Let $E/\mathbb{Q}$ be an elliptic curve with complex multiplication and consider the quantity $\omega(#E(F_p))$, where $\omega(n)$ denotes the number of distinct prime factors of $n$ and $p$ is a prime of good reduction for $E$. Independent work of Cojocaru and Liu shows that the normal order of $\omega(#E(F_p))$ is $\log \log p$, and moreover that there is an elliptic curve analogue of the celebrated Erdős - Kac theorem: The quantity 

$$\frac{\omega(#E(F_p)) - \log \log p}{\sqrt{\log \log p}}$$

has a Gaussian normal distribution. In this talk, we will discuss the frequency with which $\omega(#E(F_p))$ is much larger or smaller than expected. For fixed $\gamma > 1$, we have

$$\# \{ p \leq x : \omega(#E(F_p)) > \gamma \log \log x \} = \frac{x}{(\log x)^{2+\gamma \log \gamma - \gamma + o(1)}}.$$

The same result holds for the quantity $\# \{ p \leq x : \omega(#E(F_p)) < \gamma \log \log x \}$ when $0 < \gamma < 1$. (Received September 04, 2015)