Plot Results

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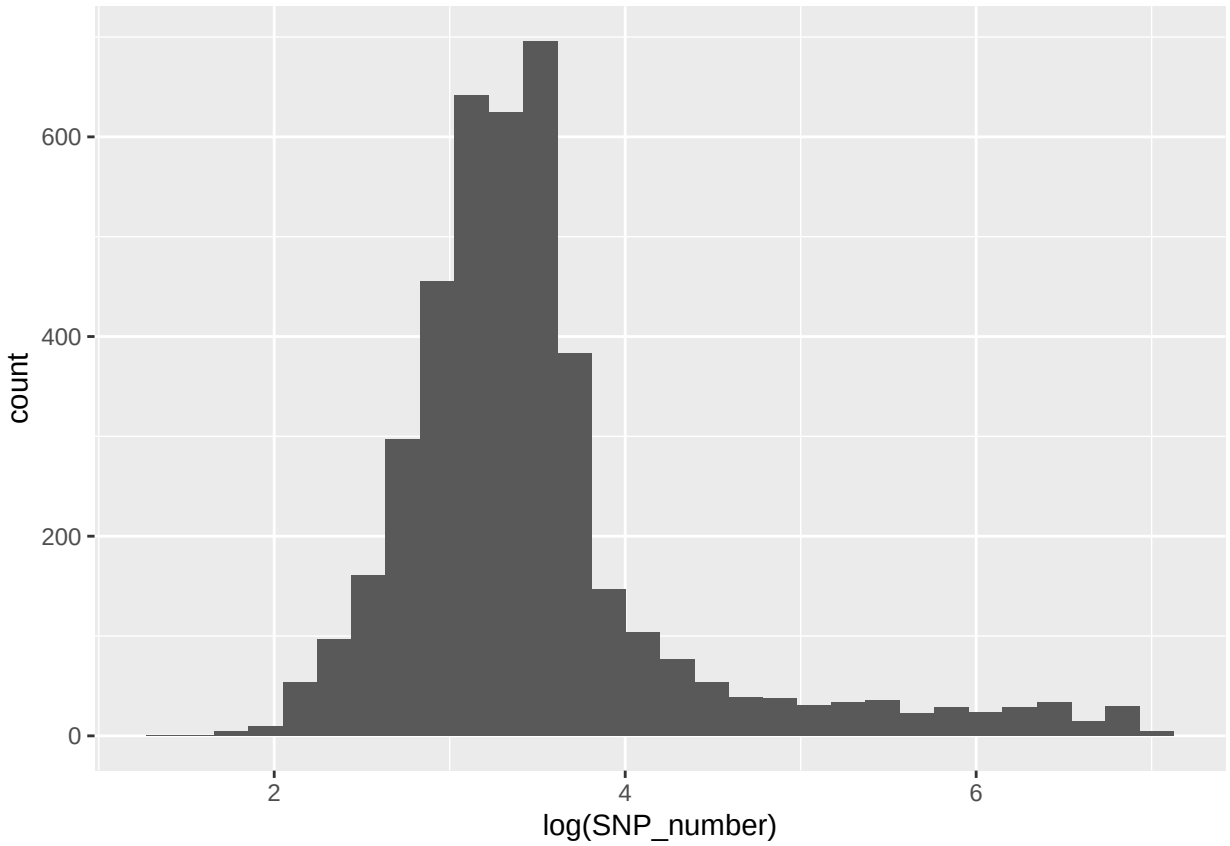
Increasing Allele Frequency for Various Traits

This code builds off of a previous pipeline which takes GWAS data and returns the average increasing allele frequency (with confidence intervals) for various phenotypes. Using these output files, this code creates a bar graph that compares the mean increasing allele frequency for a select few of these traits. A p-value threshold of 1e-5 is used throughout this report to create a cutoff for which SNP's are considered significant.

We ran the pipeline on our larger data set from all of the UK Biobank data. Traits with no significant SNPs and therefore no data for mean increasing allele frequency were removed from the data set. We then plotted the number of significant SNPs associated with each trait on a logarithmic scale. As shown in the graph, most traits only had one significant SNP, meaning the increasing allele frequency data was not very informative due to the small sample size.

