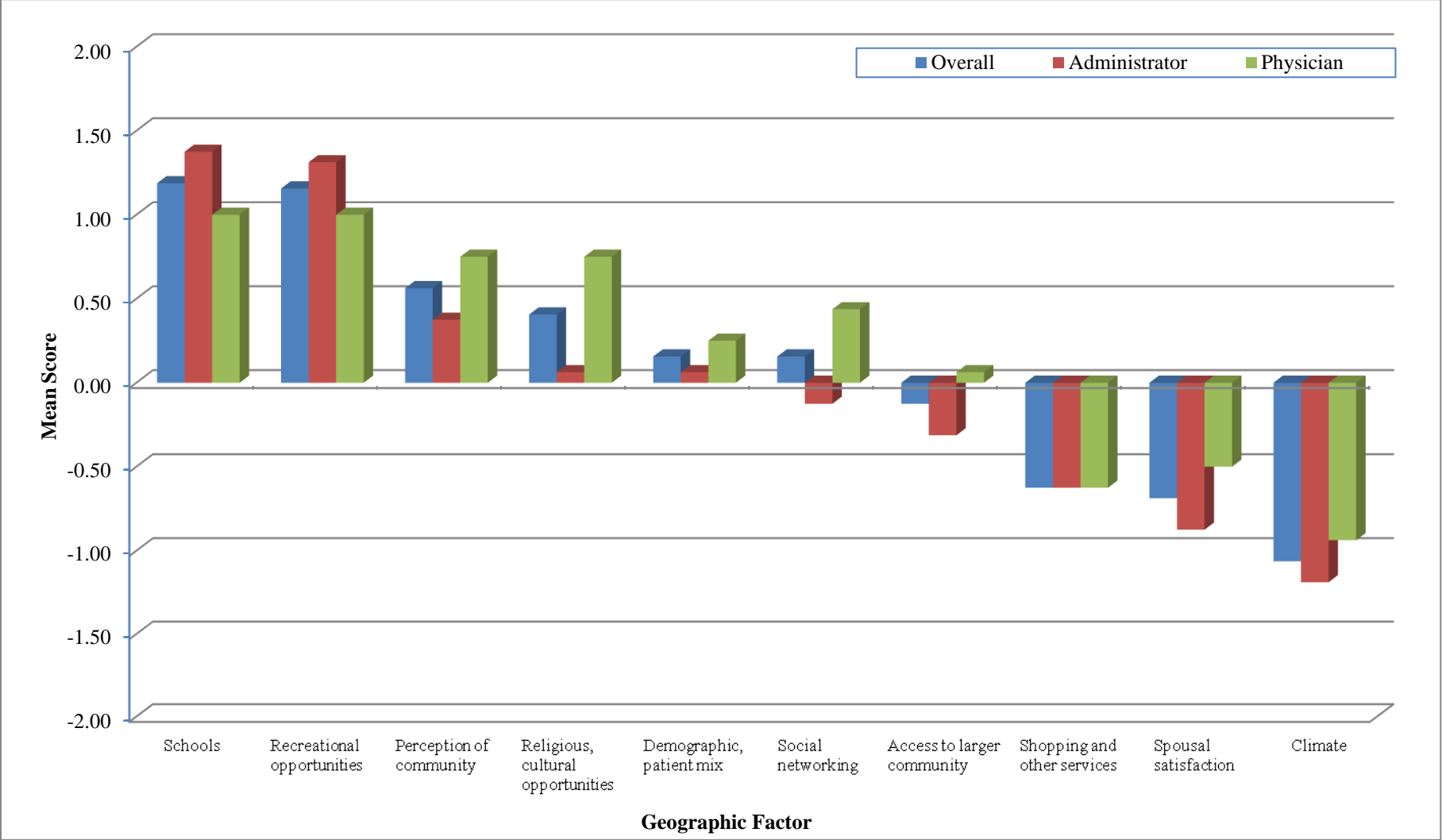


Figure 2
 Economic Class CAH Community Advantages and Challenges Mean Scores
 Rank Order by Overall Score

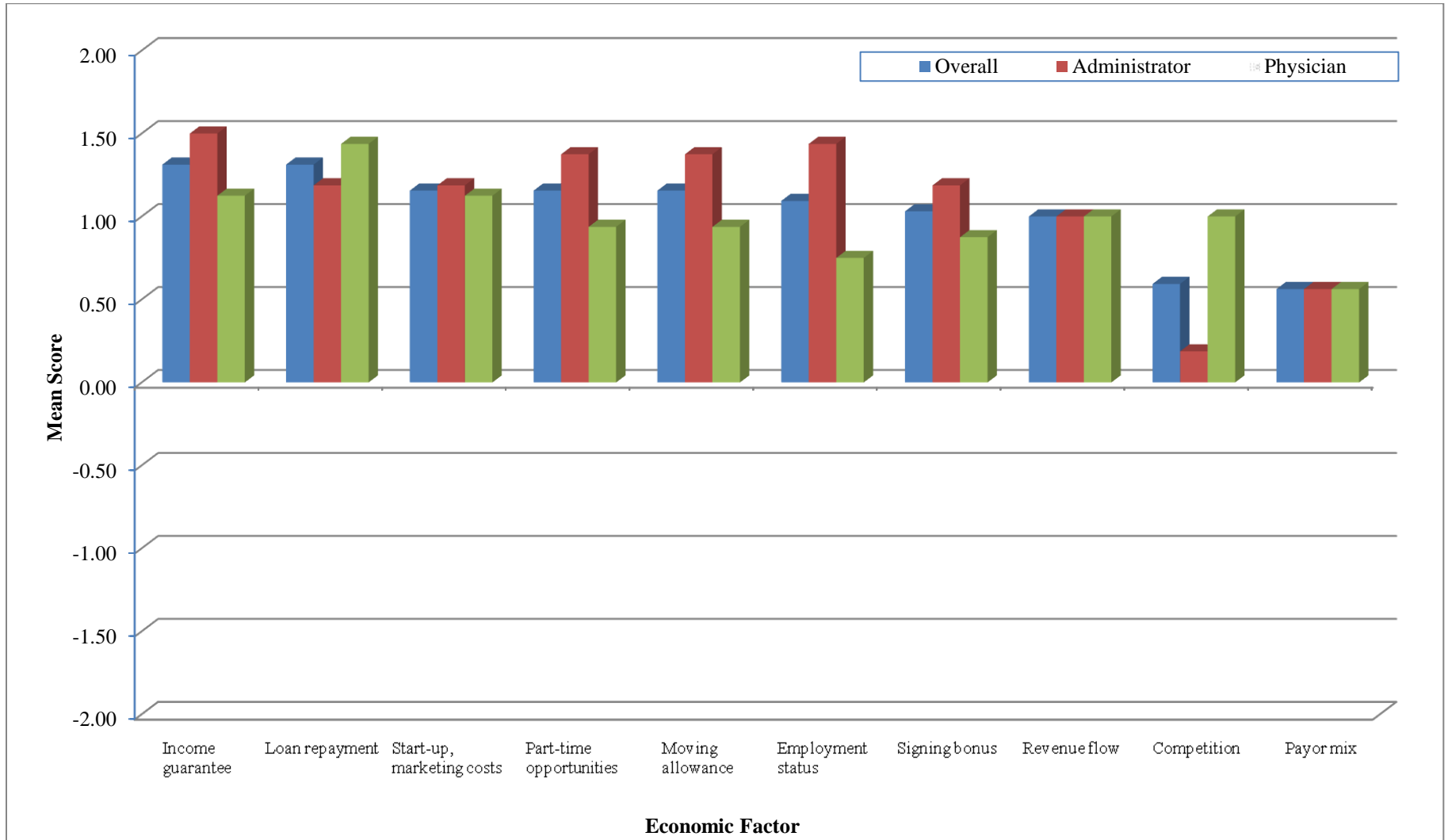


Figure 3
 Scope of Practice Class CAH Community Advantages and Challenges Mean Scores
 Rank Order by Overall Score

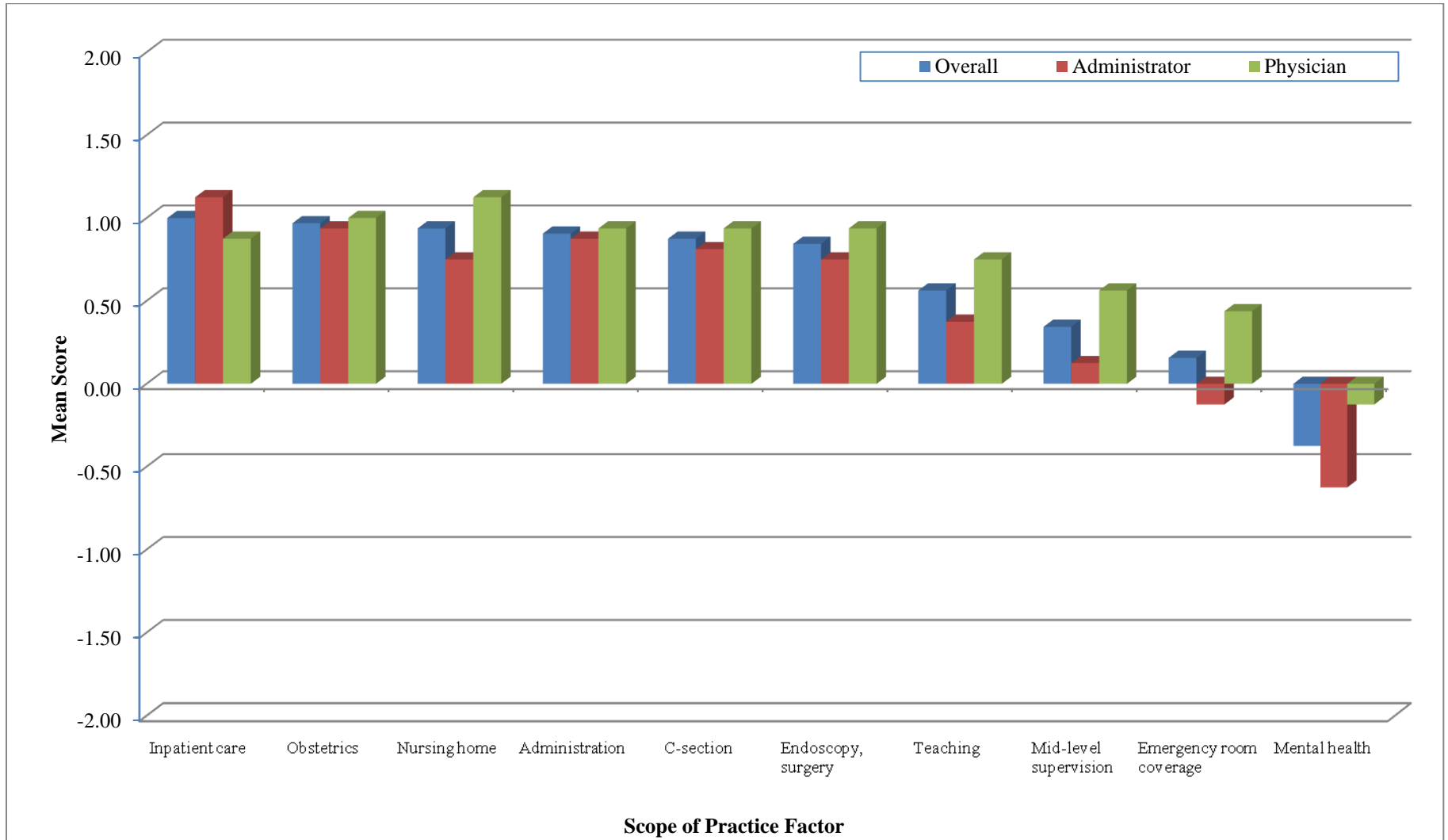


Figure 4
Medical Support Class CAH Community Advantages and Challenges Mean Scores
Rank Order by Overall Score

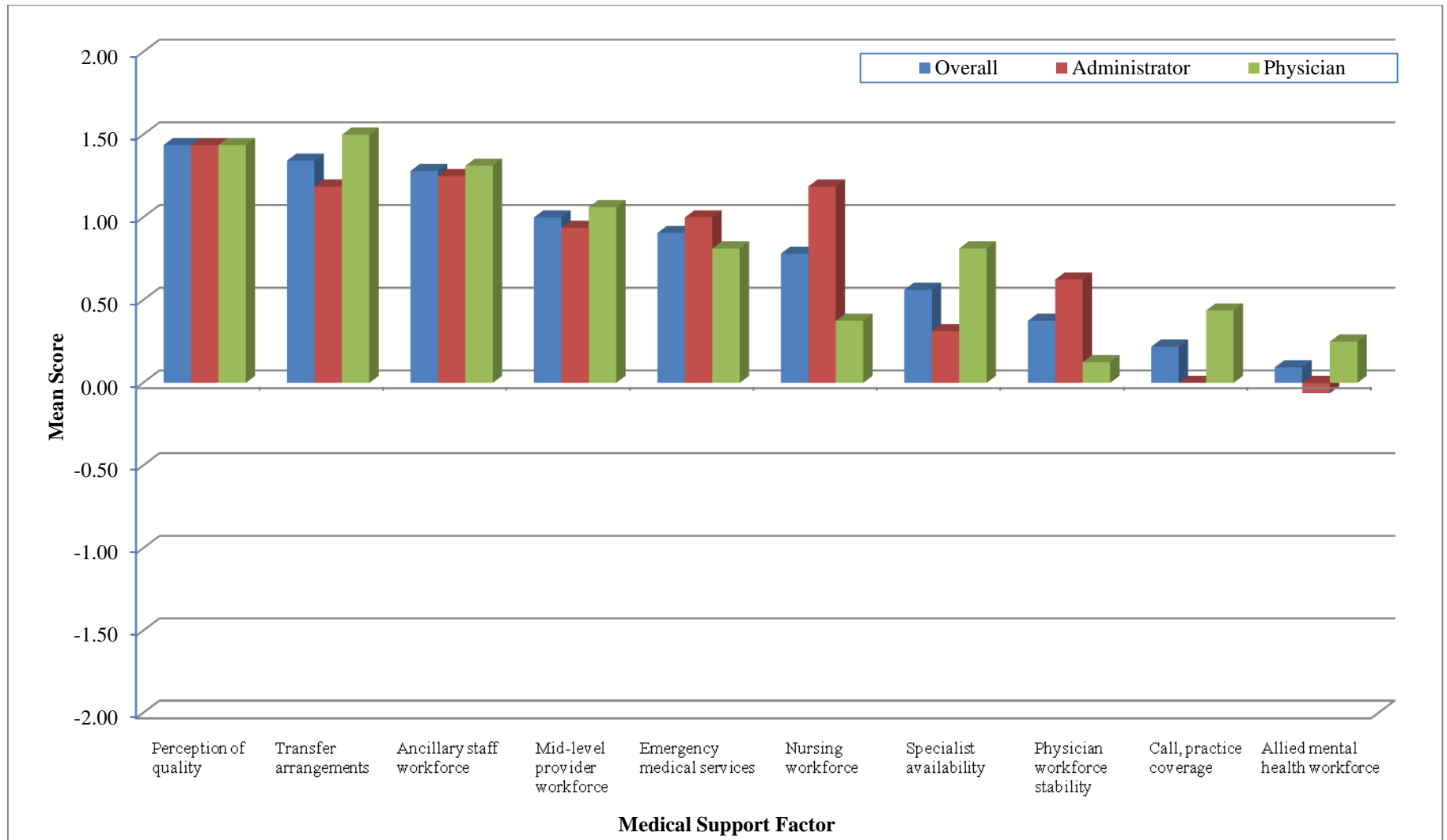


Figure 5
Hospital and Community Support Class CAH Community Advantages and Challenges Mean Scores
Rank Order by Overall Score

