CALIFORNIA
HEALTHCARE
FOUNDATION

Putting Quality to Work:
Rewarding Plan Performance in
Medi-Cal Managed Care

Appendix D

Formula for the Use of Harmonic Means

The harmonic mean is 1/(mean of reciprocals of the values).

The steps for calculating harmonic mean are:

1) calculate the reciprocal of each value (i.e., the reciprocal of a number is that number divided into 1, for example, the reciprocal of 5 is 1/5 or 0.2);

2) calculate the arithmetic mean (average) of the reciprocals; and

3) calculate the reciprocal of the result of step 2.

For example the formula for calculating the harmonic mean for the three numbers 1, 2 and 9 is as follows: $1 / (((1/1) + (1/2) + (1/9)) / 3) = 1.86$

Simplified example
In order to create county averages, it is necessary to calculate the harmonic mean; otherwise one value may have more impact on the result. There is a significant amount of variation in denominators among GMC HMOs.

Plan A: 88
Plan B: 118
Plan C: 599
Plan D: 1423

The calculated average would be as follows using each of the methods:

The harmonic mean is 180.
The arithmetic mean is 557.

As one can see, Plan D drives the arithmetic mean and does not adequately represent the four numbers whereas the harmonic mean is a better representation.