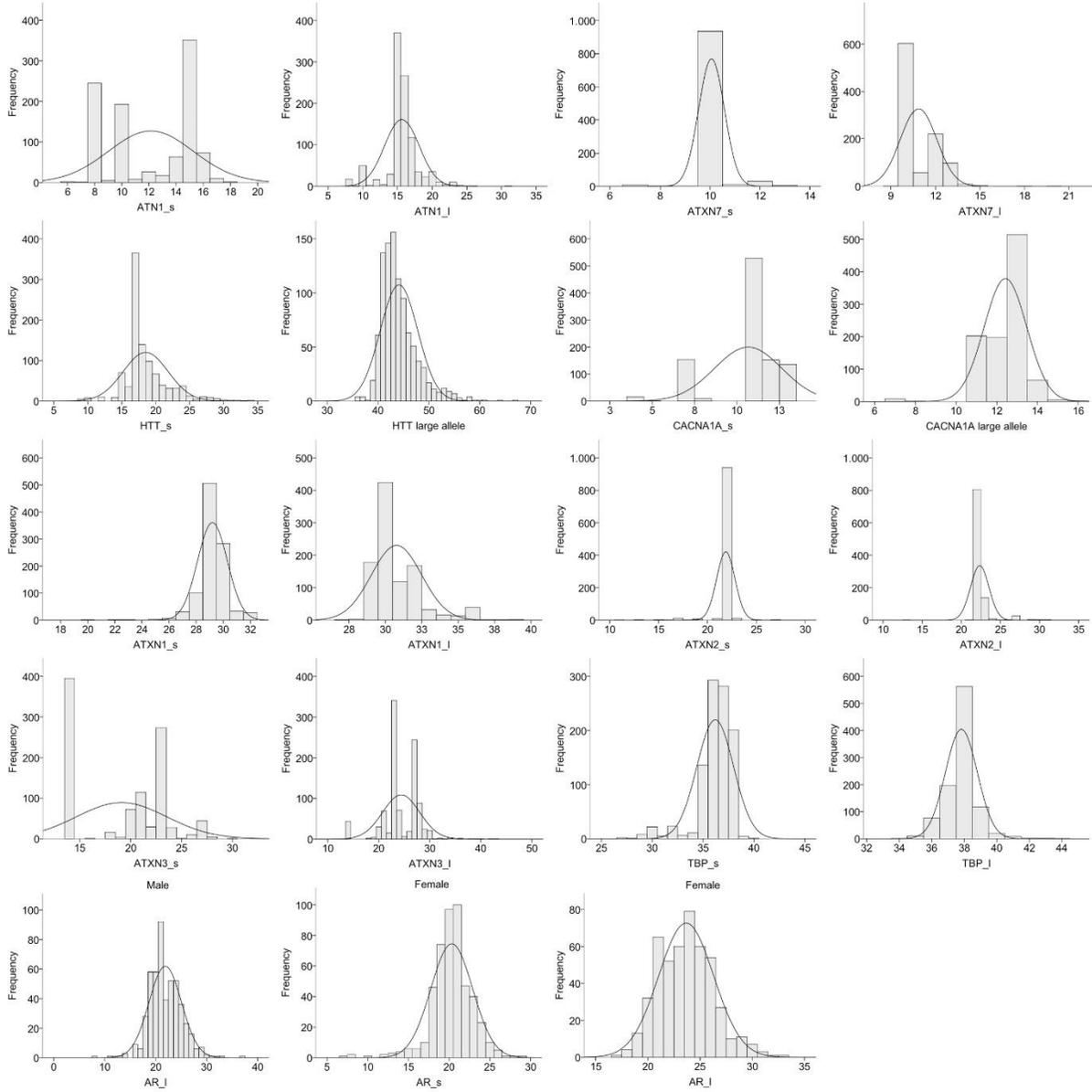


Supplementary Table 1: Distributions of the CAG repeat tracts in the PDAGs.