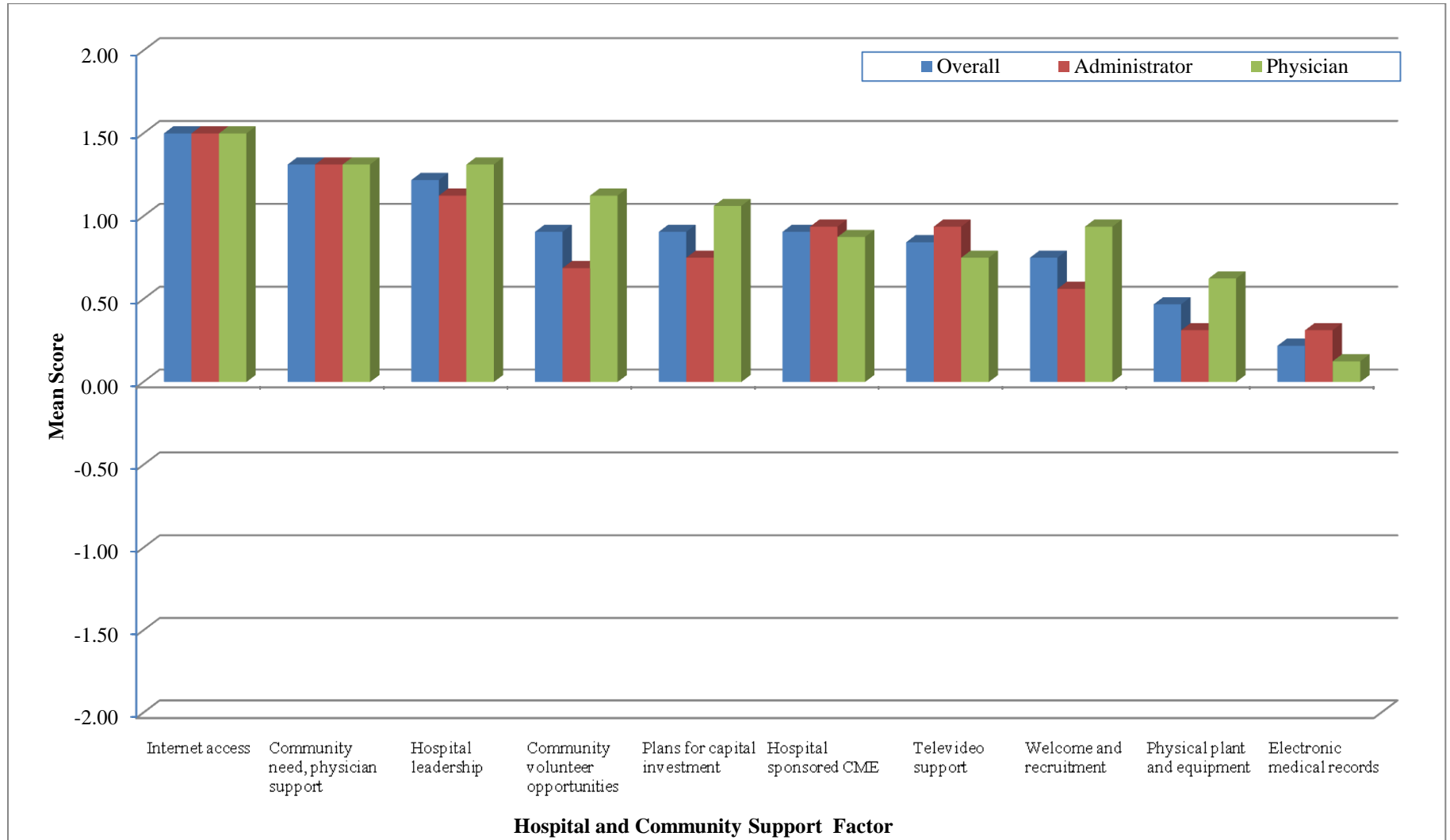


Figure 6
Class CAH Community Advantages and Challenges Cumulative Scores
Rank Order by Summary Score

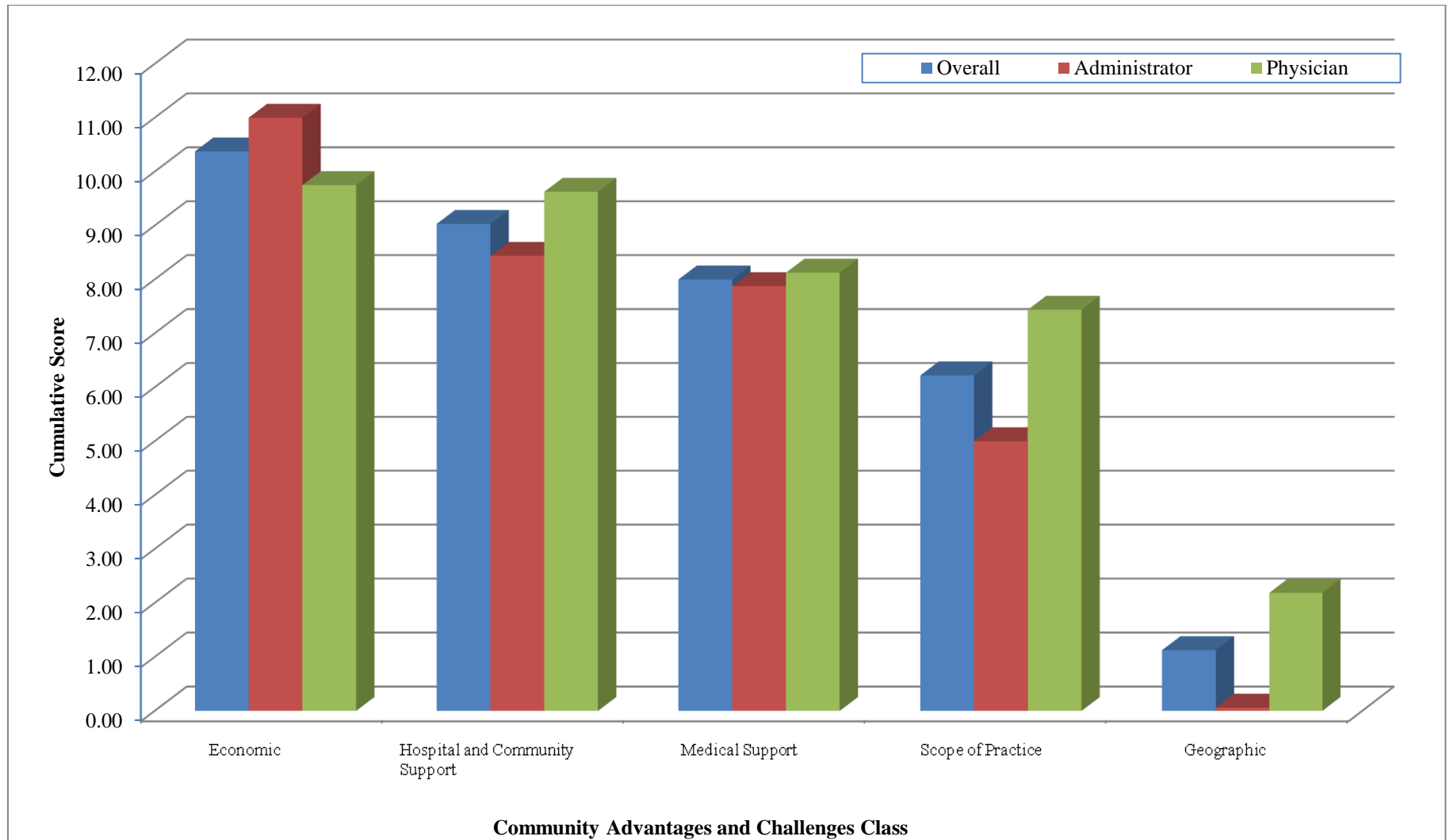


Figure 7
Summary Class CAH Community Advantages and Challenges Mean Scores
Overall by Respondent

