

Menopausal status

Age Cohorts	Mid-age
Surveys	All
Derived Variable	MENSTAT
Definition	Menopausal status
Source Items (Index Numbers)	Hyster1: m1q16a, m3q27a, m4q24a, m5q26a. Hyster2: m2q21a, m3q36a, m4q35a. Ovaries1: m1q16b. Ovaries2: m2q21b, m3q36b, m4q35b, m5q40a. Hormone replacement: m1q22, m2q26b, m3q26b, m4q23b, m5q25b. Oral contraceptive: m1q20, m2q26a, m3q26a, m4q23a, m5q25a. Bleed12: m1q31a, m2q27a, m3q27b, m4q24b, m5q26b. Bleed3: m1q31b, m2q27b, m3q27c, m4q24c, m5q26c. Irregular: m1q32, m2q28, m3q28, m4q25, m5q27
Statistical form	Categorical variable
Index Number	REPH 166
Derived Variable	MENSTATGP
Definition	Grouped variable for re-coded menopausal status
Source Items (Index Numbers)	Re-coded menopausal
Statistical form	Categorical variable status
Index Number	REPH 167
Prepared by	Nelufa Begum, Janneke Berecki and Annette Dobson
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Source Items

- Hyster1** Have you (ever) had a hysterectomy (Survey 1, Survey 3, Survey 4, Survey 5)?
- Hyster2** Have you had a hysterectomy in the
- Last 2 years (Survey 2)?
 - More than 2 years ago (Survey 2)?
 - Past 3 years? (Survey 3)?
- Ovaries1** Have you (ever) had both ovaries removed?
- Ovaries2** Have you had both ovaries removed in the
- Last 2 years (Survey 2)?
 - More than 2 years ago (Survey 2)?
 - Past 3 years? (Survey 3, Survey 4, Survey 5)?
- Hormone replacement** Are you currently on hormone replacement therapy (HRT)?
- Oral contraceptive** Are you currently taking the oral contraceptive pill for any reason?
- Bleed12** Have you had a period or menstrual bleeding in the last 12 months?
- Bleed3** Have you had a period or menstrual bleeding in the last 3 months?
- Irregular** Compared with twelve months ago, are your periods:
- Less frequent 1
 - About the same 2
 - More frequent 3
 - Changeable 4

Derived Menopause Variable

The survey items are used to define menstrual status for Mid-age women who completed all Surveys: Survey 1 to 5.

Three categories of surgical menopause are defined: hysterectomy only (removal of the uterus), bilateral oophorectomy only (both ovaries removed), and both hysterectomy and bilateral oophorectomy; these are all referred to as surgical menopause. Once a woman has had surgical menopause her status cannot revert to pre-menopausal. Women who have had a bilateral oophorectomy with or without a hysterectomy will simultaneously go through spontaneous menopause, regardless of age [1]. If only a hysterectomy is performed, menstrual bleeding ceases although hormonal production may continue for several years.

Hormone replacement therapy (HRT) is given to some women during or after the menopausal transition to provide a continued supply of some of the hormones produced by their bodies during the reproductive period. These hormones (oestrogen with or without progesterone) can also be given to women who have undergone bilateral oophorectomy, to replace the oestrogen no longer produced by the ovaries.

Like HRT, most oral contraceptives (OCP) include both oestrogen and progesterone. OCP is usually given to premenopausal women, but it can mask underlying menopause. Both HRT and OCP can induce periodic bleeding, or suppress periodic bleeding, regardless of underlying menopausal status. Women using OCP or HRT are therefore treated separately.

Menopausal status for women who had not undergone surgical menopause was based on the definitions of Guthrie et al. [2]: women were defined as pre-menopausal if they had menstruated in the last 3 months and reported no change in menstrual frequency in the last 12 months; peri-menopausal if they reported changes in menstrual frequency or 3-11 months of amenorrhea; and naturally post-menopausal if they reported amenorrhea for 12 consecutive months or more.

