The Chernoff bound state that :

$$\mathbb{P}(\frac{1}{n}\sum_{i=1}^{n} X_i \geq a) \leq e^{-n(\lambda a - f(\lambda))} \qquad with \qquad f(\lambda) = \log(\mathbb{E}[e^{\lambda x}]) \quad (MGF)$$

In the pooling case our X_i are i.i.d. Bernoulli Random Variables, equal 0 if the single person is in approval with the president, 0 otherwise. Indicating with "$\boldsymbol{p}$" the fraction of people approving (that obviously will correspond with the probability of success) I define my estimator as the mean of these R.V. :

$$\hat{\mathbf{p}} = \frac{1}{n}\sum_{i=1}^{n} X_i \quad ; \quad \mathbb{E}[X_i] = p \qquad and \qquad \lim_{n \to \infty} \frac{1}{n}\sum_{i=1}^{n} X_i = p$$

In this case the Chernoff Bound become :

$$\mathbb{P}(\hat{p} \geq p + \epsilon) \leq \mathbb{E}[\lambda x]^n e^{-n\lambda(p+\epsilon)} = \frac{(pe^{\lambda} + (1-p))^n}{e^{n\lambda(p+\epsilon)}}$$

And minimizing this bound through :

$$\frac{\partial}{\partial \lambda}\frac{(pe^{\lambda} + (1-p))^n}{e^{n\lambda(p+\epsilon)}} = 0 \qquad => \qquad e^{\lambda} = \frac{(1-p)(p+\epsilon)}{p(1-p-\epsilon)}$$

Substituting it we find then :

$$\mathbb{P}[\hat{p} \geq p + \epsilon] \leq \Big(\Big(\frac{p}{p+\epsilon}\Big)^{p+\epsilon}\Big(\frac{1-p}{1-p-\epsilon}\Big)^{1-p-\epsilon}\Big)^n = e^{-nD_{KL}(p+\epsilon||p)}$$

With a similar calculation it can be verified also that :

$$\mathbb{P}[\hat{p} \leq p - \epsilon] \leq \Big(\Big(\frac{p}{p-\epsilon}\Big)^{p-\epsilon}\Big(\frac{1-p}{1-p+\epsilon}\Big)^{1-p+\epsilon}\Big)^n = e^{-nD_{KL}(p-\epsilon||p)}$$

From these two bounds we can find, at least in principle, the wanted N minimal in order to be sure to fulfill the asked condition. In fact :

$$\mathbb{P}[|\hat{p} - p| \leq \epsilon] = 1 - \mathbb{P}[\hat{p} \leq p - \epsilon] - \mathbb{P}[\hat{p} \geq p + \epsilon] \geq 1 - e^{-nD_{KL}(p-\epsilon||p)} - e^{-nD_{KL}(p+\epsilon||p)}$$

imposing now

$$\mathbb{P}[|\hat{p} - p| \leq \epsilon] = 0.95 \qquad and \qquad \epsilon = 0.01$$

We can determine the minimal number of people needed extracting n from the last inequality

$$-(0.95-1) = 0.05 \leq e^{-nD_{KL}(p+\epsilon||p)}\Big(1 + e^{D_{KL}(p+\epsilon||p) - D_{KL}(p-\epsilon||p)}\Big)$$

$$=> \qquad n_{min} = \frac{-\ln(0.05) + \ln\Big(1 + e^{D_{KL}(p+\epsilon||p) - D_{KL}(p-\epsilon||p)}\Big)}{D_{KL}(p+\epsilon||p)}$$

The problem is that we don't have p. However it can be solved defining n as a function of n and then take the maximal value in order to be sure, in any case, to make a correct pooling. Given that this function will not be of a simple form we can make a simple observation : the D_{KL} is a relative entropy between the estimator and the true distribution and what we want to find is the value that minimize it, then maximizing the $n_{\min}$ function. In the case of Bernoulli variables the variance and the entropy will be maximized when p = 1 - p = 0.5 and, given that the logarithm is monotonic, the $D_K L$ will be minimized in that case. For p = 0.5 we find $n_{min} = \frac{-\ln(0.05)+\ln\Big(1+e^{D_{KL}(0.5+0.01||0.5) - D_{KL}(0.5-0.01||0.5)}\Big)}{D_{KL}(0.5+0.01||0.5)} \simeq 18443$