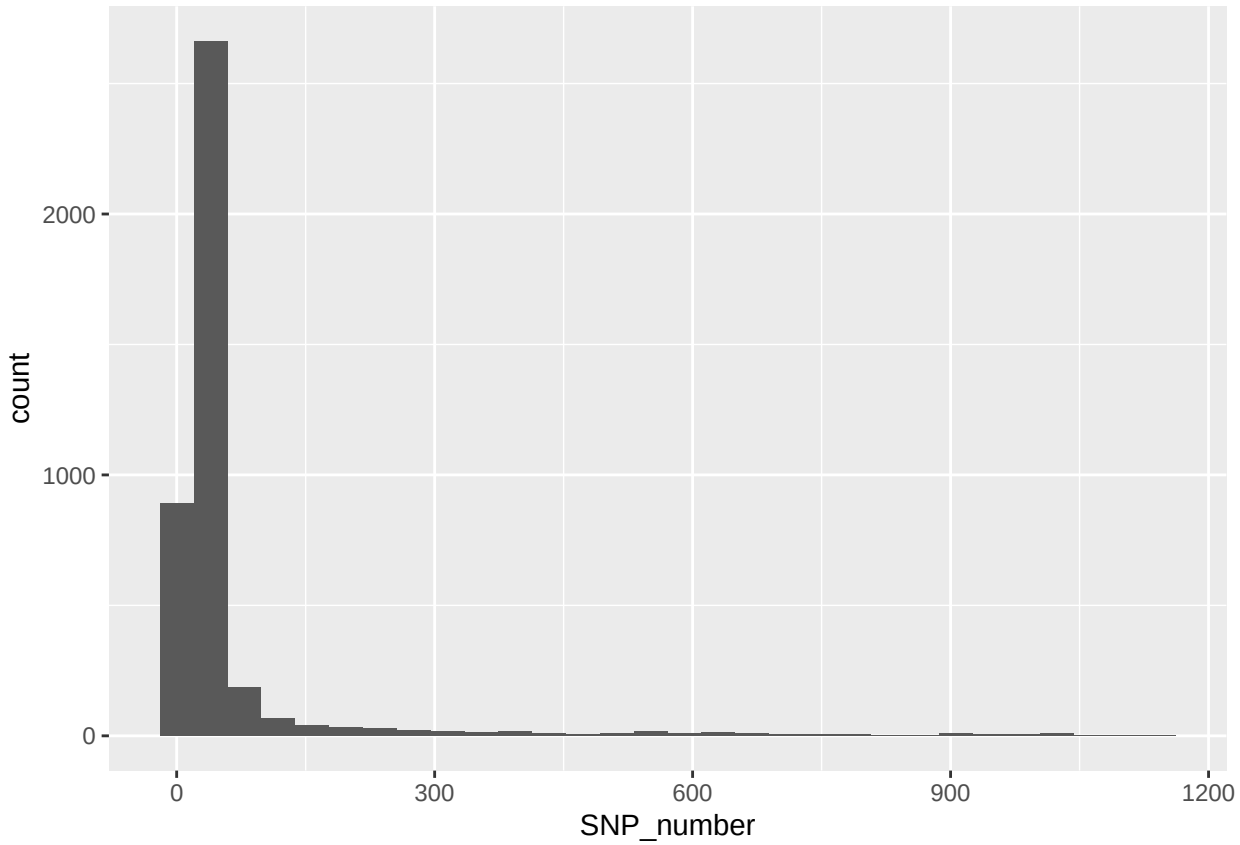
```
df_all <- fread("output/results/all_1e-5_0.01.txt.gz")
df_all <- drop_na(df_all, SNP_number)
df_all <- distinct(df_all, phenotype_name, .keep_all= TRUE)

ggplot(data = df_all, mapping = aes(x = log(SNP_number))) + geom_histogram()
```



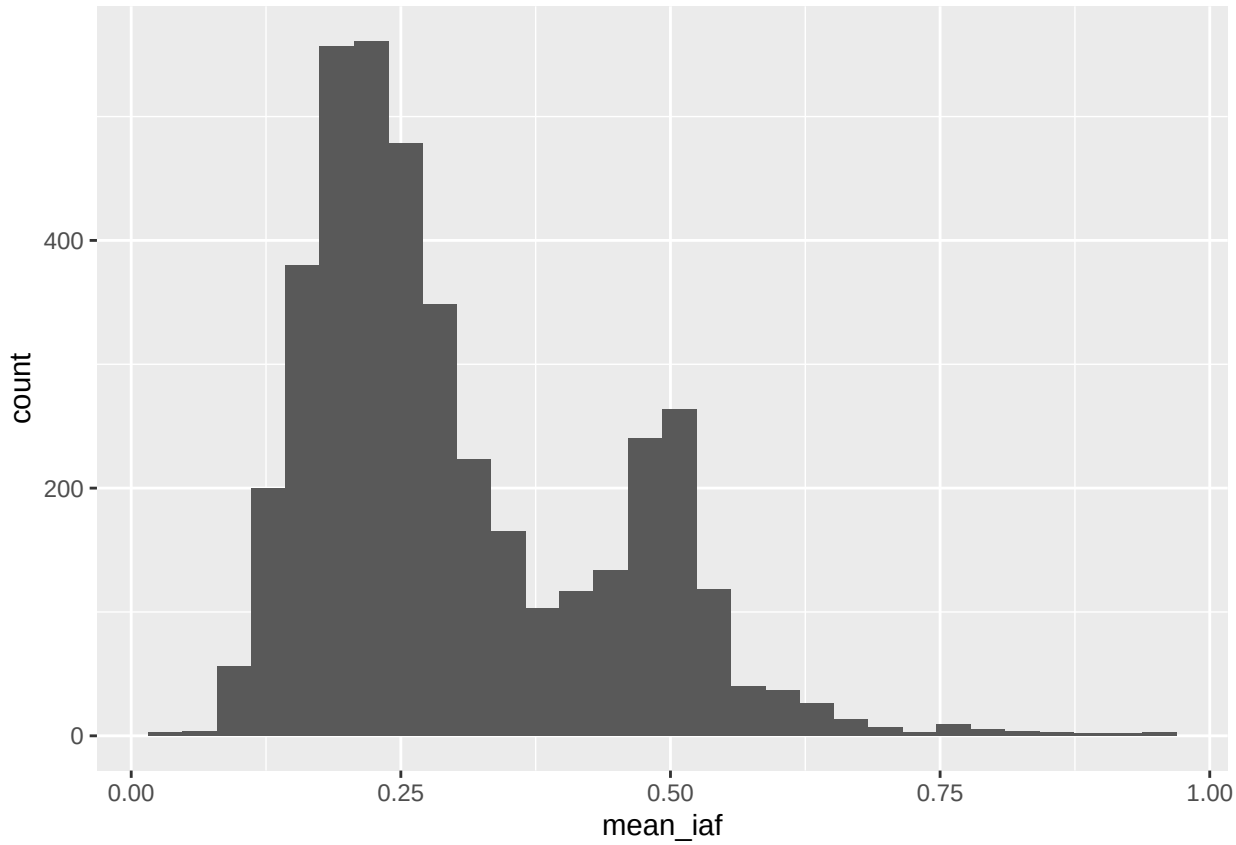
We then filtered out all traits with less than 10 significant SNPs. The SNP numbers were again plotted in a histogram, not on a logarithmic scale this time.

```
df_10 <- filter(df_all, SNP_number >= 10)
ggplot(data = df_10, mapping = aes(x = SNP_number)) + geom_histogram()
```