The menopausal status

As hysterectomy and bilateral oophorectomy are both irreversible operations, responses at earlier survey/s are used for assignment with respect to these operations at later surveys; for example, status at Survey 2 is based on hysterectomy and bilateral oophorectomy data at Surveys 1 and 2. Similarly, post-menopausal women cannot revert to pre- or peri-menopause status: response at earlier surveys is used to determine status at later surveys. Furthermore, once a woman is defined as post-menopausal, she will remain in this category regardless of later HRT or OCP use. This ensures consistency across surveys.

Firstly, surgical-menopausal women were assigned menopausal status (hysterectomy only, bilateral oophorectomy only, or both hysterectomy and bilateral oophorectomy). From the remaining women we categorised the HRT group (those currently taking HRT); for the remaining women, we categorised those currently taking OCP. Finally, the remaining women were categorised as pre-, peri- or post-menopausal according to their reported menstrual pattern. Menopausal status was categorised as missing if all relevant items were missing at a particular survey. Women who had completed the survey but did not report one or more relevant items at that survey were considered as unclassifiable.

In addition, for the re-coded variables, the following rules were applied:

- A woman can progress to surgical menopause from categories HRT, OCP, pre-, peri- or post-menopause.
- assumes that the categories pre-, peri- and post-menopausal, the natural order of menopause is pre →peri →post. A woman can remain at the same menopausal status from one survey to the next, or can move 'up' in the model (i.e. pre →peri or peri →post), but cannot move 'down' in menopausal status (i.e. peri →pre or post →pre).
- when any information about hysterectomy or bilateral oophorectomy or HRT or OCP is missing, we defined menopausal status by using all other information available (e.g. HRT, OCP and bleeding patterns).

Therefore, the codes and the category labels for the menopause status are:

Code	Category
1	Hysterectomy only
2	Bilateral oophorectomy only
3	Hysterectomy and bilateral oophorectomy
4	Menopausal status could not be defined due to hormone replacement therapy (HRT) use
5	Menopausal status could not be defined due to oral contraceptive (OCP) use
6	Pre-menopausal
7	Peri-menopausal
8	Post-menopausal

9 Unclassifiable
 Missing

Table 1 shows the distribution for the re-coded menopausal status for Surveys 1 to 5.

Table 1: Distribution of menopausal status (percent) of middle aged women at Surveys 1 to 5

Survey:	1	2	3	4	5
Hysterectomy only	17.0	17.7	19.4	20.6	21.2
Oophorectomy only	0.7	0.7	0.7	0.8	1.0
Hysterectomy and oophorectomy	5.8	7.6	8.9	9.9	10.9
HRT use	9.2	11	16.7	9.7	6.3
OCP use	5.4	3.9	2.2	0.5	0.1
Pre-menopausal	33.6	23	9.0	2	0.2
Peri-menopausal	22.5	24	17.9	9.6	2.0
Post-menopausal	5.5	11.7	24.6	46.6	58.1
Missing	0.0	0.0	0.0	-	0.0
Unclassifiable	0.3	0.4	0.6	0.4	0.2
Total Number	13716	12338	11200	10905	10565
<i>Survey not completed</i>		<i>1378</i>	<i>2516</i>	<i>2811</i>	<i>3151</i>
<i>- Number (Percent)</i>		<i>(10%)</i>	<i>(18.3%)</i>	<i>(20.5%)</i>	<i>(23%)</i>

Generally in statistical analysis, the missing and unclassifiable categories will be excluded and the 3 types of surgical menopause will be aggregated (codes 1, 2 and 3). This summary variable is included as MENSTATGP with the following codes:

Code	Category
1	Surgical menopause
2	Menopausal status could not be defined due to hormone replacement therapy (HRT) use
3	Menopausal status could not be defined due to oral contraceptive (OCP) use
4	Pre-menopausal
5	Peri-menopausal
6	Post-menopausal

The distribution of MENSTATGP is shown in Table 2.

