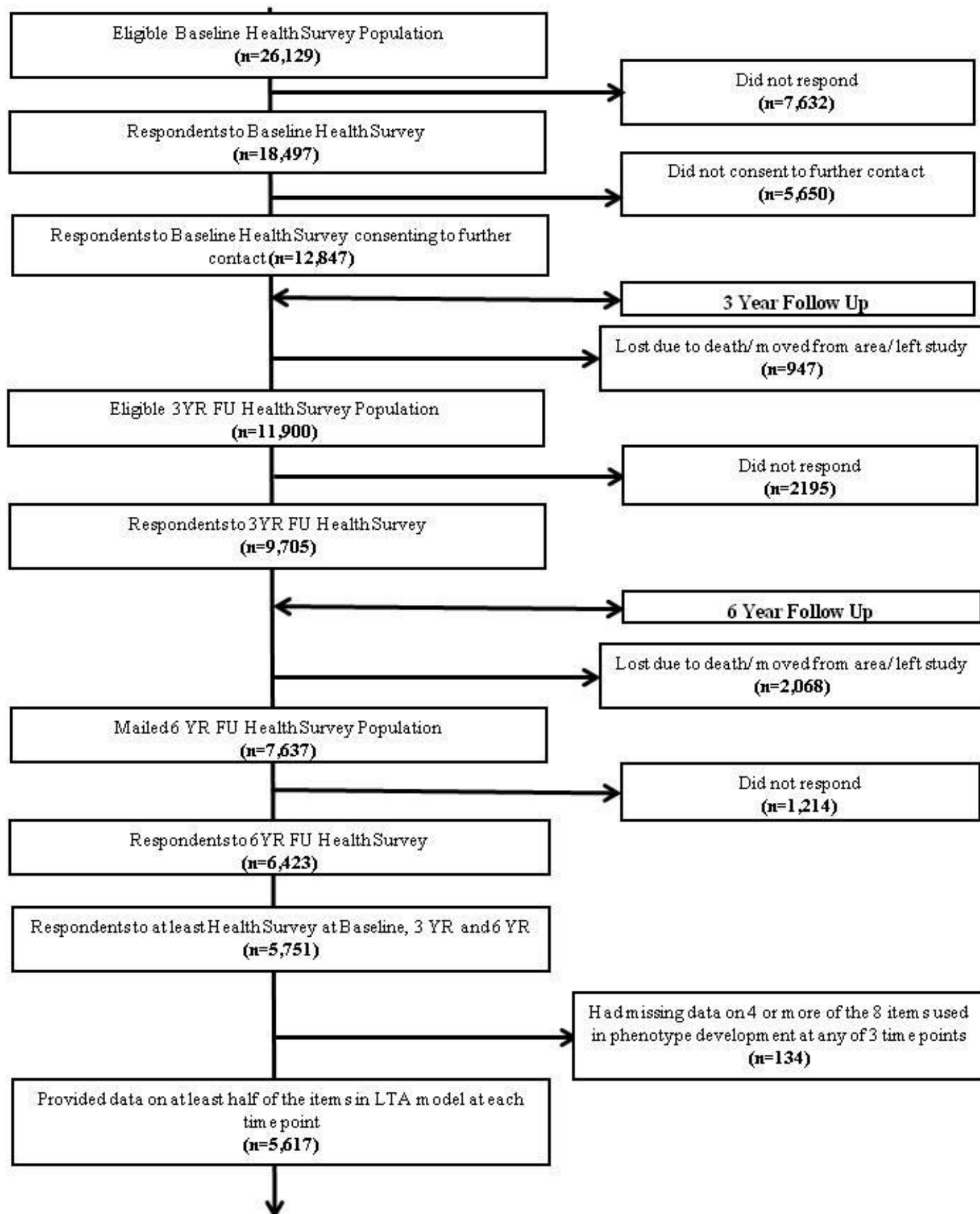


Supplementary Figure 1: Flow diagram of NorStOP recruitment over 6 years follow up and identification of analysis population.



Supplementary Figure 2: Initial 40 items considered for analysis and discussed with Research User Group.

AUSCAN (15 items):

- How much pain do you have:
 - At rest?
- How much pain do you have:
 - Gripping objects?
- How much pain do you have:
 - When lifting objects?
- How much pain do you have:
 - When turning objects with your hands?
- How much pain do you have:
 - When squeezing objects with hands?
- How severe is stiffness in hands after first waking in the morning?
- How much difficulty do you have:
 - Turning taps on?
- How much difficulty do you have:
 - Turning a door-knob or handle?
- How much difficulty do you have:
 - Doing up buttons?
- How much difficulty do you have:
 - Fastening jewellery?
- How much difficulty do you have:
 - Opening a new jar?
- How much difficulty do you have:
 - Carrying a full pot with one hand (i.e. a saucepan)
- How much difficulty do you have:
 - Peeling vegetables/fruit?
- How much difficulty do you have:
 - Picking up large heavy objects?
- How much difficulty do you have:
 - Wringing out washcloths (i.e. a flannel)?

AIMS2 (Hand and Finger Function) (3 items):

- Could you easily write with a pen or pencil?
- Could you easily turn a key in a lock?
- Could you easily tie a knot/bow?

AIMS2 (Arthritis Pain) (3 items)

- How often did you have pain in two or more hand joints?
- How often did morning stiffness in your hands last more than one hour from waking up?
- How did your hand problems make it difficult for you to sleep?

AIMS2 (Overall Arthritis Impact) (1 item)

- How often have you taken medication for hand symptoms?

Stand-alone questions (12 items):

- Hand problems in both hands (or one hand only)
- How much hand stiffness do you usually have?
- How much hand aching do you usually have?
- How much hand tenderness do you usually have?
- How much hand weakness do you usually have?
- How much hand clumsiness do you usually have?
- How much burning sensation do you usually have in your hand?
- How much hand tingling do you usually have?
- How much hand numbness do you usually have?
- How often did your hands feel hot or warm?
- How often did your hand problems make you feel frustrated?
- How often did hand problems cause you to drop objects?

Previous hand experiences (5 items):

- Duration of hand pain
- Previous injury to hand
- Operation on hand
- Job that has involved excessive use of hands
- Hobby/pastime that has involved excessive use of hands

Presence of nodes (1 item):

- Finger(s) with nodes

A finger with nodes:



Supplementary Table 1: Phenotype proportions and item-response probabilities from the sensitivity analysis.

State	1	2	3	4	5	6
Latent state proportion at baseline	75.9%	4.0%	4.9%	6.4%	6.9%	1.8%
Potential labels:	Least affected	High pain	Poor gross function	High pain & poor gross function	Severely affected	Poor Gross Function & Pain squeezing
Pain when turning objects	0.000	0.639	0.105	0.880	0.983	0.198
Pain when squeezing objects	0.002	0.854	0.083	0.930	0.999	0.410
Pain when gripping objects	0.005	0.711	0.148	0.848	0.958	0.169
Difficulty opening a new jar	0.004	0.178	0.559	0.848	0.999	0.990
Difficulty carrying a full pot	0.004	0.063	0.492	0.787	0.979	0.920
Difficulty wringing out a dishcloth	0.002	0.150	0.312	0.735	0.987	0.823
Difficulty doing-up buttons	0.001	0.025	0.041	0.171	0.858	0.377
Difficulty turning taps on	0.000	0.018	0.040	0.068	0.878	0.423