To get an idea of the distribution of mean increasing allele frequencies, we plotted each traits mean_iaf in a histogram. As the plot shows, most traits have an average increasing allele frequency of 0.5.

```
ggplot(data = df_10, mapping = aes(x = mean_iaf)) + geom_histogram()
```



We calculated the average of the mean iaf's for all of the traits with more than 10 SNP's.

```
mean_of_mean_iaf <- mean(df_10[,mean_iaf])
mean_of_mean_iaf
```

```
## [1] 0.3002762
```

The average is below 0.5, suggesting mutational bias towards increasing alleles.

We then filtered our data into two groups. The first group was of traits with a mean increasing allele frequency statistically significantly higher than 0.5. The second was of traits significantly lower than 0.5. Traits whose confidence intervals included 0.5 we removed entirely.

```
df_sig_dif <- filter(df_10, lower_ci > 0.5 | 0.5 > upper_ci)
df_greater_0.5 <- filter(df_sig_dif, lower_ci > 0.5)
df_less_0.5 <- filter(df_sig_dif, 0.5 > upper_ci)
```

```
num_traits <- nrow(df_10)
traits_greater <- nrow(df_greater_0.5)
percent_greater <- traits_greater/num_traits
traits_less <- nrow(df_less_0.5)
percent_less <- traits_less/num_traits
```

```
cat("There were ", traits_greater, " traits with mean iaf significantly higher than 0.5.
This is ", 100*round(percent_greater, 4), "% of traits with 10 or more significant SNPs.")
```

```
## There were  94  traits with mean iaf significantly higher than 0.5.
## This is  2.29 % of traits with 10 or more significant SNPs.
```

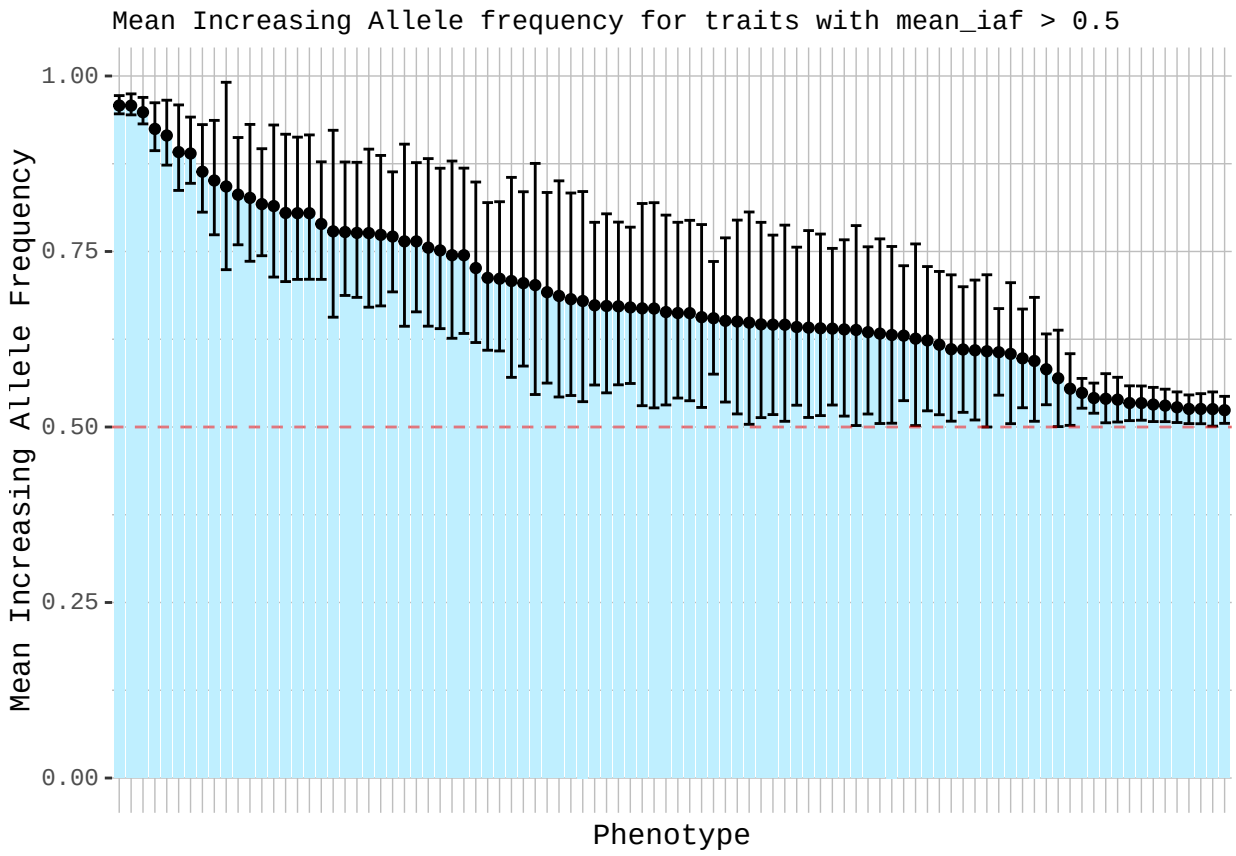
```
cat("There were ", traits_less, " traits with mean iaf significantly lower than 0.5.
This is ", 100*round(percent_less, 4), "% of traits with 10 or more significant SNPs.")
```

```
## There were  3094  traits with mean iaf significantly lower than 0.5.
## This is  75.37 % of traits with 10 or more significant SNPs.
```

```
plot_data <- function(dat, title) {
  pl <- ggplot(data = dat, mapping = aes(x = reorder(phenotype_name, -mean_iaf), y = mean_iaf)) + geom_
        axis.title.x  = element_text(family = "mono"),
        axis.title.y  = element_text(family = "mono"),
        axis.text.x   = element_blank(),
        axis.ticks.x = element_blank(),
        axis.text.y   = element_text(family = "mono"),
  panel.background = element_rect(fill = "white",
                                  colour = "white",
                                  size = 0.5, linetype = "solid"),
  panel.grid.major = element_line(size = 0.25, linetype = 'solid',
                                  colour = "grey"),
  panel.grid.minor = element_line(size = 0.25, linetype = 'solid',
                                  colour = "grey"))
  return(pl)
}
```