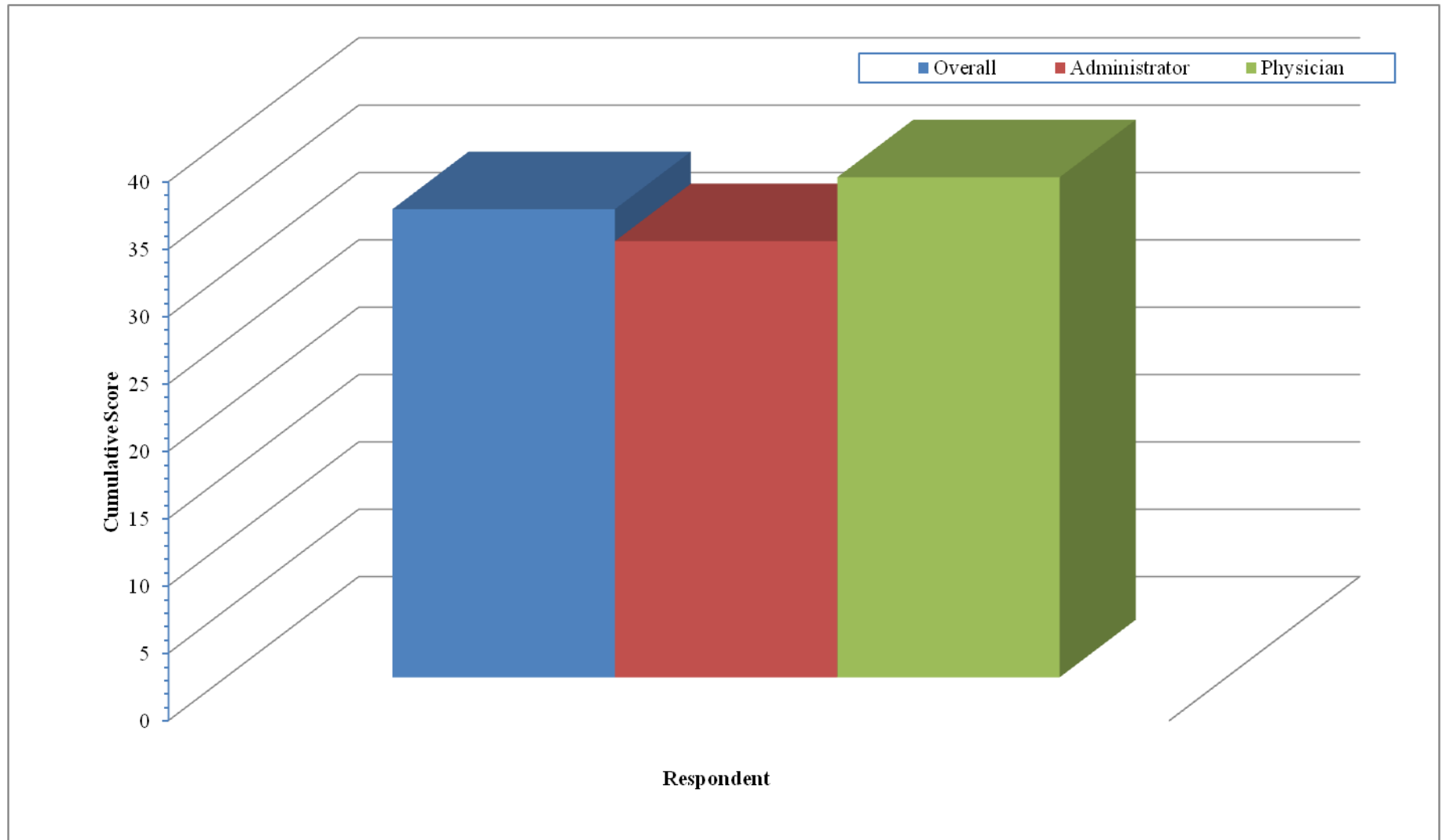


Figure 8
Top 10 CAH Community Advantages Mean Scores
Rank Order by Overall Score

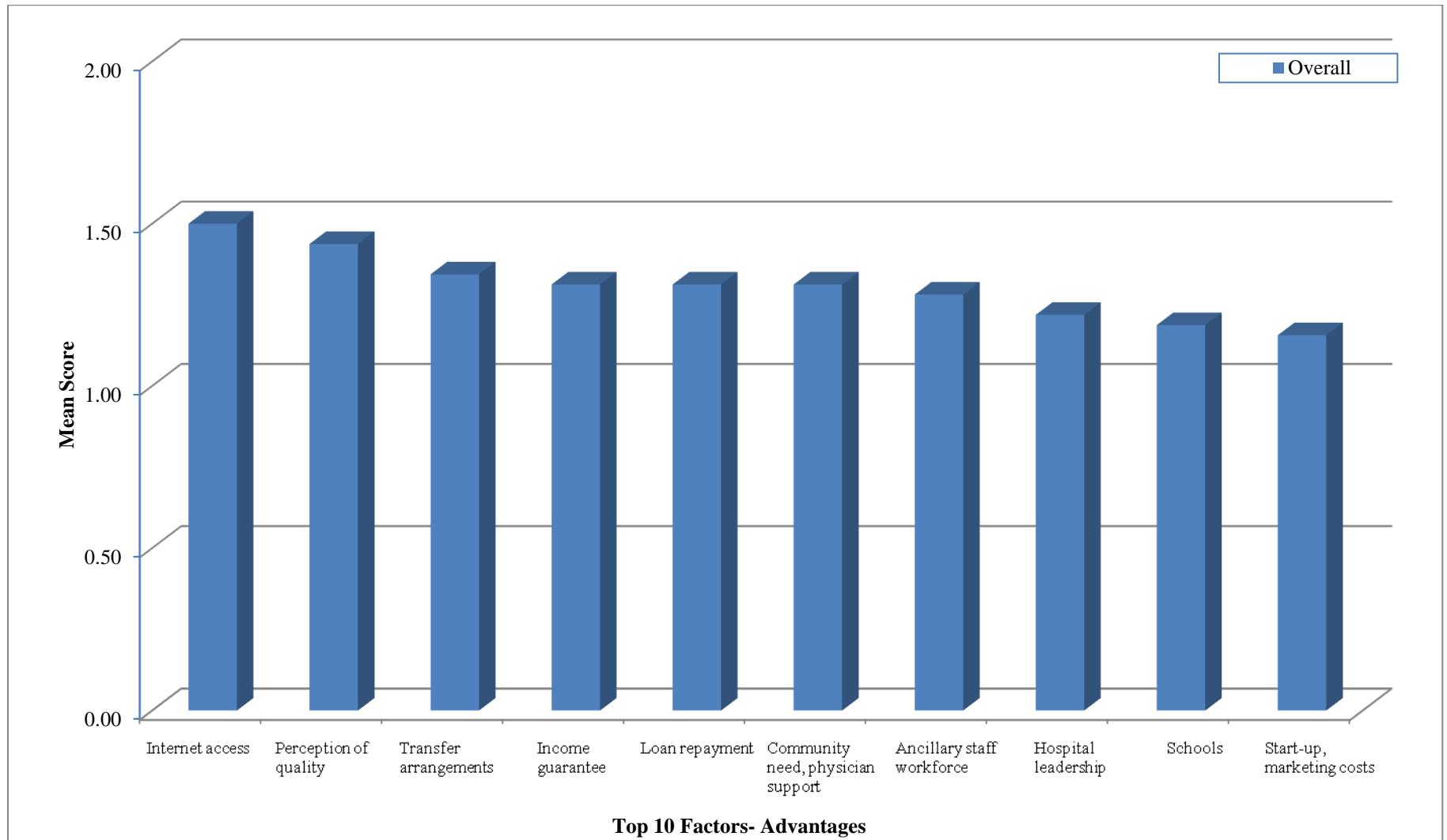


Figure 8
Top 10 CAH Community Advantages Mean Scores
Rank Order by Overall Score

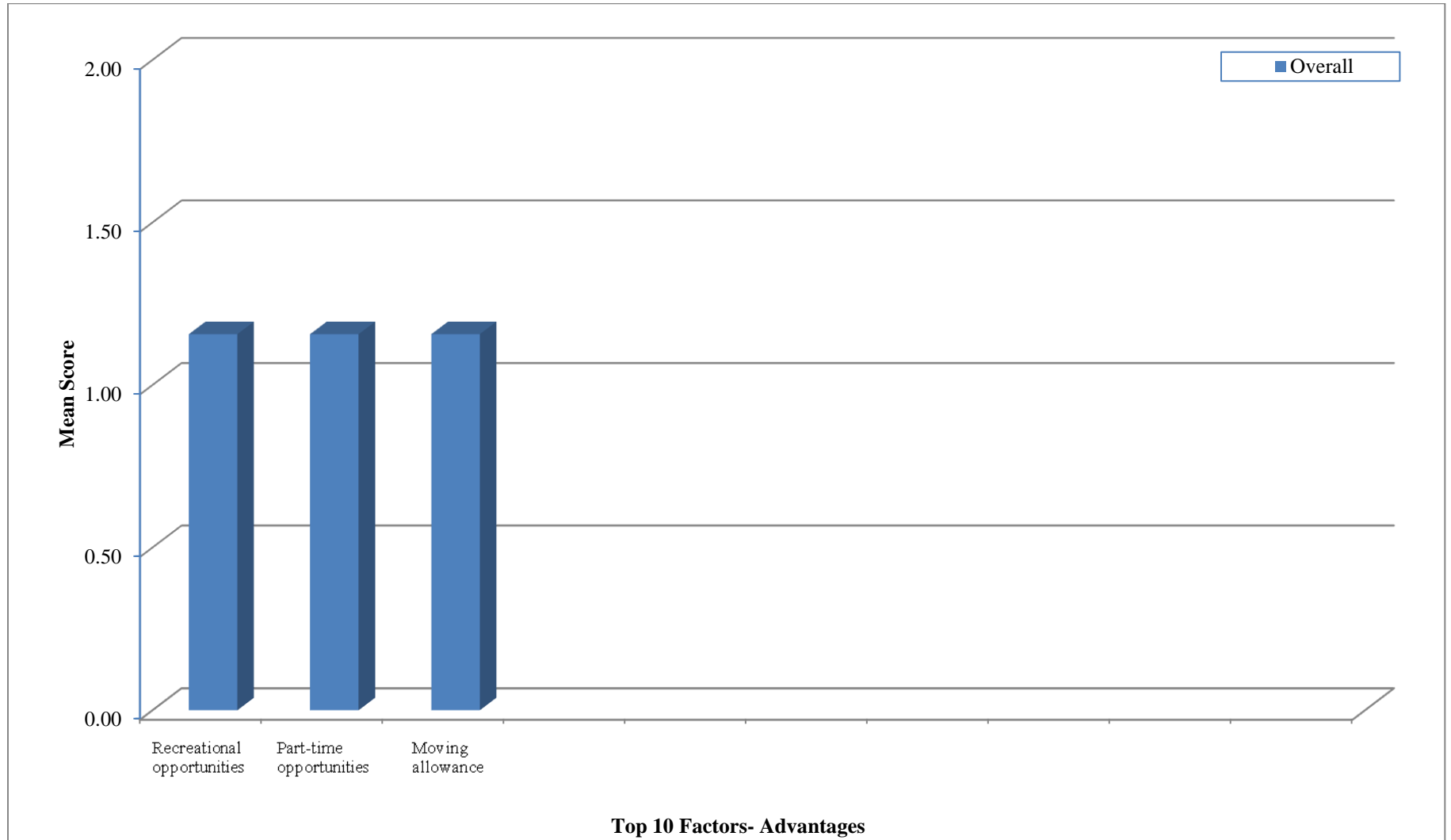


Figure 9
 Top 10 CAH Community Challenges Mean Scores
 Rank Order by Overall Score

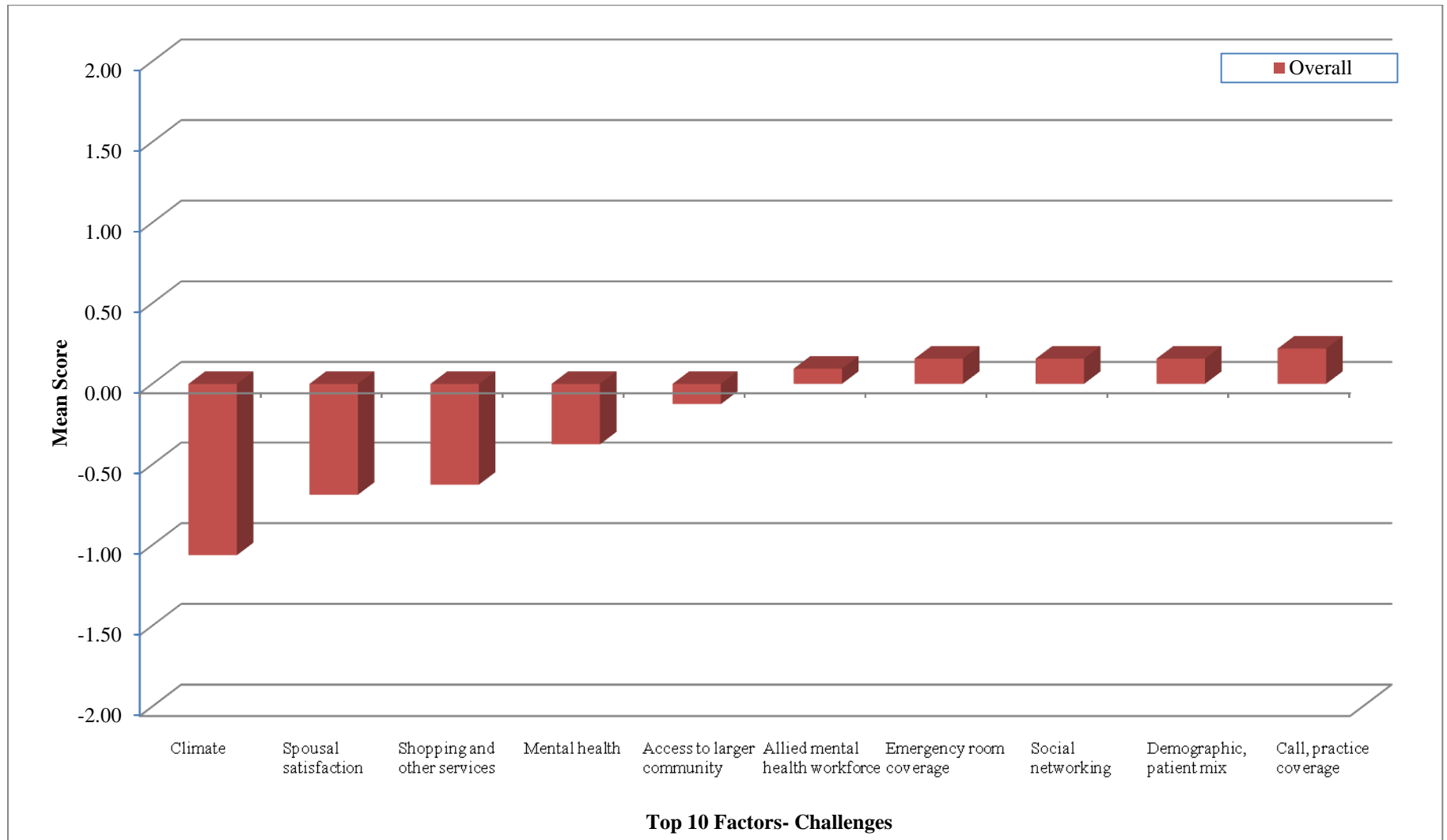


Figure 9
Top 10 CAH Community Challenges Mean Scores
Rank Order by Overall Score

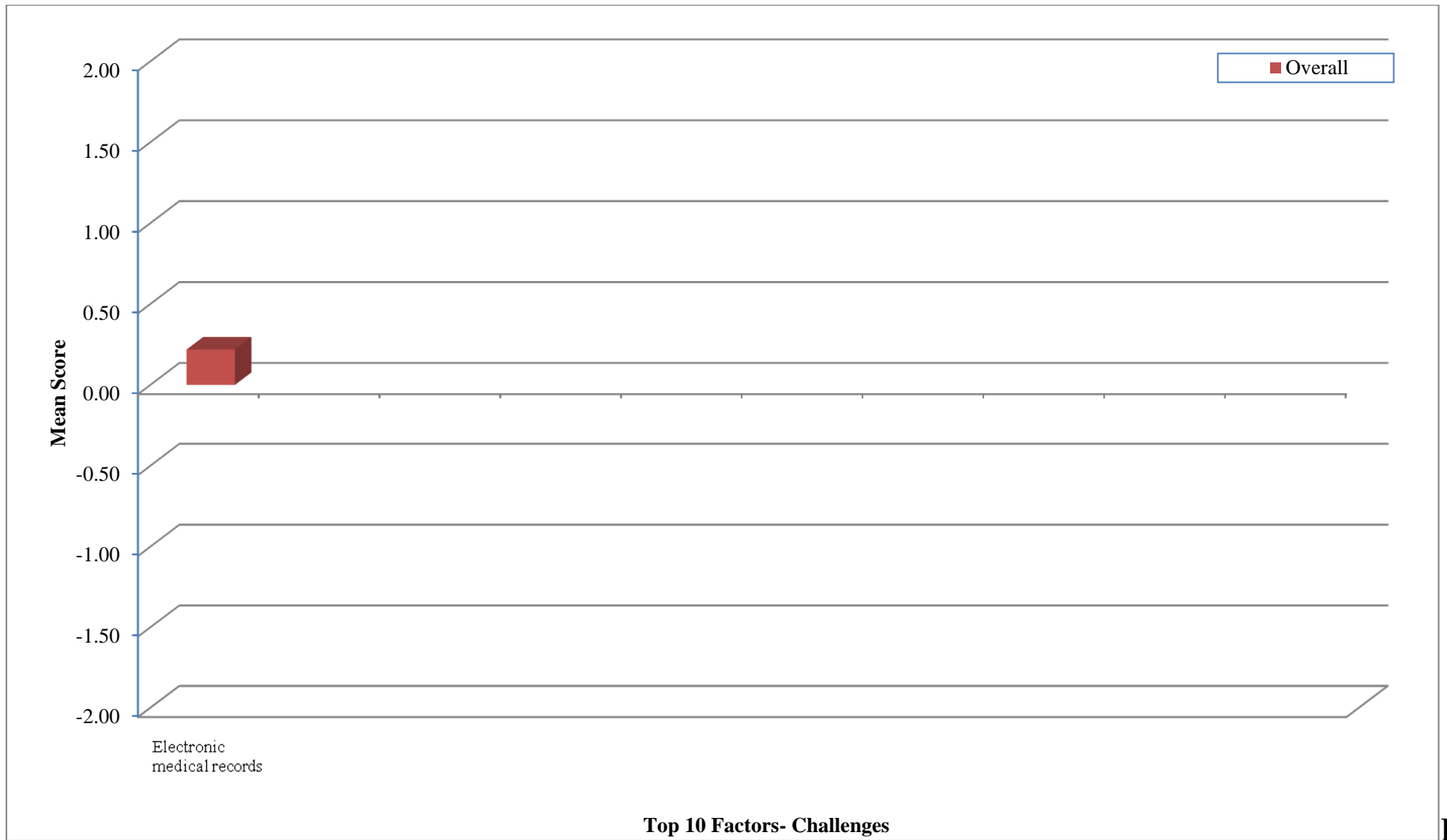


Figure 10
 Geographic Class CAH Community Importance Mean Scores
 Rank Order by Overall Score