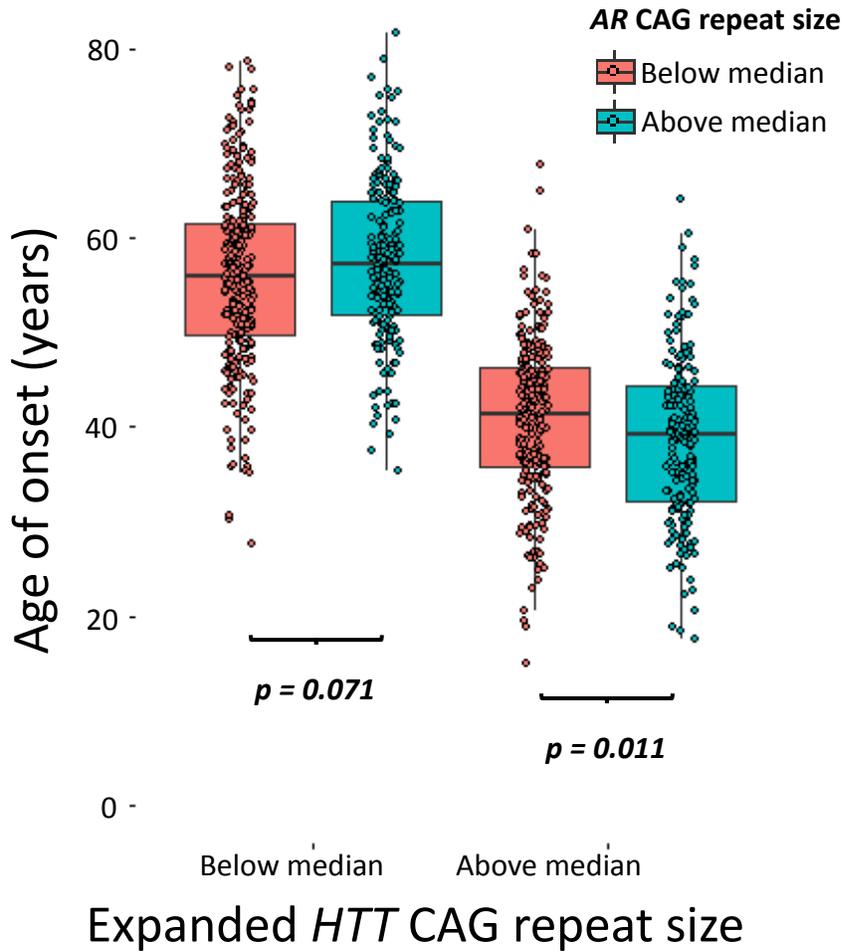
Allele		<i>n</i>	Mean ¹	Median	Mode	Range
<i>HTT</i>	long	996	44.1 ± 3.7	43	43	36-67
	short	998	18.5 ± 3.3	17	17	9-34
<i>ATN1</i>	long	997	15.6 ± 2.5	16	15	8-31
	short	997	12.1 ± 3.1	13	15	6-18
<i>ATXN7</i>	long	995	10.9 ± 1.2	10	10	9-20
	short	995	10.1 ± 0.5	10	10	7-13
<i>CACNA1A</i>	long	996	12.4 ± 1.0	13	13	7-16
	short	996	10.7 ± 2.0	11	11	4-13
<i>ATXN1</i>	long	996	30.8 ± 1.7	30	30	27-39
	short	996	29.2 ± 1.1	29	29	20-32
<i>ATXN2</i>	long	991	22.4 ± 1.2	22	22	13-31
	short	991	21.9 ± 0.9	22	22	11-27
<i>ATXN3</i>	long	991	24.4 ± 3.6	23	14	14-43
	short	991	19.1 ± 4.4	21	23	14-30
<i>AR</i>	long	990	22.8 ± 3.0	23	21	8-37
	short	990	21.2 ± 3.0	21	21	7-37
<i>TBP</i>	long	995	37.8 ± 1.0	38	38	34-44
	short	995	36.2 ± 1.8	36	36	27-40

PDAG = polyglutamine disease-associated gene

Supplementary Figure 1: Distribution patterns of CAG repeat tracts in various polyglutamine disease-associated genes. Bars represent the frequency of a particular CAG repeat size in either the shorter (s) or the longer (l) allele of each gene. Curves represent the hypothetical normal distribution. For the AR gene histograms were produced for men and woman separately.



Supplementary Figure 2: Interaction between AR and mutant *HTT* CAG repeat size. Longer AR CAG repeat size tended to delay age of onset in HD patients with a below median number of CAG repeats in the expanded *HTT* allele (Mann-Whitney *U*-test $p=0.071$), while for patients with an above median expansion longer AR CAG repeats tended to advance age of onset (Mann-Whitney *U*-test $p=0.011$). Black horizontal lines represent medians, boxes display interquartile ranges and whiskers are $1.5 \times$ interquartile range. Circles represent individual patient data with horizontally added jitter.



Supplementary Figure 3: Interaction between AR and mutant HTT CAG repeat size is sex-specific. In males a longer AR CAG repeat size delayed age of onset in subjects with a relatively low expanded HTT CAG repeat size (Mann-Whitney U -test $p=0.004$), while in females a longer AR allele resulted in an earlier age of onset in subjects with a relatively larger expanded HTT CAG repeat size (Mann-Whitney U -test $p=0.009$). Black horizontal lines represent medians, boxes display interquartile ranges and whiskers are $1.5 \times$ interquartile range. Circles represent individual patient data with horizontally added jitter.