We then plotted the mean increasing allele frequency with error for all of the traits with mean iaf significantly greater than 0.5.

```
plot_data(df_greater_0.5, "Mean Increasing Allele frequency for traits with mean_iaf > 0.5")
```



The following table contains the phenotype names for all of the traits included in the above graph. They are sorted in the order they appear from left to right.

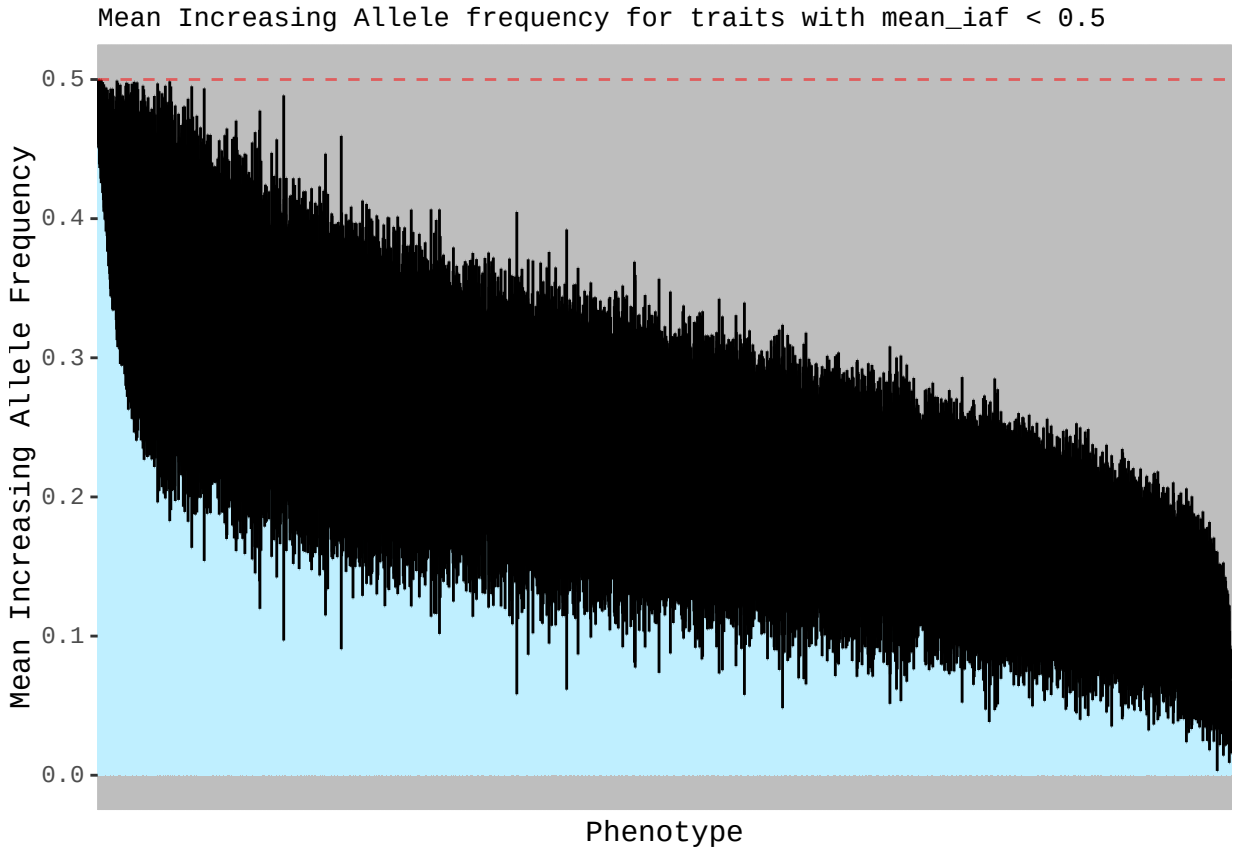
```
greater_table <- select(df_greater_0.5, c("mean_iaf", "SNP_number", "phenotype_name")) %>% arrange(desc
kable(greater_table)
```