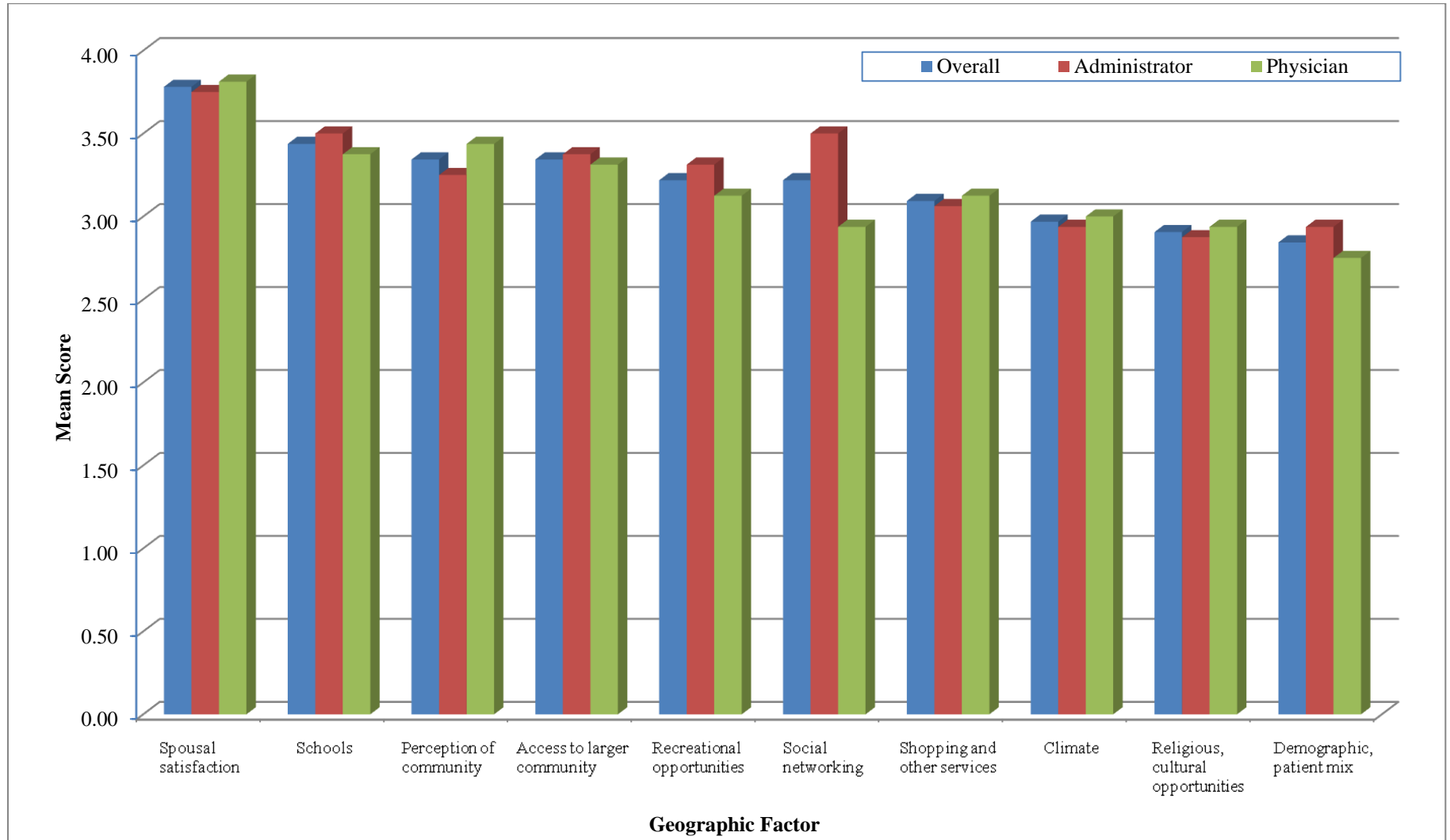


Figure 11
 Economic Class CAH Community Importance Mean Scores
 Rank Order by Overall Score

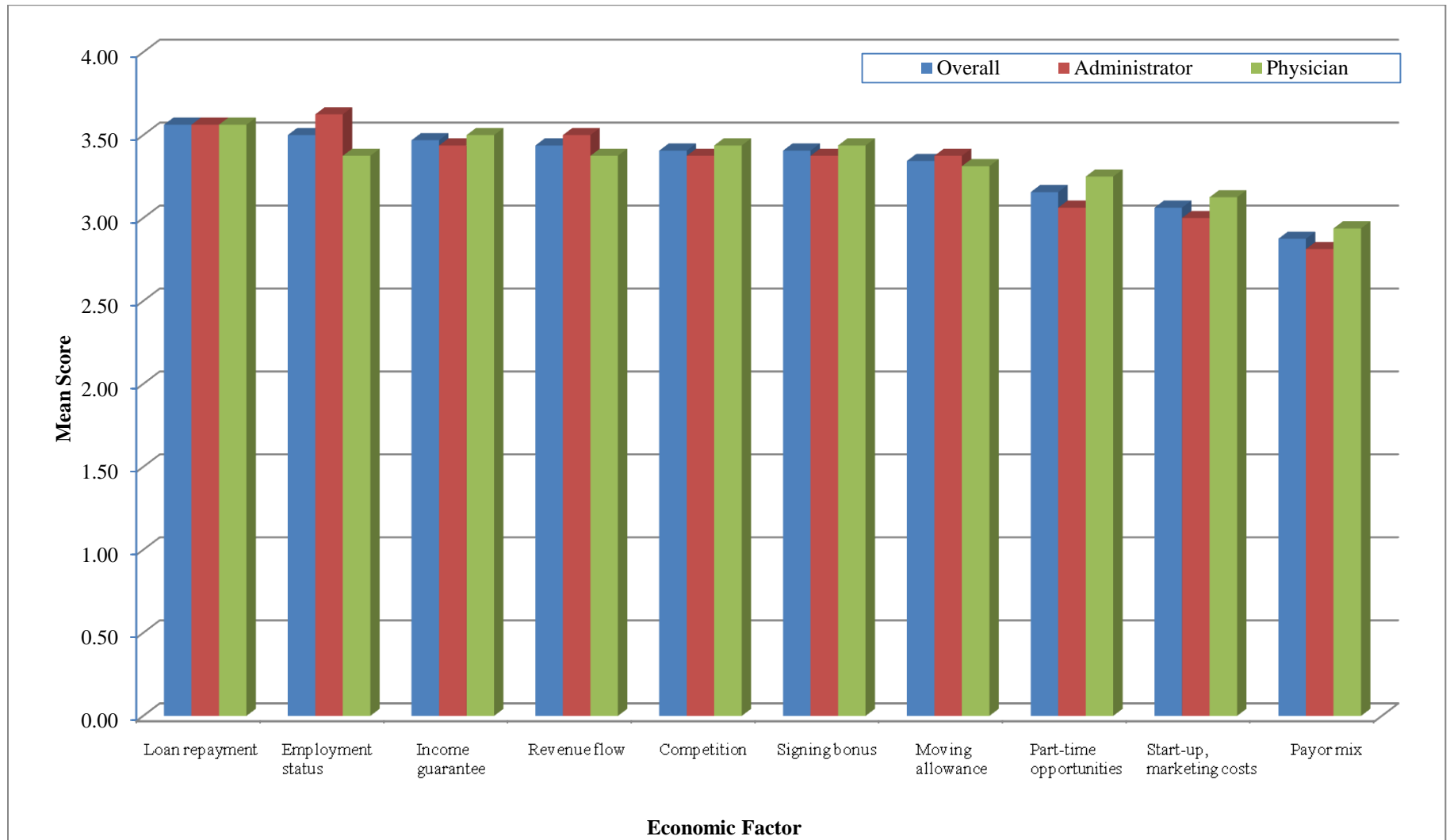


Figure 12
 Scope of Practice Class CAH Community Importance Mean Scores
 Rank Order by Overall Score

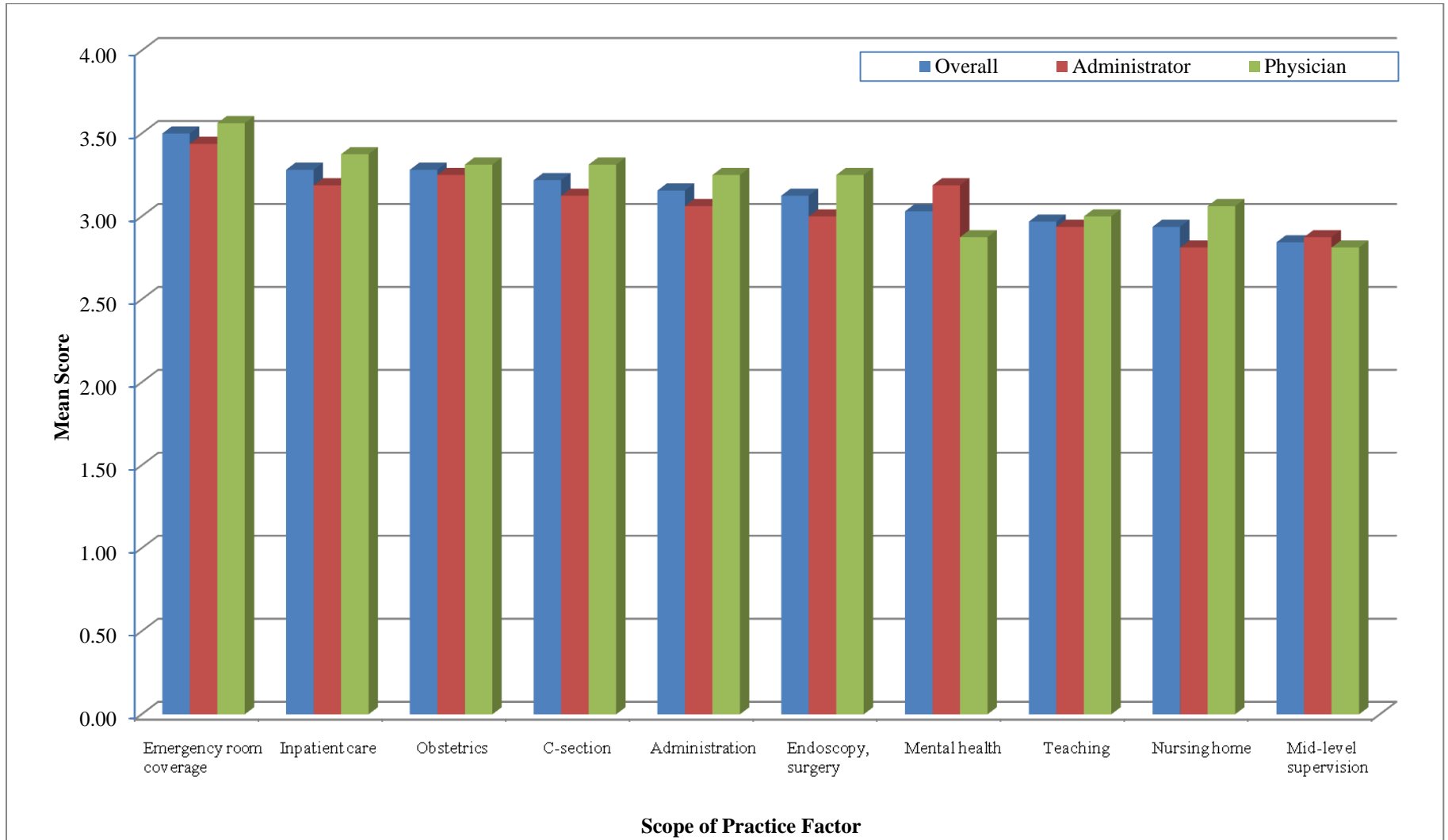


Figure 13
 Medical Support Class CAH Community Importance Mean Scores
 Rank Order by Overall Score

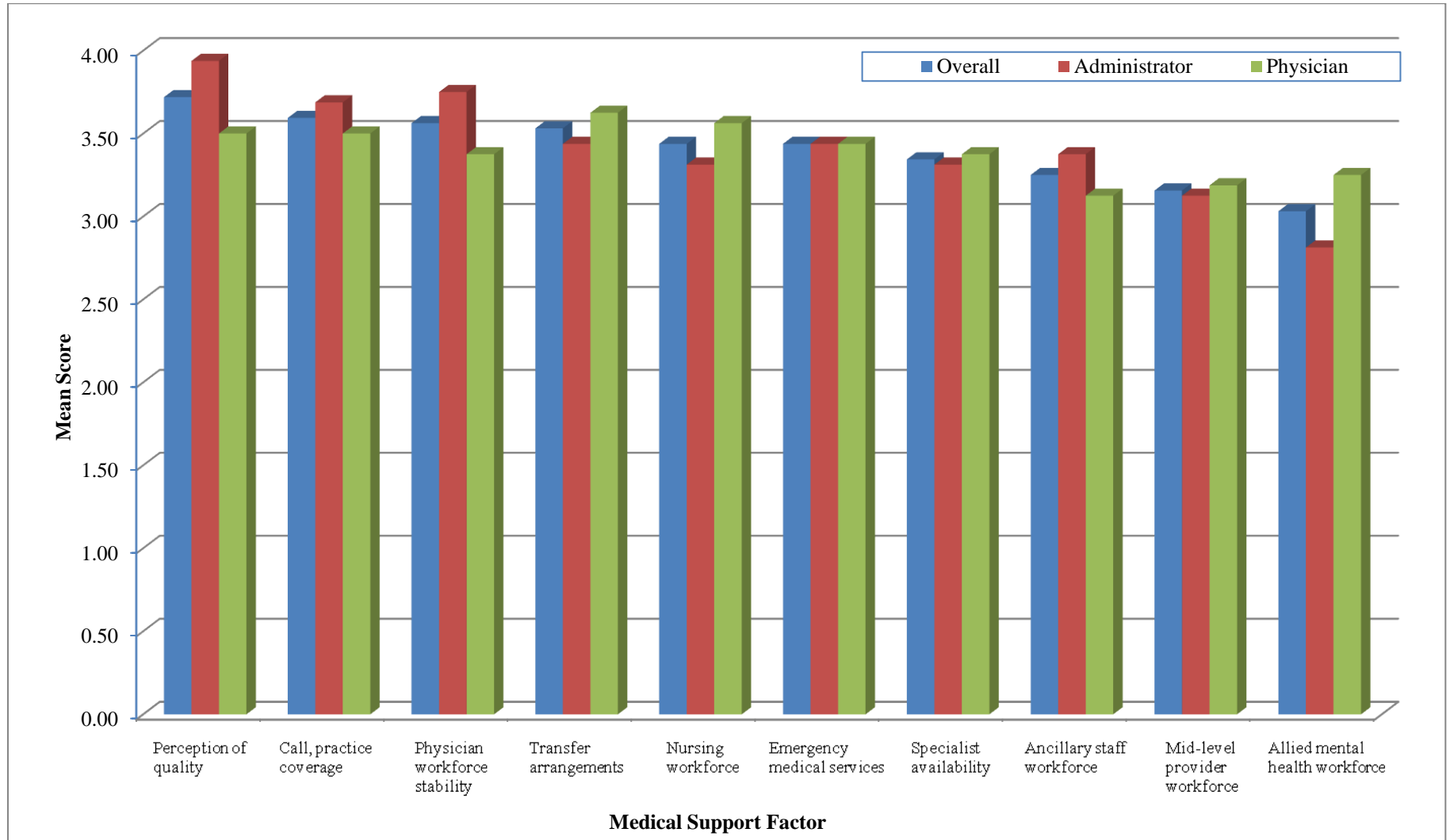


Figure 14
 Hospital and Community Support Class CAH Community Importance Mean Scores
 Rank Order by Overall Score