Table 2: Distribution of menopausal status (percent) at Surveys 1 to 5 and could be classified

Survey:	1	2	3	4	5
Surgical menopause	23.5	26.1	29.2	31.5	33.1
HRT use	9.2	11	16.8	9.7	6.3
OCP use	5.5	3.9	2.2	0.5	0.1
Pre-menopausal	33.7	23.1	9	2	0.2
Peri-menopausal	22.6	24.1	18	9.6	2
Post-menopausal	5.5	11.8	24.8	46.7	58.3
Total number	13675	12286	11125	10867	10546

The SAS code defining menopausal status is shown below. The length of the SAS program for re-coding menopause is too large for inclusion and part of the program is included here.

```

SURVEY 1
/*mid 1 hrt*/ m1hrt=m1q22 ;
/*mid 1 OCP*/ m1oralc=m1q20 ;
/*mid 1 hyst*/ m1hyst=m1q16a ;
/*mid 1 ooph*/ m1ovaries = m1q16b;

/* Mid 1 Menopausal Status */;
/*ov and hyst*/
if m1hyst=1 and m1ovaries =1 then m1menopause = 3;
/*hyst only*/
else if m1hyst = 1 then m1menopause = 1;
/*ovaries only*/
else if m1ovaries =1 then m1menopause = 2;
else if m1hyst = 2 and m1ovaries = 2 and m1hrt=1 then m1menopause = 4;
else if m1hyst = 2 and m1ovaries = 2 and m1hrt=2 and m1oralc =1 then m1menopause = 5;
/*no bleed*/
else if m1hyst = 2 and m1ovaries = 2 and m1hrt=2 and m1oralc =2 and m1q31a = 2 then m1menopause
= 8;
/*regular bleed*/
else if m1hyst = 2 and m1ovaries = 2 and m1hrt=2 and m1oralc =2 and ((m1q31a=1 and m1q31b=1
and m1q32=2) or (m1q31b=1 and m1q32=2)) then m1menopause= 6 ;
/*irregular bleed*/
else if m1hyst = 2 and m1ovaries = 2 and m1hrt=2 and m1oralc =2 and ((m1q31a=1 and m1q31b=2) or
(m1q31b=2 and m1q32 in (1,3,4)) or (m1q31a=1 and m1q32 in (1,3,4,)) or (m1q31b=2 or m1q32 in
(1,3,4))) then m1menopause=7 ;
/*missing*/
else if m1hyst =. and m1ovaries =. and m1q20 =. and m1q22 =. and m1q31a =. and m1q31b =. and
m1q32 =. then m1menopause =. ;
/*unclassifiable*/
else m1menopause = 9 ;

/*Unclassifiable dataset defined by using information available: survey 1*/
if (m1hyst =. or m1hyst = 2) and (m1ovaries =. or m1ovaries = 2) and m1hrt = 1 then m1menopause =
4;
else if (m1hyst =. or m1hyst = 2) and (m1ovaries =. or m1ovaries = 2) and (m1hrt =. or m1hrt = 2)
and m1oralc = 1 then m1menopause = 5;
else if (m1hyst =. or m1hyst = 2) and (m1ovaries =. or m1ovaries = 2) and (m1hrt =. or m1hrt = 2)
and (m1oralc =. or m1oralc = 2) and m1q31a = 2 then m1menopause = 8;
else if (m1hyst =. or m1hyst = 2) and (m1ovaries =. or m1ovaries = 2) and (m1hrt =. or m1hrt = 2)
and (m1oralc =. or m1oralc = 2) and ((m1q31a=1 and m1q31b=2) or (m1q31b=2 and m1q32 in
(1,3,4)) or (m1q31a=1 and m1q32 in (1,3,4,)) or (m1q31b=2 or m1q32 in (1,3,4))) then

```

```
m1menopause=7 ;
else if (m1hyst = . or m1hyst = 2) and (m1ovaries = . or m1ovaries = 2) and (m1hrt = . or m1hrt = 2)
and ((m1q31a=1 and m1q31b=1 and m1q32=2) or (m1q31b=1 and m1q32=2)) then m1menopause= 6 ;
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SURVEY 2