mean_iaf	SNP_number	phenotype_name
0.9579103	178	Both eyes present: Yes
0.9578194	99	Ever had laser treatment for glaucoma or high eye pressure: No
0.9483764	124	Ever had corneal graft surgery: No
0.9245941	82	Surgery/amputation of toe or leg: No
0.9152119	57	Illnesses of adopted siblings: None of the above (group 2)
0.8915831	43	Night shifts worked: This type of shift pattern was not worked during job
0.8895757	56	Worked with pesticides: Rarely/never
0.8636351	37	Number of triplets attempted (left)
0.8511145	18	Recent medication for COPD (Chronic Obstructive Pulmonary Disease)
0.8426164	19	Previously smoked cigarettes on most/all days
0.8309027	41	Breathing problems during period of job: No
0.8263211	36	Worked with materials containing asbestos: Rarely/never
0.8174949	43	General pain for 3+ months
0.8147173	28	Fat removed from meat
0.8048952	35	Age cataract diagnosed
0.8045774	24	Which eye(s) affected by myopia (short sight): Both eyes
0.8045394	33	Age stroke diagnosed
0.7892228	34	Number of triplets attempted (right)
0.7786546	23	Illnesses of adopted father: None of the above (group 2)
0.7777325	33	FI2 : identify largest number
0.7765122	27	Likelihood of resuming smoking
0.7761910	25	Job involved shift work: No
0.7736931	28	Completion status of test: Fully completed
0.7713125	35	Which eye(s) affected by hypermetropia (long sight): Both eyes
0.7644399	21	Which eye(s) affected by astigmatism: Both eyes
0.7643738	36	Final attempt correct: yes
0.7554557	24	Hearing test done: Yes
0.7515264	27	Difficulty stopping worrying during worst period of anxiety
0.7446948	24	Illnesses of adopted siblings: None of the above (group 1)
0.7446802	33	Ever been injured or injured someone else through drinking alcohol: No
0.7264410	29	Ever had refractive laser eye surgery: No
0.7124701	30	OCT measured (left): Measurable
0.7111982	27	Vegetable consumers
0.7079258	25	Chest pain due to walking ceases when standing still
0.7049083	29	Illnesses of adopted mother: None of the above (group 2)
0.7021021	18	Ever had cataract surgery: No
0.6920131	21	Number of things worried about during worst period of anxiety
0.6866731	23	Workplace had a lot of cigarette smoke from other people smoking: Rarely/never
0.6820479	21	Worked with paints, thinners or glues: Rarely/never
0.6795063	22	Bread consumed
0.6733176	31	Depression possibly related to stressful or traumatic event
0.6724020	32	ECG, load
0.6718908	27	Which eye(s) affected by presbyopia: Both eyes
0.6703138	37	Illnesses of siblings: None of the above (group 2)
0.6689578	24	Number of spontaneous miscarriages
0.6687345	20	Anaesthetics administered post delivery: Other
0.6637162	31	Keyed up or on edge during worst period of anxiety

mean_iaf	SNP_number	phenotype_name
0.6623290	35	Frequency of heavy DIY in last 4 weeks
0.6622125	28	Worried most days during period of worst anxiety
0.6564705	33	Workplace had a lot of diesel exhaust: Rarely/never
0.6549303	57	FI4 : positional arithmetic
0.6512261	26	Workplace very cold: Rarely/never
0.6502060	20	Vitamin and mineral supplements: Vitamin B
0.6486180	18	Years since last breast cancer screening / mammogram
0.6462012	26	OCT measured (right): Measurable
0.6457422	27	Able to walk or cycle unaided for 10 minutes
0.6456462	20	3mm index of best keratometry results (left)
0.6424118	28	Gas or solid-fuel cooking/heating: A gas hob or gas cooker
0.6415114	27	Lipoprotein A (quantile)
0.6405977	27	Heating type(s) in home: Gas central heating
0.6401445	35	Able to pay rent/mortgage as an adult
0.6390005	31	Number of trend entries
0.6382506	25	Did your sleep change?
0.6350998	29	Gap coding: Looking after the home and/or family
0.6330235	29	Trouble falling asleep
0.6310685	24	Vitamin B12
0.6301386	41	Type of accommodation lived in: A house or bungalow
0.6258231	28	Coffee consumed
0.6232917	39	Age diabetes diagnosed
0.6172099	42	FI7 : synonym
0.6107582	40	Speech-reception-threshold (SRT) estimate (left)
0.6104081	53	Illnesses of father: None of the above (group 1)
0.6092652	32	Illnesses of mother: None of the above (group 2)
0.6078876	40	Maximum workload during fitness test
0.6065006	97	Attendance/disability/mobility allowance: None of the above
0.6041412	51	Length of working week for main job
0.5977928	72	Vitamin and mineral supplements: Multivitamins +/- minerals
0.5940496	46	Belief that own life is meaningful
0.5822369	124	Potassium in urine
0.5694031	78	Frequency of drinking alcohol
0.5545460	139	Salad / raw vegetable intake
0.5485781	648	HDL cholesterol (quantile)
0.5412126	627	HDL cholesterol (mmol/L)
0.5401794	285	Hair colour (natural, before greying): Dark brown
0.5389879	292	Hot drink temperature
0.5341453	533	Apoliprotein A (quantile)
0.5340855	522	Apoliprotein A (g/L)
0.5319875	491	Hand grip strength (left)
0.5304746	560	Eosinophill count
0.5280567	621	Neutrophill count
0.5257408	722	White blood cell (leukocyte) count
0.5257308	661	Glycated haemoglobin (quantile)
0.5254967	535	Aspartate aminotransferase (quantile)
0.5239245	774	Platelet count