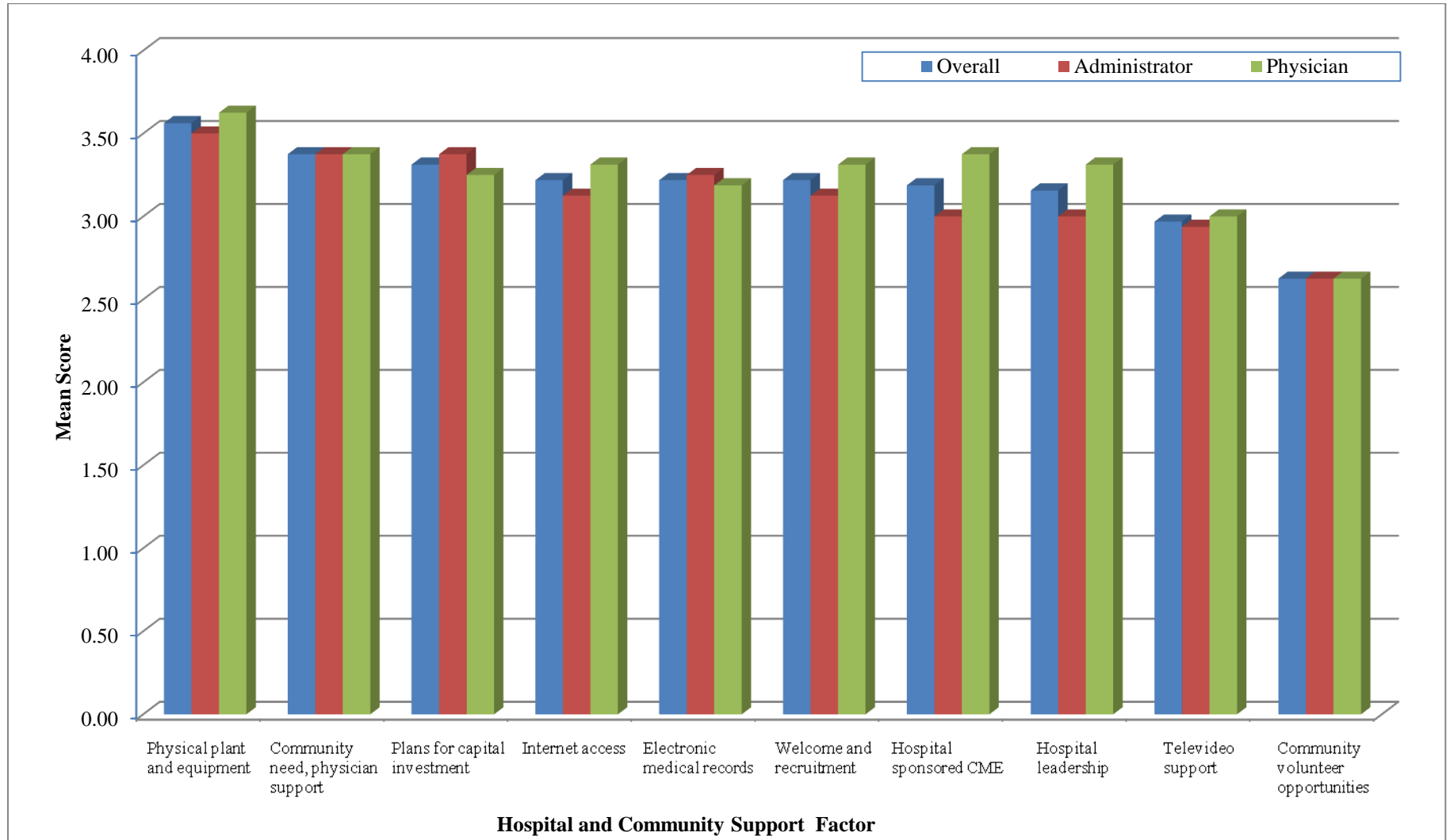


Figure 15
 Class CAH Community Importance Cumulative Scores
 Rank Order by Summary Score

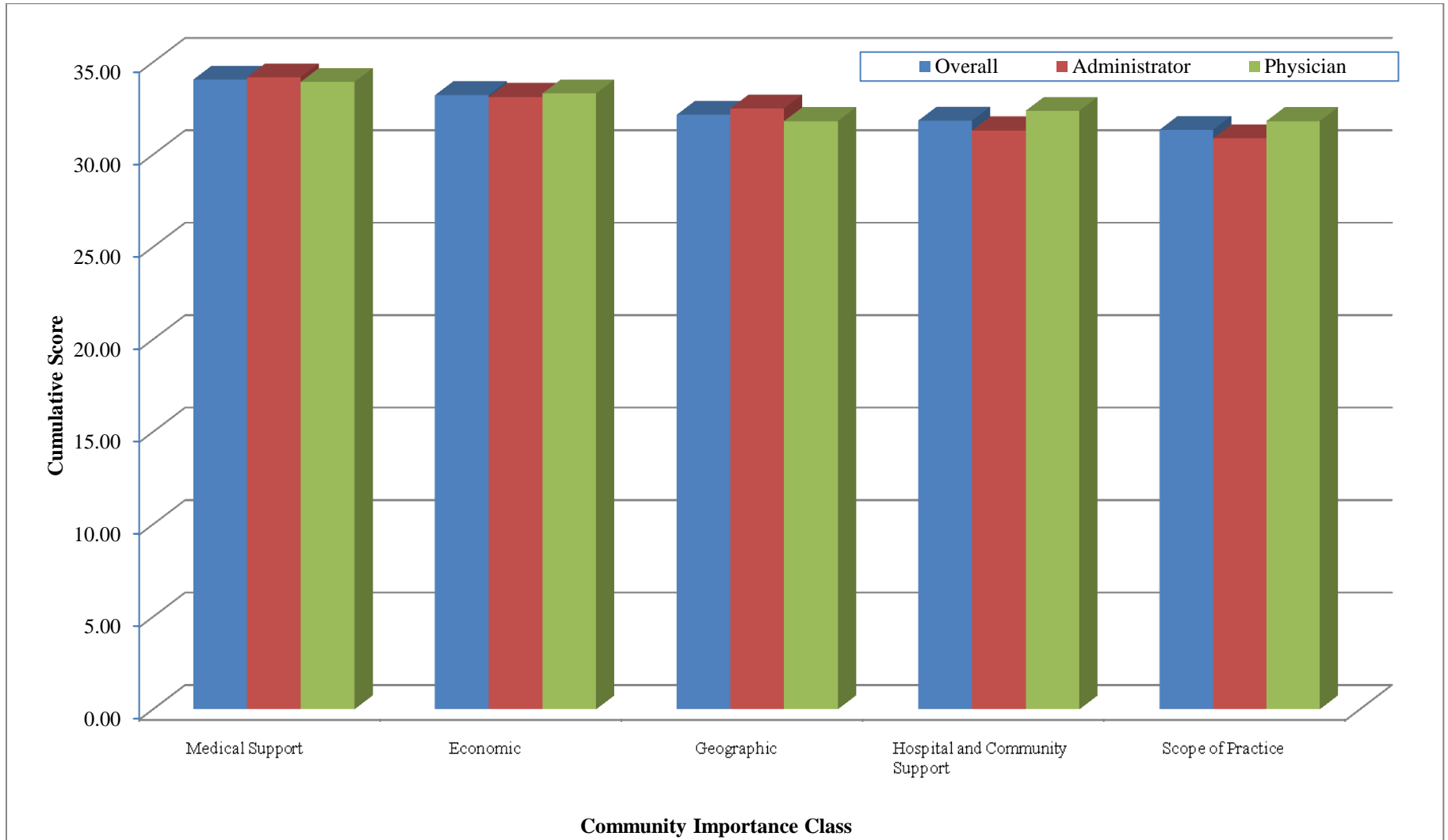


Figure 16
Summary Class CAH Community Importance Mean Scores
Overall by Respondent

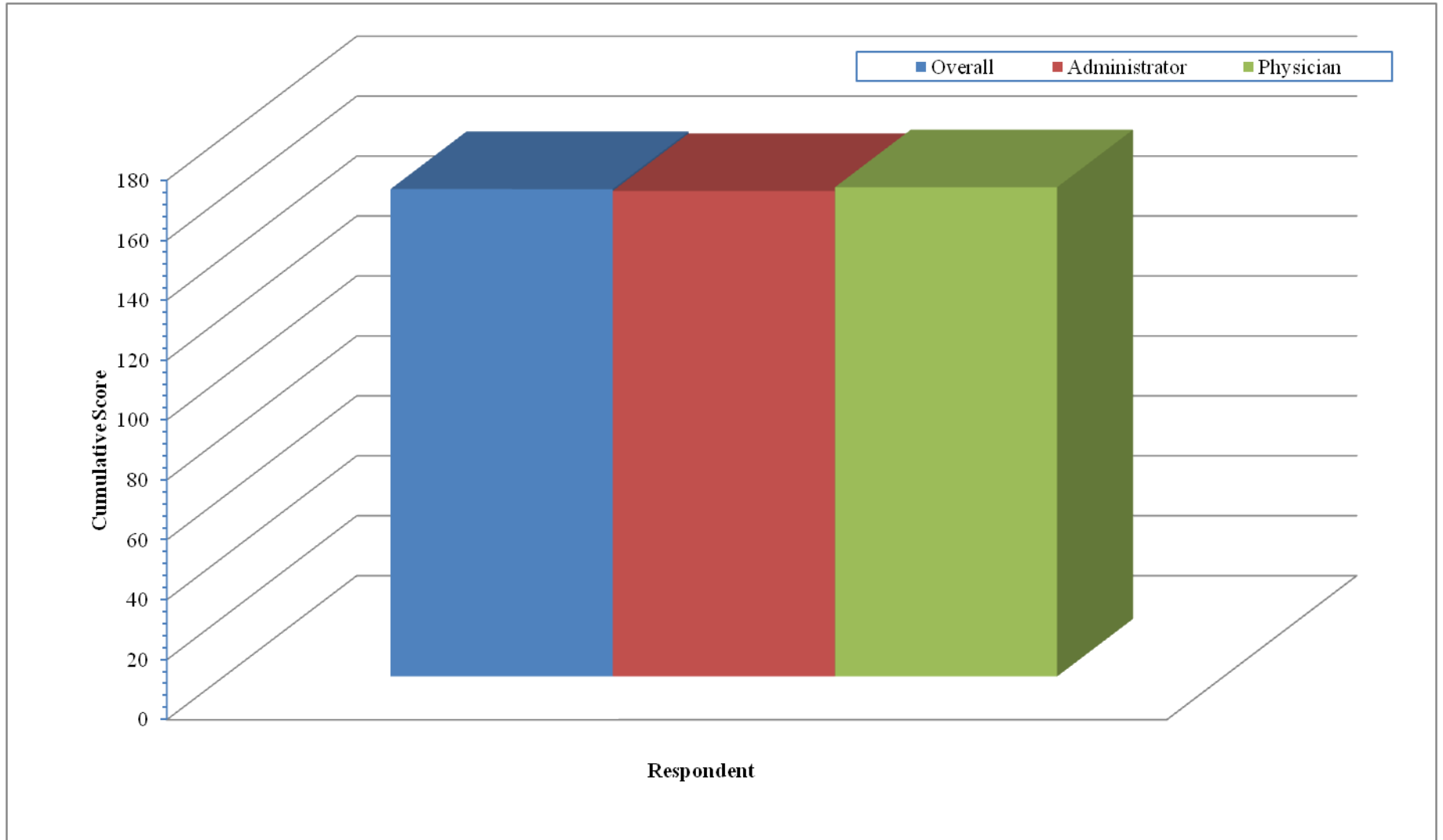


Figure 17
Top 10 CAH Community Importance Mean Scores
Rank Order by Overall Score

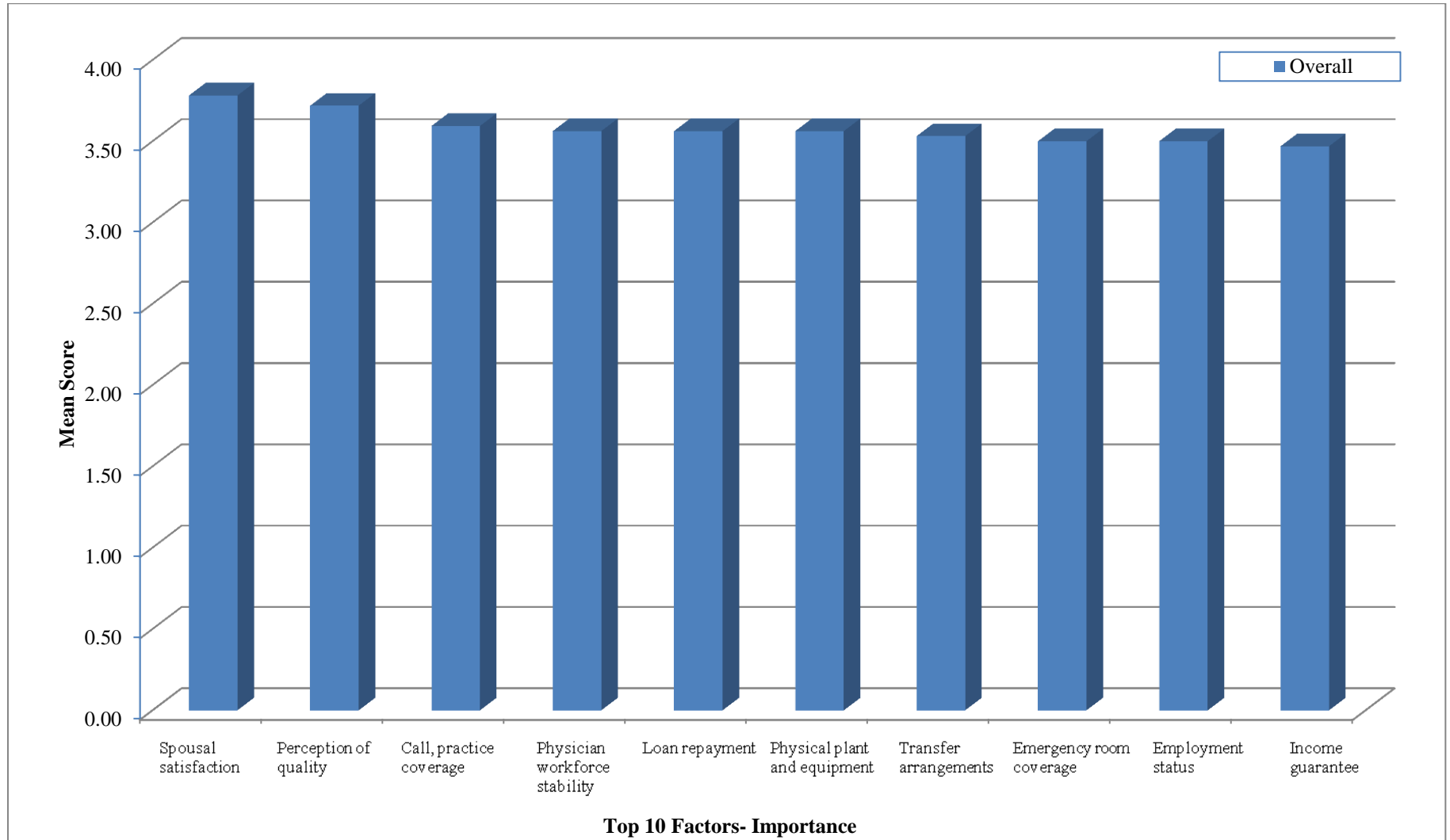


Figure 18
 Geographic Class CAH Community Apgar Mean Scores
 Rank Order by Overall Score

