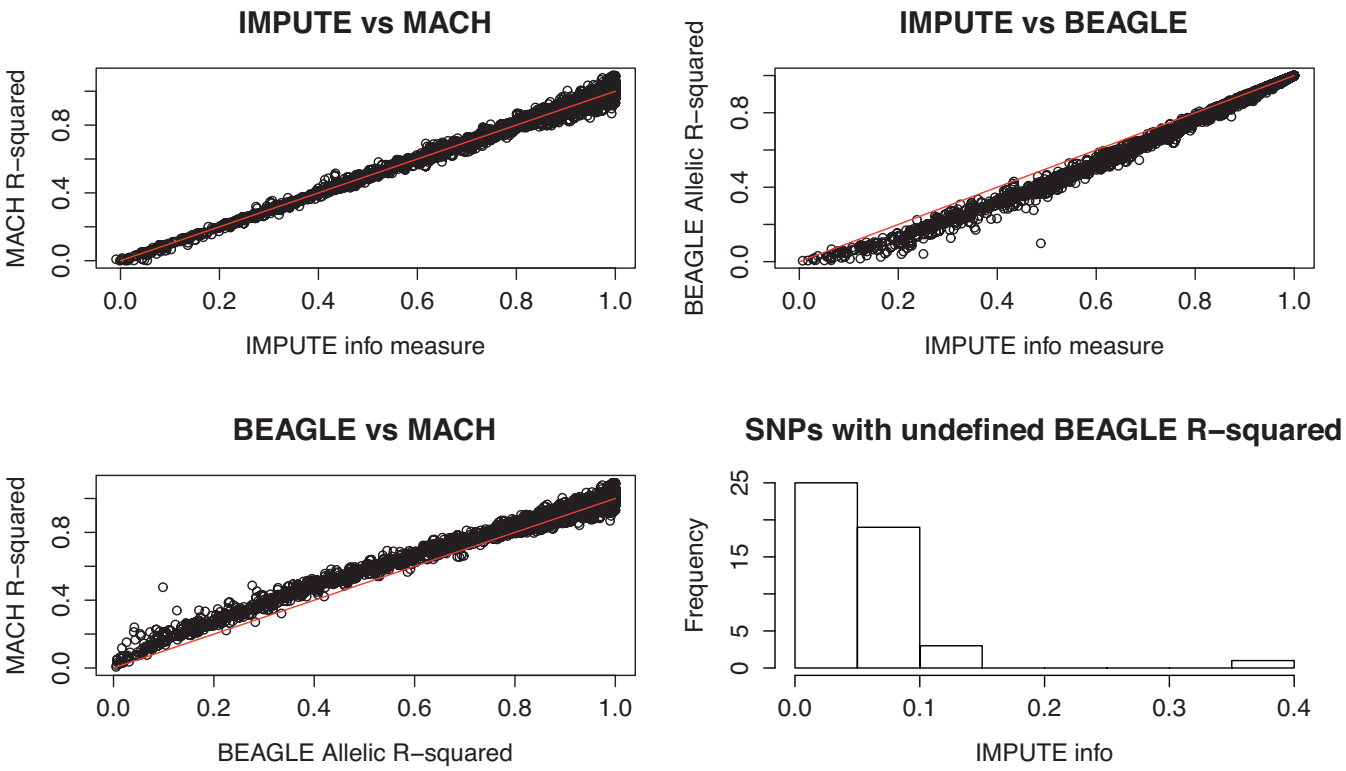Supplementary information S5