Finally, we plotted the mean increasing allele frequency for traits with mean iaf significantly less than 0.5.

```
plot_data(df_less_0.5, "Mean Increasing Allele frequency for traits with mean_iaf < 0.5")
```



A table containing the data represented in the bar graph is included below. Due the large number of traits with significant SNP's, only the 200 traits with the highest and lowest mean iaf values are displayed.

```
less_table <- select(df_less_0.5, c("mean_iaf", "SNP_number", "phenotype_name")) %>% arrange(desc(mean_
kable(head(less_table, 100))
```

mean_iaf	SNP_number	phenotype_name
0.4792598	641	Haematocrit percentage
0.4787391	692	High light scatter reticulocyte count
0.4735191	654	Reticulocyte count
0.4731082	665	High light scatter reticulocyte percentage
0.4691816	349	Alanine aminotransferase (U/L)
0.4682042	262	Plays computer games
0.4675897	449	Qualifications: None of the above
0.4669448	628	Reticulocyte percentage
0.4643177	235	Nervous feelings
0.4633277	222	Intra-ocular pressure, Goldmann-correlated (right)
0.4627744	261	Relative age of first facial hair
0.4599568	357	Alcohol intake frequency.
0.4590060	557	Cystatin C (mg/L)
0.4579955	188	C-reactive protein (mg/L)
0.4553221	265	Aspartate aminotransferase (U/L)
0.4551206	163	Current tobacco smoking
0.4513512	166	Glucose (mmol/L)
0.4509290	168	Smoking status: Current
0.4484510	487	Creatinine (umol/L)
0.4447419	182	Non-cancer illness code, self-reported: high cholesterol

mean_iaf	SNP_number	phenotype_name
0.4438421	227	Mean corpuscular haemoglobin concentration
0.4433855	206	Frequency of tiredness / lethargy in last 2 weeks
0.4430719	123	Pain type(s) experienced in last month: Back pain
0.4397910	168	Tea intake
0.4369906	327	Hair colour (natural, before greying): Blonde
0.4368547	157	Medication for cholesterol, blood pressure or diabetes: Cholesterol lowering medication
0.4350941	103	Own or rent accommodation lived in: Rent - from local authority, local council, housing association
0.4342840	139	Frequency of depressed mood in last 2 weeks
0.4262799	185	Treatment/medication code: levothyroxine sodium
0.4259945	90	Exposure to tobacco smoke outside home
0.4254569	245	Non-cancer illness code, self-reported: hypothyroidism/myxoedema
0.4248000	134	Medication for cholesterol, blood pressure, diabetes, or take exogenous hormones: Cholesterol lowering medication
0.4231854	81	malignant neoplasm of male genital organs
0.4210810	91	Leisure/social activities: Pub or social club
0.4209894	83	Major dietary changes in the last 5 years: Yes, because of illness
0.4203623	69	Illnesses of siblings: Diabetes
0.4198226	88	Major coronary heart disease event excluding revascularizations
0.4198226	88	Major coronary heart disease event
0.4166885	75	Diagnoses - main ICD10: D12 Benign neoplasm of colon, rectum, anus and anal canal
0.4154323	77	Destinations on discharge from hospital (recoded): Usual Place of residence
0.4148825	55	Hands-free device/speakerphone use with mobile phone in last 3 month
0.4117135	70	Diagnoses - main ICD10: N40 Hyperplasia of prostate
0.4115021	65	Number of attempts
0.4109953	85	Illness, injury, bereavement, stress in last 2 years: Financial difficulties
0.4107093	82	Disorders of lens
0.4106365	158	Direct bilirubin (umol/L)
0.4088643	78	Time spent driving
0.4084874	120	Treatment/medication code: amlodipine
0.4077745	67	Eye problems/disorders: Glaucoma
0.4070249	68	Diagnoses - main ICD10: C61 Malignant neoplasm of prostate
0.4066853	62	Treatment/medication code: lisinopril
0.4062007	56	Diagnoses - main ICD10: H26 Other cataract
0.4059245	58	Diagnoses - main ICD10: I21 Acute myocardial infarction
0.4042132	62	Cancer code, self-reported: breast cancer
0.4034056	57	Ever worried more than most people would in similar situation
0.4031767	62	Spread type: Never/rarely use spread
0.4009950	65	Medication related adverse effects (Asthma/COPD)
0.4002689	55	Hair colour (natural, before greying): Red
0.3988279	80	Non-cancer illness code, self-reported: heart attack/myocardial infarction
0.3985697	53	Cancer diagnosed by doctor
0.3981090	53	Maximum heart rate during fitness test
0.3980150	43	Medication for pain relief, constipation, heartburn: Omeprazole (e.g. Zanprol)
0.3971152	60	Recent feelings of tiredness or low energy
0.3938916	44	Illnesses of mother: Chronic bronchitis/emphysema
0.3938361	75	Medication related adverse effects
0.3934793	49	Treatment/medication code: omeprazole
0.3934333	92	Treatment/medication code: atenolol
0.3930369	48	Non-cancer illness code, self-reported: hiatus hernia
0.3925089	39	Illnesses of father: Prostate cancer
0.3924187	60	Attendance/disability/mobility allowance: Blue badge