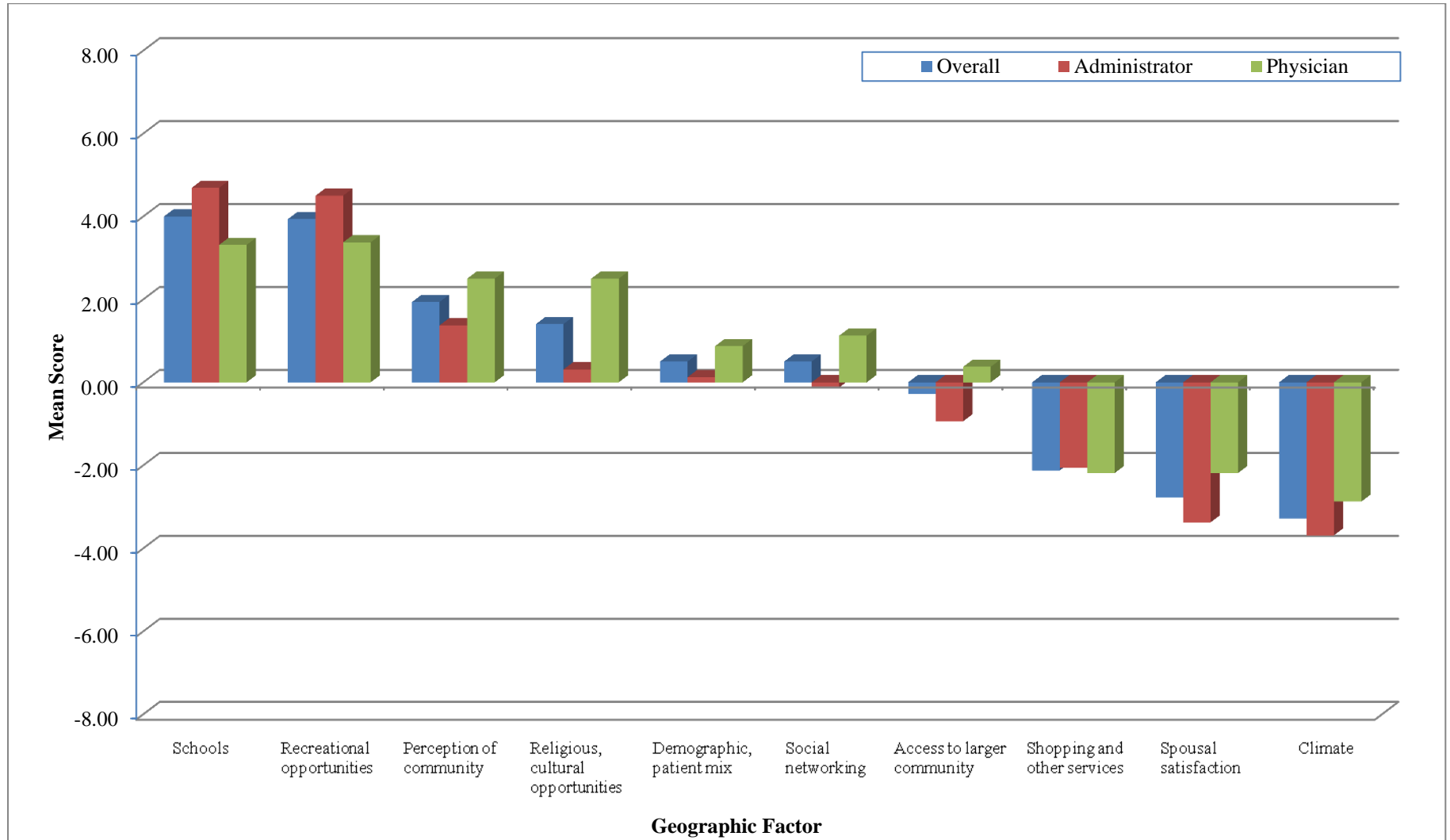


Figure 19
 Economic Class CAH Community Apgar Mean Scores
 Rank Order by Overall Score

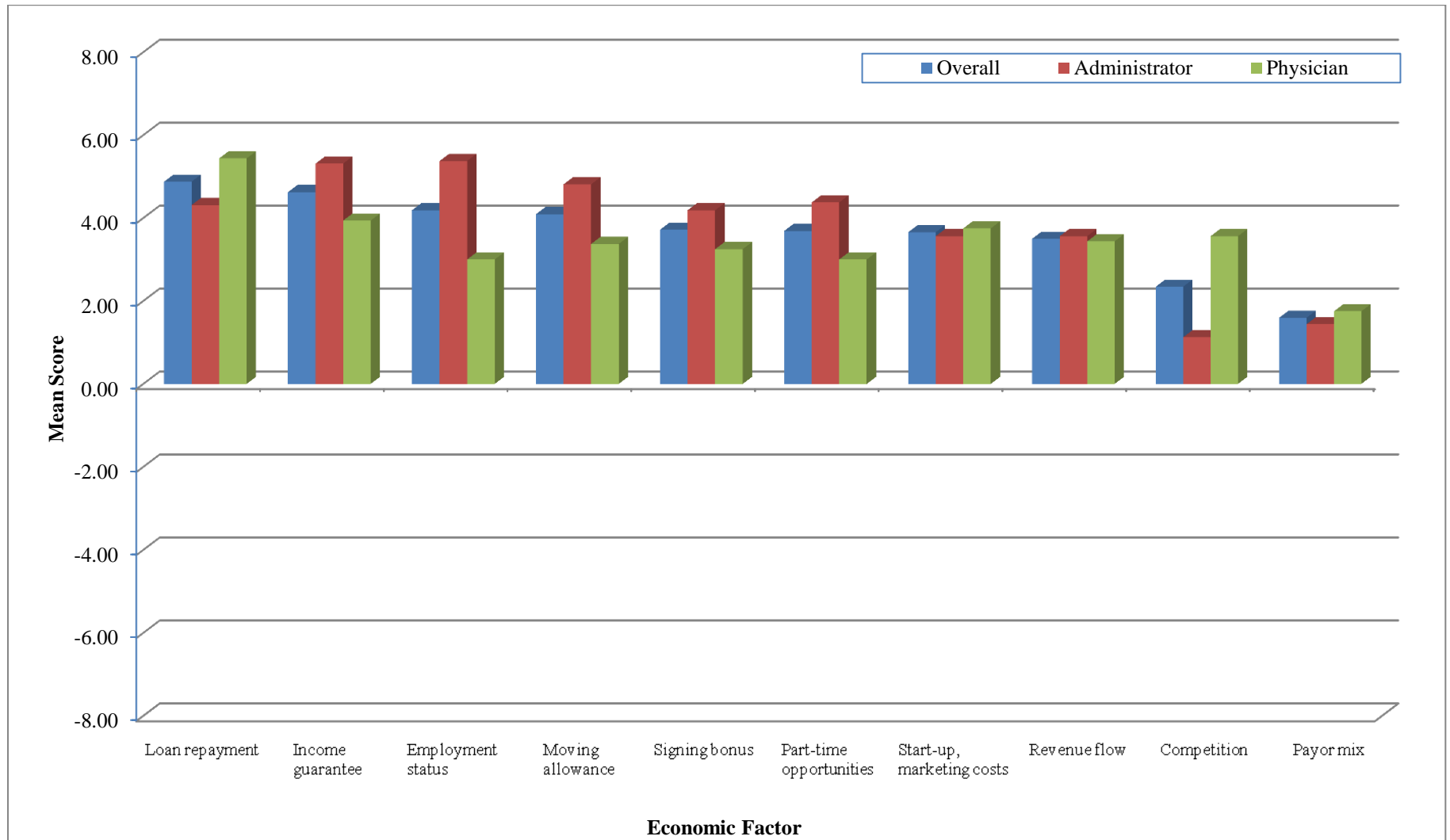


Figure 20
 Scope of Practice Class CAH Community Apgar Mean Scores
 Rank Order by Overall Score

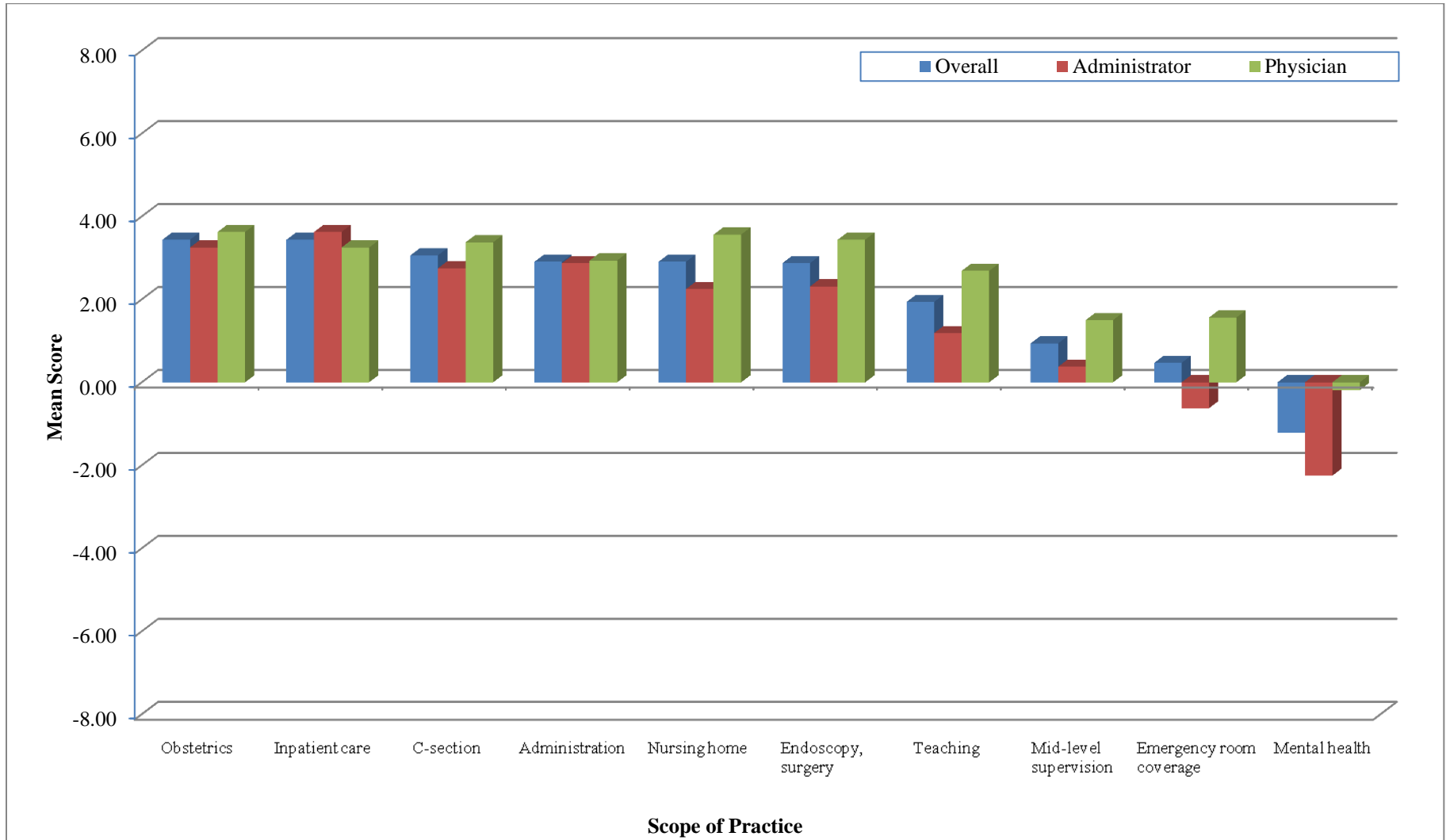


Figure 21
 Medical Support Class CAH Community Apgar Mean Scores
 Rank Order by Overall Score

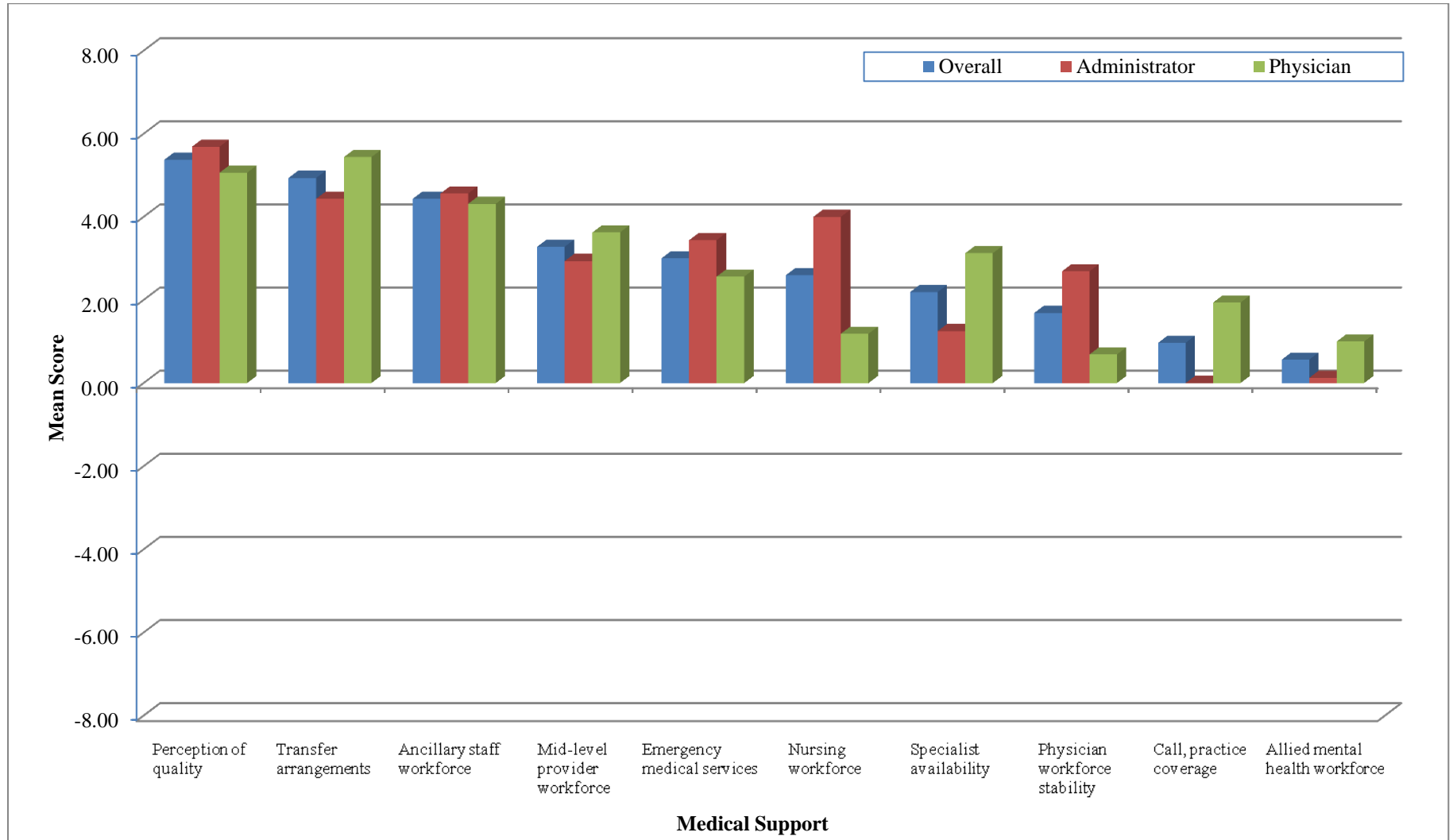


Figure 22
 Hospital and Community Support Class CAH Community Apgar Mean Scores
 Rank Order by Overall Score

