Coverings by homothets of a convex body

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Rogers proved that for any convex body K, we can cover R^d by translates of K of density roughly $d \log d$. We discuss several related results. First, we extend Roger's result by showing that, if we are given a family of positive homothets of K of infinite total volume, then we can find appropriate translation vectors for each given homothet to cover R^d with the same density. Second, we consider an extension to multiple coverings of space by translates of a convex body. Finally, we also prove a lower bound on the total volume of a family $\mathcal{F}$ of homothets of K that guarantees the existence of a covering of K by members of $\mathcal{F}$.