mean_iaf	SNP_number	phenotype_name
0.3915362	37	Meniscus derangement
0.3911624	58	Physically abused by family as a child
0.3908373	72	Leisure/social activities: Other group activity
0.3898203	41	Manifestations of mania or irritability: I was more restless than usual
0.3893392	72	Treatment/medication code: allopurinol
0.3885164	18	Job SOC coding: Upholsterers
0.3880297	36	Recent easy annoyance or irritability
0.3879469	43	Recent trouble relaxing
0.3869292	31	Current employment status: Doing unpaid or voluntary work
0.3868704	45	Hallux valgus (acquired)
0.3864660	31	Frequency of other exercises in last 4 weeks
0.3855261	40	Never eat eggs, dairy, wheat, sugar: Eggs or foods containing eggs
0.3822956	50	Illnesses of mother: Breast cancer
0.3815406	35	Treatment/medication code: alendronate sodium
0.3811939	46	Qualifications: NVQ or HND or HNC or equivalent
0.3807454	31	Treatment/medication code: citalopram
0.3804269	35	Diagnoses - main ICD10: L72 Follicular cysts of skin and subcutaneous tissue
0.3795029	46	Diagnoses - main ICD10: L03 Cellulitis
0.3793776	81	Carpal tunnel syndrome
0.3788928	72	Diagnoses - main ICD10: K51 Ulcerative colitis
0.3788288	43	Treatment/medication code: salbutamol
0.3787318	36	Type of accommodation lived in: A flat, maisonette or apartment
0.3786293	50	Diagnoses - main ICD10: R07 Pain in throat and chest
0.3773275	37	Diagnoses - main ICD10: R19 Other symptoms and signs involving the digestive system and abdomen
0.3770607	73	Prospective memory result
0.3770292	38	Side salad intake
0.3770001	87	Diagnoses - main ICD10: G56 Mononeuropathies of upper limb
0.3767643	49	Bread type: Brown
0.3762816	37	Non-cancer illness code, self-reported: irritable bowel syndrome
0.3761439	29	Type of fat/oil used in cooking: Cooking fat unknown

```
kable(tail(less_table, 100))
```

mean_iaf	SNP_number	phenotype_name
0.1214711	43	Treatment/medication code: adalat 5mg capsule
0.1214171	22	Job SOC coding: Electrical/electronics engineers n.e.c.
0.1214114	31	Diagnoses - main ICD10: N60 Benign mammary dysplasia
0.1212171	27	Blepharochalasis
0.1206562	19	Diagnoses - main ICD10: K05 Gingivitis and periodontal diseases
0.1205520	39	Non-cancer illness code, self-reported: transient ischaemic attack (tia)
0.1204620	47	Job SOC coding: Youth and community workers
0.1203553	18	Illnesses of adopted father: Lung cancer
0.1203137	39	Job coding: civil service senior manager outside the senior civil service (former grades 6 and 7)
0.1201319	27	Treatment/medication code: nifedipine
0.1196288	40	Mood [affective] disorders
0.1196288	40	Mood disorders
0.1196183	16	Job coding: housekeeper, butler, valet, cook-housekeeper, companion-housekeeper
0.1192626	30	Diagnoses - main ICD10: I65 Occlusion and stenosis of precerebral arteries, not resulting in cerebral infarction