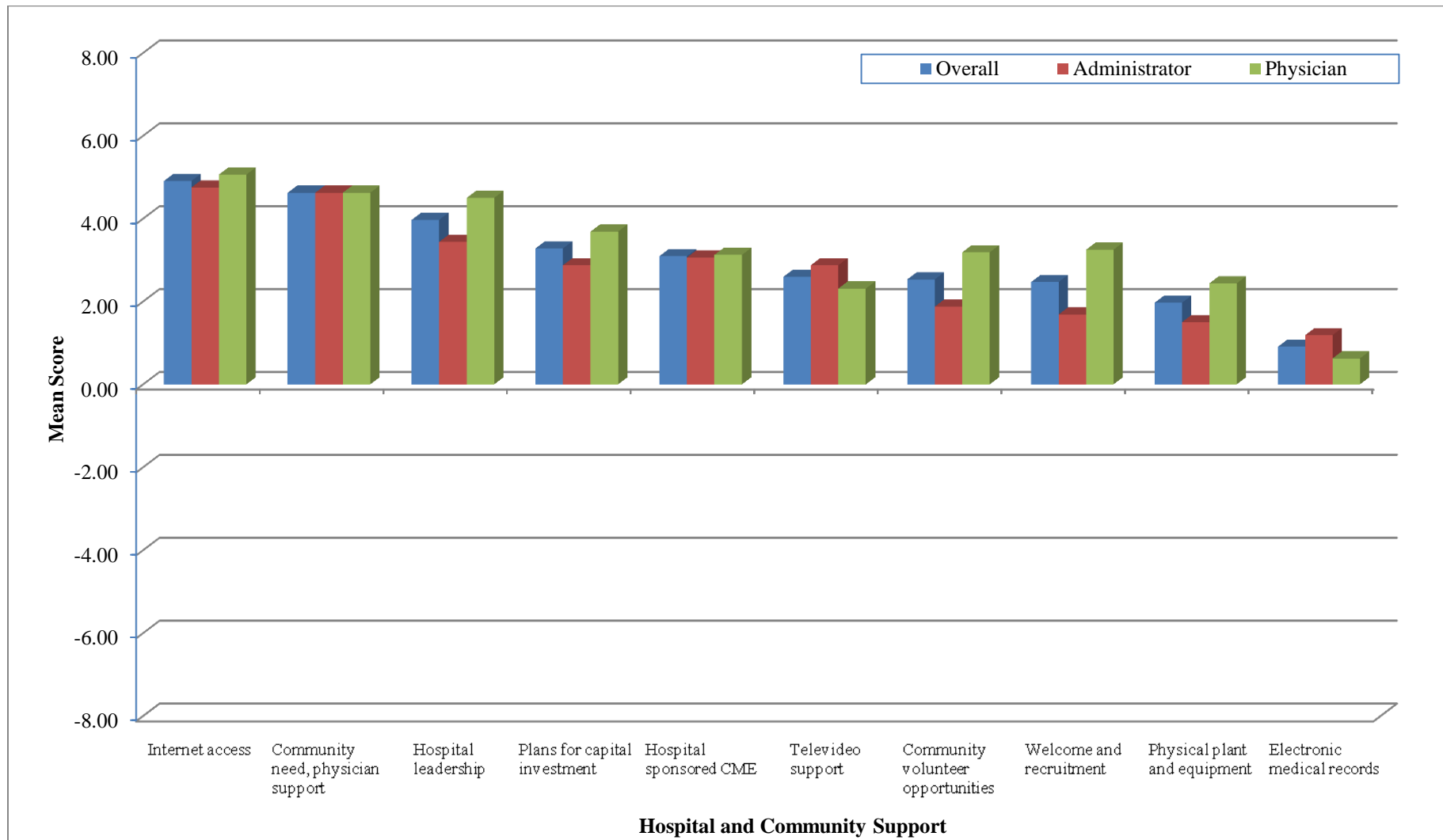


Figure 23
 Class CAH Community Apgar Cumulative Scores
 Rank Order by Summary Score

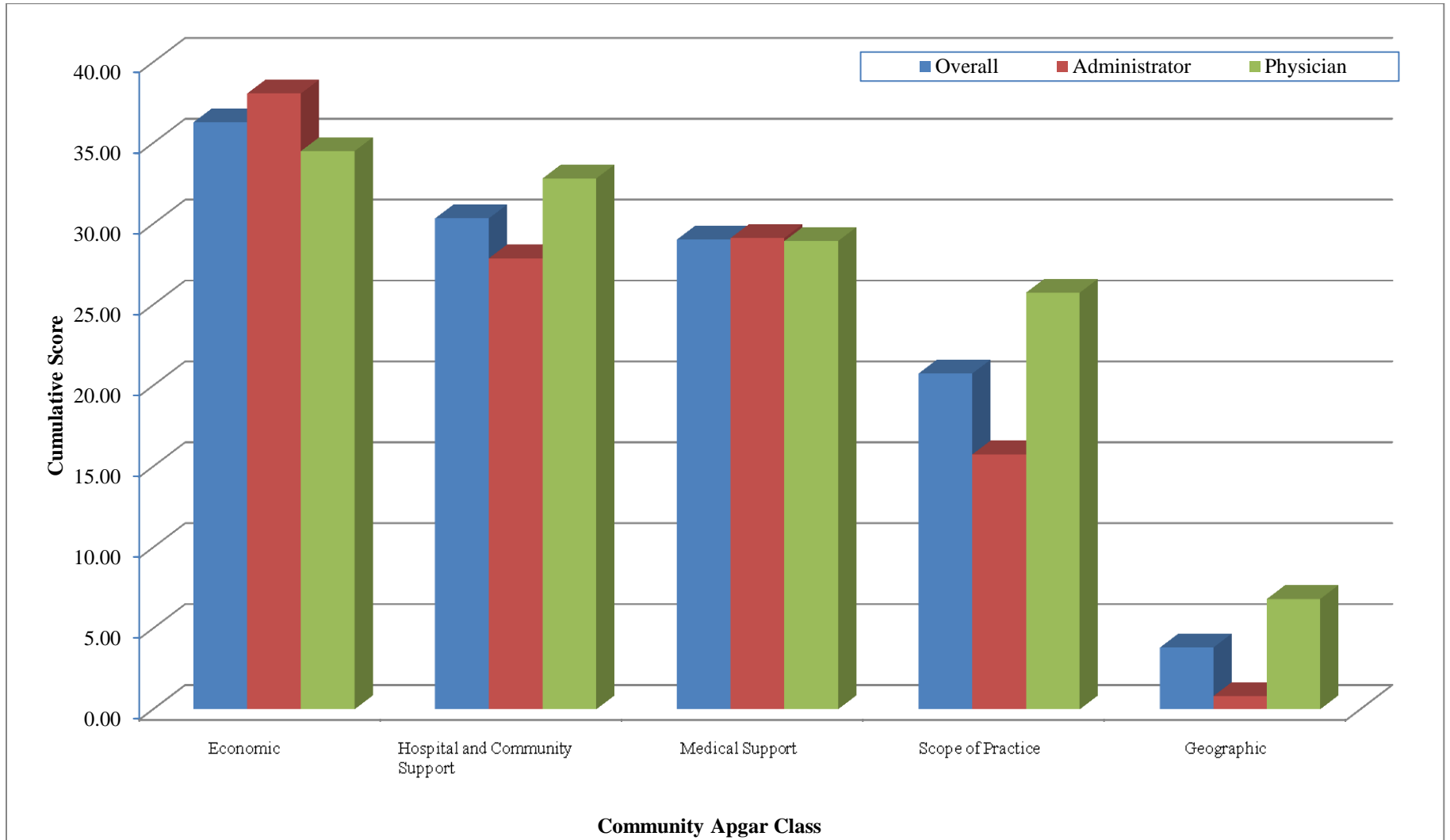


Figure 24
Summary Class CAH Community Apgar Mean Scores
Overall by Respondent

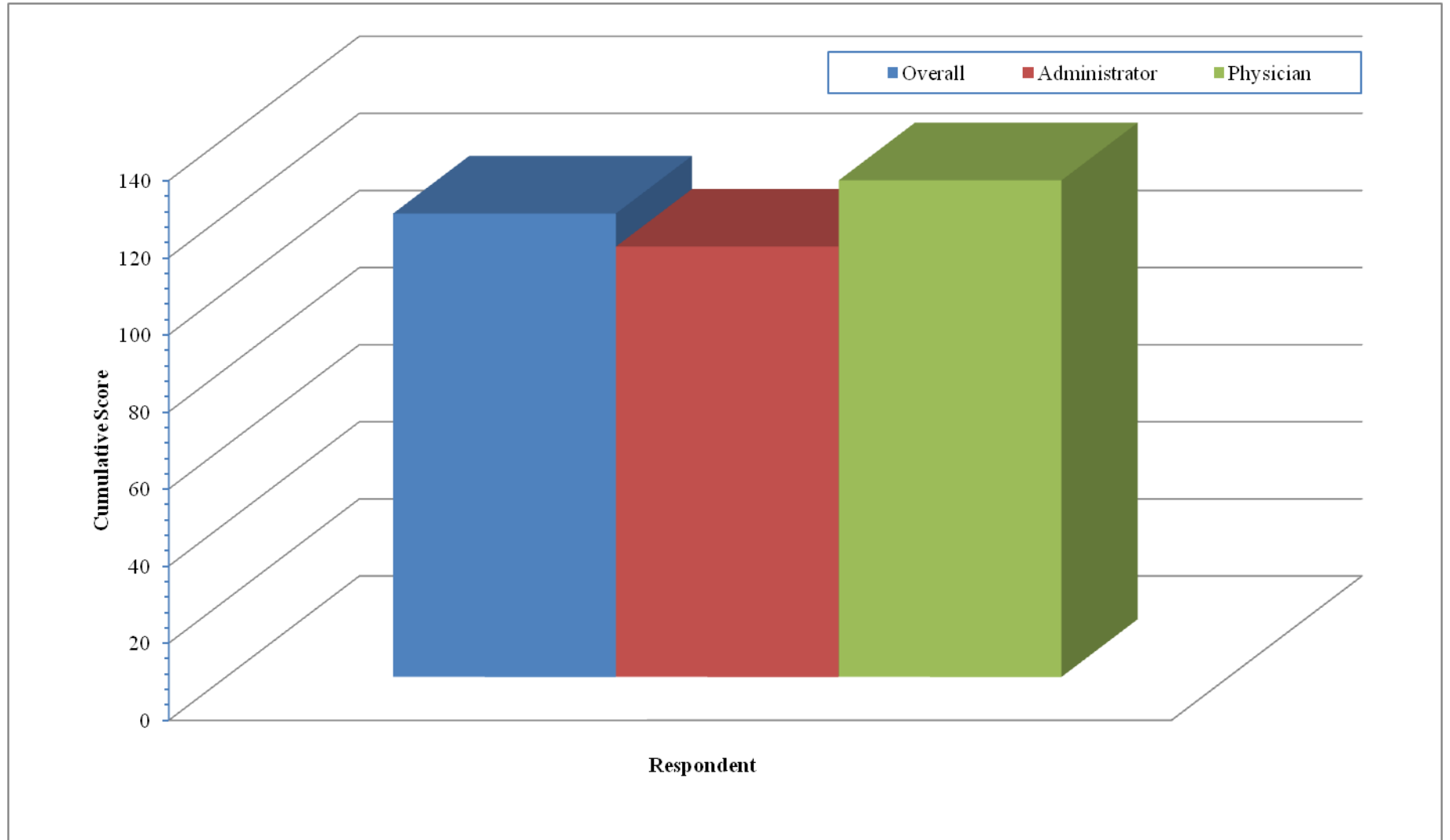


Figure 25
 Top 10 CAH Community Apgar Mean Scores
 Rank Order by Overall Score

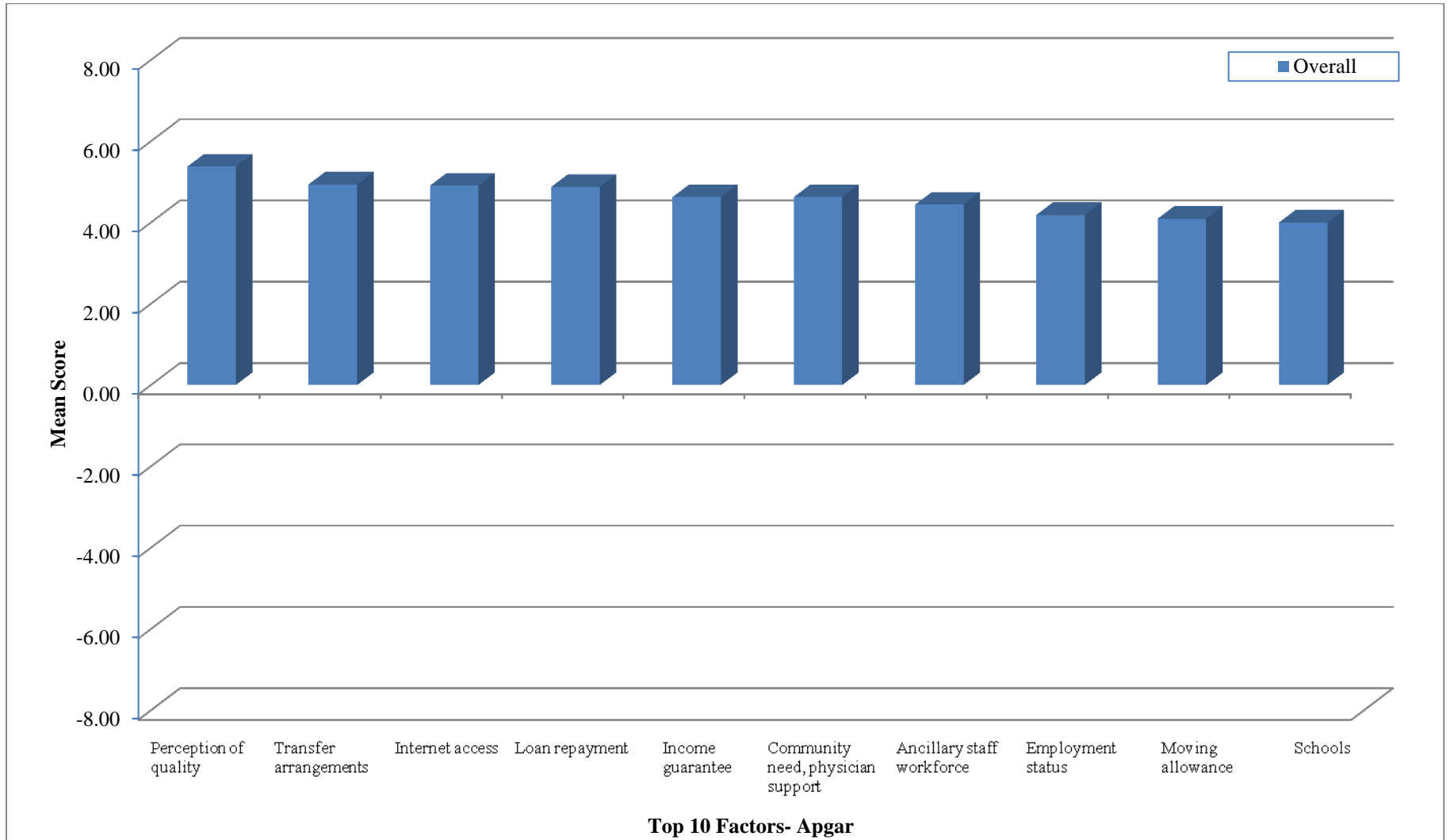


Figure 26
 Bottom 10 CAH Community Apgar Mean Scores
 Rank Order by Overall Score

