

# COLLOQUIUM

Department of Statistics and Probability  
Michigan State University

**Dennis Gilliland**  
Michigan State University

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## Lower Estimates for the Recovery of Overcharges to Medicare

### ABSTRACT:

Statistical estimates presented in legal settings are typically challenged. Hired experts raise questions about the pedigree of the data, the choice of procedure, the assessment of sampling error and coverage probability. In contentious situations, there is a great advantage to presenting simple and exact estimation methods. The simplicity allows the trier of fact (judge or jury) to understand the method; the exactness removes issues that the opposing expert can use to raise concerns about the methods.

As examples, we use the government's attempt to recover overpayments by Medicare to health care providers. In these applications, a population will consist of  $N$  claims (or patients or other units). We let  $x_i$  denote the amount Medicare paid the provider for claim  $i$ , we let  $y_i$  denote the unknown amount of overpayment contained in the payment  $x_i$ , and, for this talk, we assume that  $y_i = x_i$  or  $y_i = 0$  for  $i = 1, 2, \dots, N$ . Medicare has the record of the payments  $x_i$ ,  $i = 1, 2, \dots, N$  and uses random sampling and statistical estimates of the total overpayment  $Y := \sum_{i=1}^N y_i$  in its attempt to recover overpayment from the provider.

We begin by explaining Edward's *Minimum Sum Method (MSM)*, a method that depends upon an exact lower estimate  $L$  (guaranteed at least 90% confidence level) of the population number of successes in a finite dichotomous population. Next we present a very simple idea that greatly extends the applicability of *MSM* (Gilliland and Feng, 2010). We then present a randomized lower estimate  $L_R$  whose use increases the lower estimate (increases efficiency) and balances risk at exactly 90%/10% (Gilliland and Edwards, 2011). Finally, as time allows, we will discuss an idea to extend the applicability of the exact methods even further.

- 2003 The minimum sum method: a distribution-free sampling procedure for Medicare fraud investigations, *Health Services & Outcomes Research Methodology*, **4**, 241-263. (D. Edwards, G. Ward-Besser, J. Lasecki, B. Parker, K. Wieduwilt, F. Wu, and P. Moorhead)
- 2010 An adaptation of the minimum sum method, *Health Services & Outcomes Research Methodology*, **10**, 154 - 164. (D. Gilliland and W. Feng).
- 2011 Using randomized confidence limits to balance risk; An application to Medicare investigations. To appear in *The American Statistician*. (D. Gilliland and D. Edwards).