mean_iat	SNP_number	phenotype_name
0.1187097	34	Type of fat/oil used in cooking: Low fat olive spread for
0.1186148	34	Diagnoses - main ICD10: T85 Complications of other internal prosthetic devices, implants and grafts
0.1183243	39	Non-rheumatic valve diseases
0.1183048	38	Diagnoses - main ICD10: J32 Chronic sinusitis
0.1182033	18	Job SOC coding: Quality assurance technicians
0.1181850	37	Chest pain felt outside physical activity
0.1178114	33	Diagnoses - main ICD10: R32 Unspecified urinary incontinence
0.1176262	28	Treatment/medication code: domperidone
0.1168998	24	Diagnoses - main ICD10: N45 Orchitis and epididymitis
0.1165952	41	Diagnoses - main ICD10: I44 Atrioventricular and left bundle-branch block
0.1160010	37	Diagnoses - main ICD10: N97 Female infertility
0.1154488	25	Diagnoses - main ICD10: Z41 Procedures for purposes other than remedying health state
0.1153955	34	Diagnoses - main ICD10: O63 Long labour
0.1134114	27	Malignant neoplasm of lip, oral cavity and pharynx
0.1133673	34	Job coding: nursing auxiliary or assistant, steriliser of medical equipment, occupational therapy assistant, phlebotomist, physiotherapy assistant, ward orderly, ward assistant
0.1125184	43	Rose wine intake
0.1123354	45	Diagnoses - main ICD10: M84 Disorders of continuity of bone
0.1123302	44	Job coding: community worker, day centre officer, youth leader, youth worker, parish worker, bail support officer
0.1121476	23	Own or rent accommodation lived in: Live in accommodation rent free
0.1119767	26	Diagnoses - main ICD10: R22 Localised swelling, mass and lump of skin and subcutaneous tissue
0.1119407	42	Vitamin and/or mineral supplement use: Vitamin E
0.1118105	18	Non-cancer illness code, self-reported: fracture neck of femur / hip
0.1113244	37	Job SOC coding: Metal working production and maintenance fitters
0.1111297	38	Malignant neoplasm of ovary
0.1108655	37	Diagnoses - main ICD10: R56 Convulsions, not elsewhere classified
0.1107782	24	Treatment/medication code: evening primrose oil product
0.1106942	32	Mental health problems ever diagnosed by a professional: Obsessive compulsive disorder (OCD)
0.1105652	41	Ever believed in un-real communications or signs
0.1102211	25	Diagnoses - main ICD10: C19 Malignant neoplasm of rectosigmoid junction
0.1101608	23	Non-cancer illness code, self-reported: fracture rib
0.1099956	30	Current employment status: None of the above
0.1098479	30	Diagnoses - main ICD10: I34 Nonrheumatic mitral valve disorders
0.1094680	27	Treatment/medication code: tegretol 100mg tablet
0.1082142	32	Type of fat/oil used in cooking: Spreadable butter
0.1069216	28	Diagnoses - main ICD10: S32 Fracture of lumbar spine and pelvis
0.1062548	23	Epiphora
0.1061882	28	Diagnoses - main ICD10: C85 Other and unspecified types of non-Hodgkin's lymphoma
0.1046736	33	Treatment/medication code: selenium product
0.1043510	30	Job coding: waiter, waitress, maitre d'hotel, sommelier, steward
0.1040875	34	Malignant neoplasm of corpus uteri
0.1039662	29	Job SOC coding: Shopkeepers and wholesale/retail dealers
0.1024089	44	Diagnoses - main ICD10: N94 Pain and other conditions associated with female genital organs and menstrual cycle
0.1022082	34	Diagnoses - main ICD10: K04 Diseases of pulp and periapical tissues
0.1021646	17	Non-cancer illness code, self-reported: cholecystitis
0.1021365	17	Treatment/medication code: co-amilofruse
0.1017599	30	Cancer code, self-reported: uterine/endometrial cancer

mean_iaf	SNP_number	phenotype_name
0.1008816	16	Job coding: gardener, groundsman/groundswoman, park keeper, landscape gardener, greenkeeper, turf cutter
0.1005979	17	Job SOC coding: Playgroup leaders/assistants
0.1001765	31	Treatment/medication code: nexium 20mg tablet
0.1000622	40	Diagnoses - main ICD10: N13 Obstructive and reflux uropathy
0.0998108	42	Surgery on leg arteries (other than for varicose veins)
0.0991078	42	Job SOC coding: Receptionists
0.0986384	34	Entropion and trichiasis of eyelid
0.0970174	32	Diagnoses - main ICD10: R93 Abnormal findings on diagnostic imaging of other body structures
0.0969354	46	Job SOC coding: Electricians, electrical fitters
0.0965660	26	Type milk consumed: soya without calcium
0.0963896	31	Milk chocolate intake
0.0961939	29	Non-cancer illness code, self-reported: heart/cardiac problem
0.0961079	28	Job SOC coding: Midwives
0.0955631	37	Job coding: van driver, delivery driver, courier driver
0.0940157	27	Type of special diet followed: Lactose-free
0.0936678	46	Diagnoses - main ICD10: Z53 Persons encountering health services for specifie procedures, not carried out
0.0931118	32	Treatment/medication code: montelukast product
0.0925954	26	Non-cancer illness code, self-reported: nasal/sinus disorder
0.0922228	27	Job coding: midwife
0.0916123	18	Job SOC coding: Ship and hovercraft officers
0.0910555	29	Treatment/medication code: evorel 25 patch
0.0904206	20	Job coding: school secretary
0.0892222	31	Job SOC coding: Biological scientists and biochemists
0.0887264	37	Which eye(s) affected by myopia (short sight): Right eye
0.0886359	38	Job SOC coding: Van drivers
0.0874486	14	Diagnoses - main ICD10: R26 Abnormalities of gait and mobility
0.0874034	32	Treatment/medication code: oxybutynin
0.0862681	36	Hearing test done: No, I am unable to do this
0.0852351	44	Diagnoses - main ICD10: N63 Unspecified lump in breast
0.0851252	39	Hypertension
0.0846683	29	Diagnoses - main ICD10: E87 Other disorders of fluid, electrolyte and acid-base balance
0.0820170	39	Treatment/medication code: lercanidipine
0.0798729	34	Doctor diagnosed COPD (chronic obstructive pulmonary disease)
0.0767723	29	Treatment/medication code: beclazone 50 inhaler
0.0735905	34	Conduction disorders
0.0635443	52	Time spent doing light physical activity
0.0512380	124	Fractured heel
0.0461174	24	Depression
0.0458446	36	Treatment/medication code: dosulepin
0.0365462	127	Frequency of needing morning drink of alcohol after heavy drinking session in last year

Use of the p-value of 1e-5 to filter out significant SNPs vastly alters the results from the 5e-8 analysis. The average mean_iaf is significantly less than 0.5 compared to the previous data. Further investigation is needed to determine why this occurs.