incidence of pH values less than 2.5. As summarized in Cohen's recent editorial, this criterion is still used when identifying patients at risk. With "incidence of low pH" in mind both mean pH and mean H⁺ appear irrelevant. The real question is "Does the therapeutic regimen significantly alter the incidence of patients at risk?" In Stoebling's original paper, nonparametric statistics (chi-square) were appropriately used and demonstrated a different incidence only when antacids were administered. His tables of mean acidity in the groups above and below pH 2.5 (whether mean pH or H⁺) would thus appear peripheral to the primary concern. Their most useful purpose has probably been to stimulate this correspondence.

In conclusion, I would put a plea to editors and writers. We cannot eliminate statistics, but let us at least use them sparingly and in the certain knowledge that they at least represent something.

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Averaging Acidity Values

To the Editor:—Reading the correspondence concerning acidity values between Giesecke and Pace et al., generated a certain sense of déjà vu. This matter was fully ventilated in Anaesthesia in April 1978 and in the British Medical Journal in 1977. Despite the claim to the contrary, neither pH nor hydrogen ion concentration is an independent variable. For the conventional pH electrode and meter assembly the true independent variable is the millivolt difference across the glass membrane between the silver-silver chloride reference electrode in the glass and the calomel electrode. From this millivolt scale both pH and hydrogen ion concentration can be derived. Any random errors of measurement for any sample will be normally distributed around the mean millivolt measurement of that sample, as multiple measurements of that sample will confirm. In hydrogen ion concentration terms this is a log-normal distribution.

Presumably the purpose of the debated measurements was to determine the effects of different premedicants upon the acid output of the stomach. Therefore, pooling the measurement data obtained from a number of samples to derive this biologic response, that is, the mean acid output or average quantity of hydrogen ions secreted by the gastric mucosa, requires the use of the arithmetic mean of these values; the quantity of hydrogen ions is the molar concentration of hydrogen ions per liter multiplied by the volume secreted.

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REFERENCES

Central Venous Catheter Placement for Cardiopulmonary Bypass

To the Editor:—I was interested in the solution offered by Rasmussen and Husum for the problem encountered with central venous pressure (CVP) monitoring by pulmonary-artery catheter during total cardiopulmonary bypass. In my experience, the design of the pulmonary-artery catheter places the
CVP orifice within the right atrium or thereabouts when the distal tip is appropriately placed in most adults. Higher placement of the catheter may prevent measurement of pulmonary arterial occlusion pressures or introduce error in thermodilution cardiac output determinations.

Having encountered this problem during cardiopulmonary bypass prior to the widespread use of pulmonary-artery catheter, I have routinely either monitored clinical signs of caval obstruction or placed a central venous catheter in a known extracardiac position. Using various types of sidearm catheter introducer sheaths, I have observed that these functions well for CVP measurement or drug infusion during bypass.

Intracardiac catheters may be useless for CVP measurement and dangerous if used for drug infusion during total cardiopulmonary bypass. I certainly agree with Rasmussen and Husum that one should prove that a central line lies above the superior caval tape before it can be relied upon for either use. In any event, most sidearm catheter introducers are too short to reach that far from jugular or subclavian sites, effectively eliminating the problem.

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