```
/*mid 2 oralcont*/ m2oralc=m2q26a ;
/*mid 2 hrt*/ m2hrt=m2q26b ;
/*mid 2 hyst*/
if m1hyst = 1 or (m2q21a in (1,2,3)) then m2hyst = 1;
else if m1hyst=2 and m2q21a = 0 then m2hyst = 2;
/*mid 2 ooph*/
if m1ovaries = 1 or (m2q21b in (1,2,3)) then m2ovaries = 1;
else if m1ovaries = 2 and m2q21b = 0 then m2ovaries = 2;

/* Mid 2 Menopausal Status */;
/*ov and hyst*/
if m2hyst=1 and m2ovaries = 1 then m2menopause = 3;
/*hyst only*/
else if m2hyst=1 then m2menopause = 1;
/*ovaries only*/
else if m2ovaries = 1 then m2menopause = 2;
else if m2hyst = 2 and m2ovaries = 2 and m2hrt=1 and m1menopause = . then m2menopause = 4;
else if m2hyst = 2 and m2ovaries = 2 and m2hrt=2 and m2oralc=1 and m1menopause = . then
m2menopause = 5;
/*no bleed*/
else if m1menopause = 8 or (m2hyst = 2 and m2ovaries = 2 and m2hrt=2 and m2oralc =2 and
m2q27a=2) then m2menopause = 8;
/*regular bleed*/
else if m2hyst = 2 and m2ovaries = 2 and m2hrt=2 and m2oralc =2 and ((m2q27a=1 and m2q27b=1
and m2q28=2) or (m2q27b=1 and m2q28=2)) then m2menopause= 6 ;
/*irregular bleed*/
else if m2hyst = 2 and m2ovaries = 2 and m2hrt=2 and m2oralc =2 and ((m2q27a=1 and m2q27b=2)
or (m2q27b=2 and m2q28 in (1,3,4)) or (m2q27a=1 and m2q28 in (1,3,4,.) or (m2q27b=2 or m2q28 in
(1,3,4))) then m2menopause=7 ;
/*missing*/
else if m2hyst = . and m2ovaries = . and m2q26a = . and m2q26b = . and m2q27a = . and m2q27b = .
and m2q28 = . then m2menopause =.;
/*unclassifiable*/
else m2menopause = 9;

/*Unclassifiable dataset defined by using information available: survey 2*/
if (m2hyst = . or m2hyst = 2) and (m2ovaries = . or m2ovaries = 2) and m2hrt = 1 then m2menopause
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= 4;

else if (m2hyst = . or m2hyst = 2) and (m2ovaries = . or m2ovaries = 2) and (m2hrt = . or m2hrt = 2) and m2oralc = 1 then m2menopause = 5;

else if (m2hyst = . or m2hyst = 2) and (m2ovaries = . or m2ovaries = 2) and (m2hrt = . or m2hrt = 2) and (m2oralc = . or m2oralc = 2) and (m1menopause = 8 or m2q27a=2) then m2menopause = 8;

else if (m2hyst = . or m2hyst = 2) and (m2ovaries = . or m2ovaries = 2) and (m2hrt = . or m2hrt = 2) and (m2oralc = . or m2oralc = 2) and ((m2q27a=1 and m2q27b=2) or (m2q27b=2 and m2q28 in (1,3,4)) or (m2q27a=1 and m2q28 in (1,3,4,)) or (m2q27b=2 or m2q28 in (1,3,4))) then m2menopause=7 ;

else if (m2hyst = . or m2hyst = 2) and (m2ovaries = . or m2ovaries = 2) and (m2hrt = . or m2hrt = 2) and ((m2q27a=1 and m2q27b=1 and m2q28=2) or (m2q27b=1 and m2q28=2)) then m2menopause= 6;

And so on;

References

1. The Hysterectomy Association: www.hysterectomy-association.org.uk [Accessed 2004 February 15].
2. Guthrie JR, Dennerstein L, Dudley EC. Weight gain and the menopause: a 5-year prospective study. *Climacteric* 1999; 2:205-211.