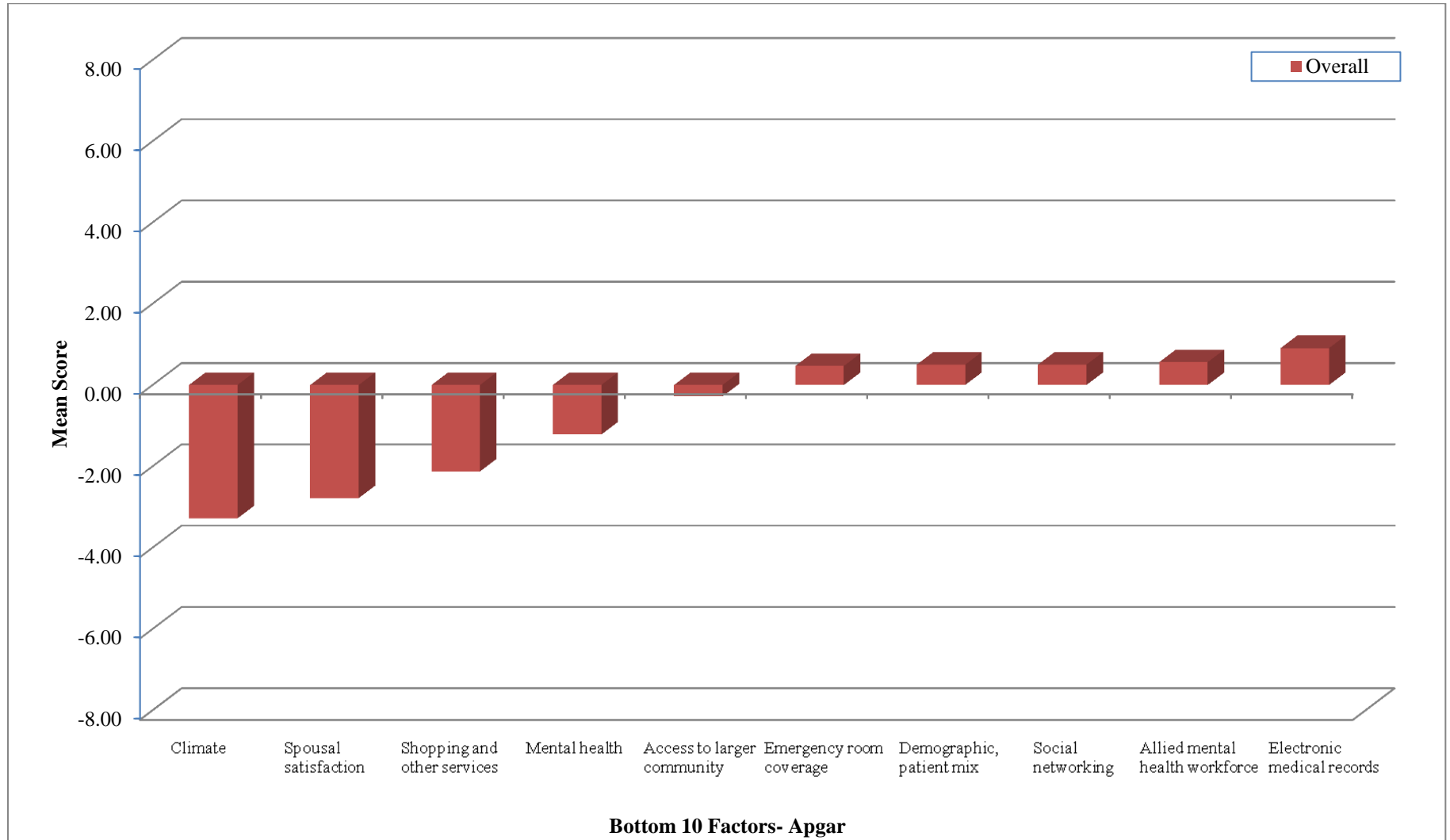
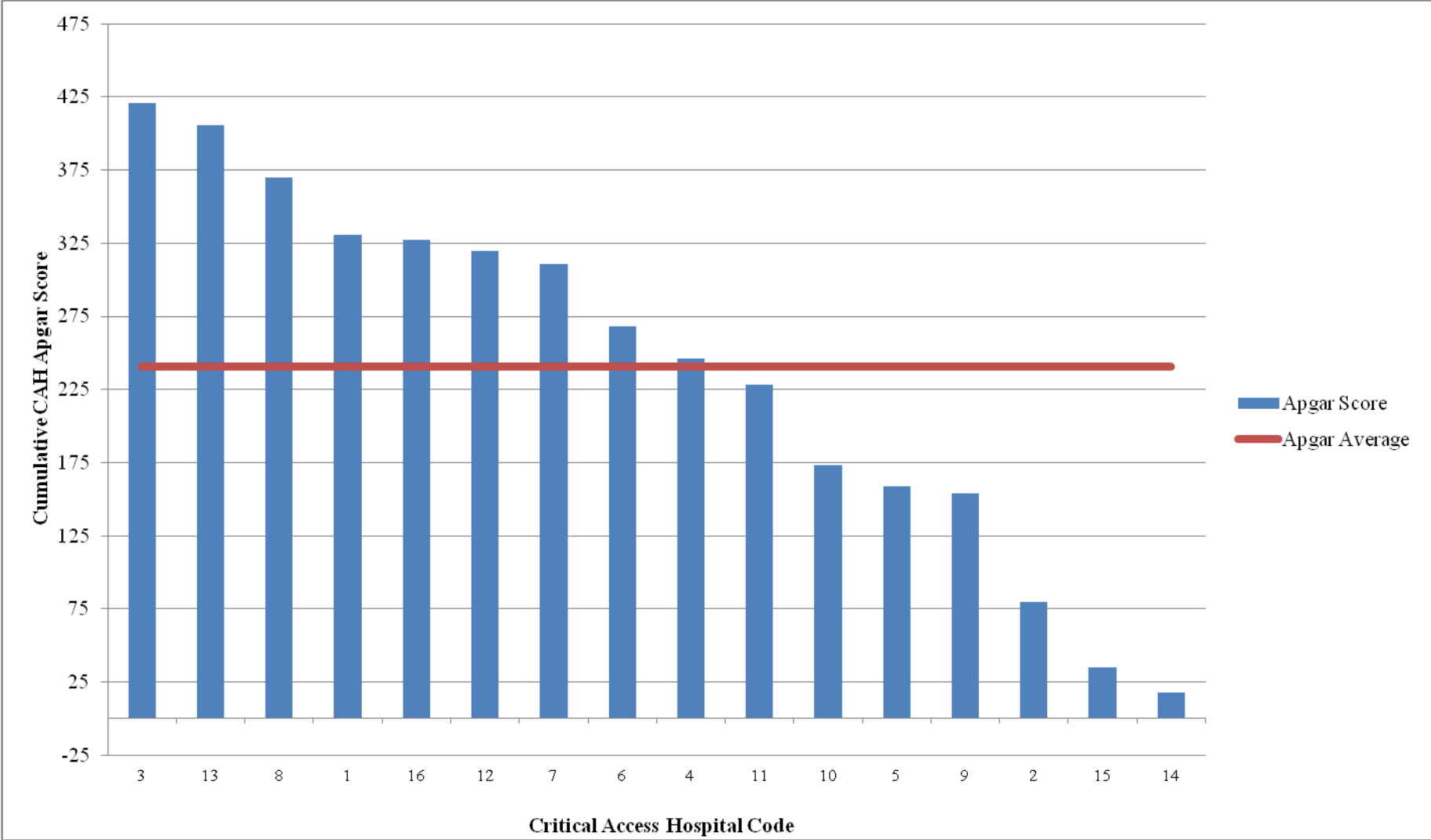


Figure 27
Cumulative CAH Community Apgar Mean Scores
Rank Order by Summary Score



Appendix A

Critical Access Hospital (CAH)

Community Apgar Questionnaire

Critical Access Hospital (CAH) Community Apgar Questionnaire

Site Code: _____

Subject Code: _____

Instructions: The interviewer will ask the subject to assess how each of the following factors, organized into five classes, impacts recruitment and retention of Family Medicine physicians in their community. Each factor will be rated on two dimensions: relative advantage or challenge for their community and relative importance to recruiting Family Medicine physicians to the community.

Class/Factor	Major Advantage	Minor Advantage	Minor Challenge	Major Challenge	Very Important	Important	Unimportant	Very Unimportant
Geographic								
Access to larger community								
Demographics/patient mix								
Social networking								
Recreational opportunities								
Spousal satisfaction (education, work, general)								
Schools								
Shopping and other services								
Religious/cultural opportunities								
Climate								
Perception of community								
Economic								
Employment status								
Part-time opportunities								
Loan repayment								
Income guarantee								
Signing bonus								
Moving allowance								
Start-up/marketing costs								
Revenue flow								
Payor mix								
Competition								

Class/Factor	Major Advantage	Minor Advantage	Minor Challenge	Major Challenge	Very Important	Important	Unimportant	Very Unimportant
Scope of Practice								
Obstetrics								
C-section								
Emergency room coverage								
Endoscopy / surgery								
Nursing home								
Inpatient care								
Mental health								
Mid-level supervision								
Teaching								
Administration								
Medical Support								
Perception of quality								
Stability of physician workforce								
Specialist availability								
Transfer arrangements								
Nursing workforce								
Allied mental health workforce								
Mid-level provider workforce								
Ancillary staff workforce								
Emergency medical services								
Call/practice coverage								

Class/Factor	Major Advantage	Minor Advantage	Minor Challenge	Major Challenge	Very Important	Important	Unimportant	Very Unimportant
Hospital and community support								
Physical plant and equipment								
Plans for capital investment								
Electronic medical records (EMR)								
Hospital leadership								
Internet access								
Televideo support								
Hospital sponsored CME								
Community need/support of physician								
Community volunteer opportunities								
Welcome and recruitment program								

Open-ended questions

1. What are your greatest barriers to recruitment and retention of Family Medicine physicians?

2. What can be done to overcome these barriers?

3. What reasons has a successful physician candidate given for not accepting a position in the community? What did that person ultimately do instead (if you know)?

Appendix B

Critical Access Hospital (CAH)

Community Apgar Questionnaire

Glossary of Terms

Critical Access Hospital
Community Apgar Questionnaire
Glossary of Terms

Geographic Class Factors

Access to larger community

The ability to access or ease of access to a larger community

Demographics/patient mix

The demographics of patients in the community including age, race, gender or other

Social networking

Opportunities or ease of socializing for the physician

Recreational opportunities

Opportunities for local, enjoyable non-work time activities

Spousal satisfaction (education, work, general)

Overall satisfaction of the spouse in regard to local community living such as education, work, and in general

School

Adequacy of schools for the physician's children

Shopping and other services

Adequacy of local access to shopping or services for physician and family

Religious/cultural opportunities

Adequacy of local access for religious or cultural participation for physician and family

Climate

Weather

Perception of community

Perception of the community overall by someone not from the community

Economic Class Factors

Employment status

Whether or not a desire for employee status is available or encouraged or required

Part-time opportunities

Whether or not a desire for part-time work status is available or supported

Loan repayment

Whether or not loan repayment is available for qualifying physician

Income guarantee

Whether or not an income guarantee is available for new physician

Signing bonus

Whether or not a signing bonus is available for new physician

Moving allowance

Whether or not a moving allowance is available for new physician

Start-up/marketing costs

Whether or not start-up or marketing cost support is available for new physician

Revenue flow

No matter by what specific means, the amount of revenue earned by the physician

Payor mix

Independent of physician earnings, the payer mix of the patients seen

Competition

The sense of competition amongst primary care providers for patients

Scope of Practice Class Factors

Obstetrics

The impact of whether or not Obstetrics is an option, not an option, or mandatory.

C-section

The impact of whether or not C-Sections is an option, not an option, or mandatory.

Emergency room coverage

The impact of whether or not ER coverage is an option, not an option, or mandatory.

Endoscopy/surgery

The impact of whether or not EGD and/or colonoscopy is an option, not an option, or mandatory.

Nursing home

The impact of whether or not nursing home care is an option, not an option, or mandatory.

Inpatient care

The impact of whether or not inpatient hospital care is an option, not an option, or mandatory.

Mental health

The impact of whether or not mental health care by the physician is an option, not an option, or mandatory.

Mid-level supervision

The impact of whether or not mid-level supervision by the physician is an option, not an option, or mandatory.

Teaching

The impact of whether or not teaching residents or medical students by physicians is an option, not an option, or mandatory.

Administration

The impact of whether or not administrative duties for the physician is an option, not an option, or mandatory.

Medical Support Class Factors

Perception of quality

The overall reputation for quality of medical care for this community as seen by someone not from this community

Stability of physician workforce

The stability of the physician workforce and longevity of the retained physicians

Specialist availability

The availability of specialists and sub-specialist for patient care; either on site or by other means

Transfer arrangements

The existence and adequacy of transfer arrangements for patients to referral hospital(s)

Nursing workforce

The adequacy of nursing workforce for both quantity and quality

Allied mental health workforce

The adequacy allied mental health workforce for both quantity and quality

Mid-level provider workforce

The adequacy of mid-level provider for both quantity and quality

Ancillary staff workforce

The adequacy of ancillary staff (such as laboratory, x-ray technician, respiratory therapy, physical therapy, occupational therapy) workforce for both quantity and quality

Emergency medical services

The adequacy of pre-hospital emergency medical services for both quantity and quality

Call/practice coverage

The adequacy of call coverage and practice coverage for physician leave, holidays and vacation for both quantity and quality

Facility and Community Support Class Factors

Physical plant and equipment

The current adequacy of the hospital and clinic physical plant and equipment

Plans for capital investment

The adequacy of the hospital plans for capital investment in the hospital and/or clinic

Electronic medical records (EMR)

The existence and adequacy of electronic medical records in the hospital and clinic environments

Hospital leadership

The adequacy of hospital leadership including the CEO, CFO and hospital board functions

Internet access

The existence and adequacy of internet access in the hospital and clinic

Televideo support

The existence and adequacy of televideo capability in the community for patient care or other communications

Hospital sponsored CME

The existence and adequacy of local hospital-sponsored continuing medical education

Community need/support of physician

The perceived sense of need for and/or community support of a new physician

Community volunteer opportunities

The existence and adequacy for local opportunities for physician volunteering, either medical or nonmedical

Welcome and recruitment program

The existence and adequacy of any recruitment plan and/or welcome for an interviewing or newly recruited physician