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Claudia A Spiro* (claudiaspiro@gmail.com). *Bounding the local distribution of the group-counting function over non-fifth-power-free integers.* Preliminary report.

Let k , m , and n be positive integers, and let x be a sufficiently large positive real number. Write $g(n)$ for the number of (isomorphism classes of finite) groups of order n , and S for the set of all positive integers that are divisible by the fifth power of at least one prime. Let

$$F(x, k) = \#\{n \leq x : n \in S, \text{ and } g(n) = k\}.$$

We obtain the bound

$$F(x, k) \ll x(\log x)^{-c(k)}$$

for an explicit constant $c(k)$ with $1/2 < c(k) < 1$, where the implied constant is effectively computable and depends on k . We discuss applications to statistical group theory. Our methods of proof require information about groups whose order is the fifth power of a prime. (Received December 13, 2006)