Current projection method

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Presentation Overview

- National method – *briefly*
- Sub-national projection method
- Demonstration of the system
- Questions?

National method and results

National projections: key points

- ‘full’ projections done every two years
- can also do ‘interim’ projections in intervening year
- latest projections are 2004-based, published October 2005
- 70 year projection period
- split by age and sex
- use base of latest population estimates
- used as a control for more specialist projections
- standard (cohort component) methodology
- comprehensive data available on GAD’s website
- a National Statistic

The cohort component method

- a starting ('base') population by age and gender

- assumptions for future:
  - fertility
  - mortality
  - migration

$$P_{t+1} = P_t + B - D + I - E$$

Responsibility for national projections

- From Jan 31 2006 responsibility transferred from GAD to ONS
- ONS will produce National Population Projections in consultation with GROS, NISRA and NAW
- NPP will be part of the National Statistics Centre for Demography (NSCD) created in ONS on 31 Jan 2006. NSCD will:
  - have UK-wide work programme
  - be overseen by new UK population committee including three RGs and Chief Statistician of Welsh Assembly Govt

Consultation

- GAD prepares proposals on ‘headline’ assumptions for each country
- individual countries consult key users, with GAD support as required
- consultation covers key UK government departments, e.g. HM Treasury, Dept of Health, ODPM, Dept for Work and Pensions and the Pensions Commission
- Expert academic group instigated in 2005
- GROS also consulted Scottish experts and Scottish Departments

Sub-national projections

Background

- Produced every two years
- Consistent with the national projections
- Cohort component method
- Birth and death rates scaled by the ratio of the number of expected births / deaths (if national rates were applied) to the average number of births /deaths in the previous 5 years

Background continued..

- Migration assumptions based on trends in net migration over the last 5 years
- **Do not** take account of predicted changes in house building or other planned policy changes
- Data sources for the net migration trends include the NHSCR, CHI, and the IPS

Current method

- Demographic component method
- Uses a single year projection model
- i.e. syoa (up to 90 and over) and sex for each future year
- Starts with the MYE for the base year
- First an estimate of the numbers surviving to be one year older is made by applying a series of mortality rates

Current method continued…

- Numbers of live births in the year are produced using fertility rates in combination with the female populations of child bearing age
- An allowance is made for infant mortality
- Lastly the age/sex structure of people entering or leaving the area is taken into account (migration)
- This process is repeated for 20 years
- For each year it is necessary to make assumptions about the future fertility rates, mortality rates and migration.

Current System

Written in VBA for Excel with 3 steps:

- Migration phase
- Main Calculation phase including the RAS Principle
- Output phase

Migration phase

The long-term assumption total for each area

- First a 5 year average of the net migration for each council area is calculated **(a) –** see PAMS (03) 10 for how the migration estimates are produced

  (NB Asylum seekers are excluded from Glasgow City)
- Next any outliers are excluded and the average excluding the outliers is calculated **(b)**
- Next a weighted average is calculated – 25% of (a) plus 75% of (b)
- It is rounded to the nearest 50 and then adjusted to sum to the national total net migration assumption

Consultation

- Next Council Chief Executives are consulted as are SE Departments, PAMS contacts etc
- Small adjustments may be made depending on the evidence and the strength of the argument
- Planned housing is not taken into account
- Short-term assumptions are determined by drawing a line from the latest net migration estimate for the area to the long-term assumption

Migration assumptions by age and sex

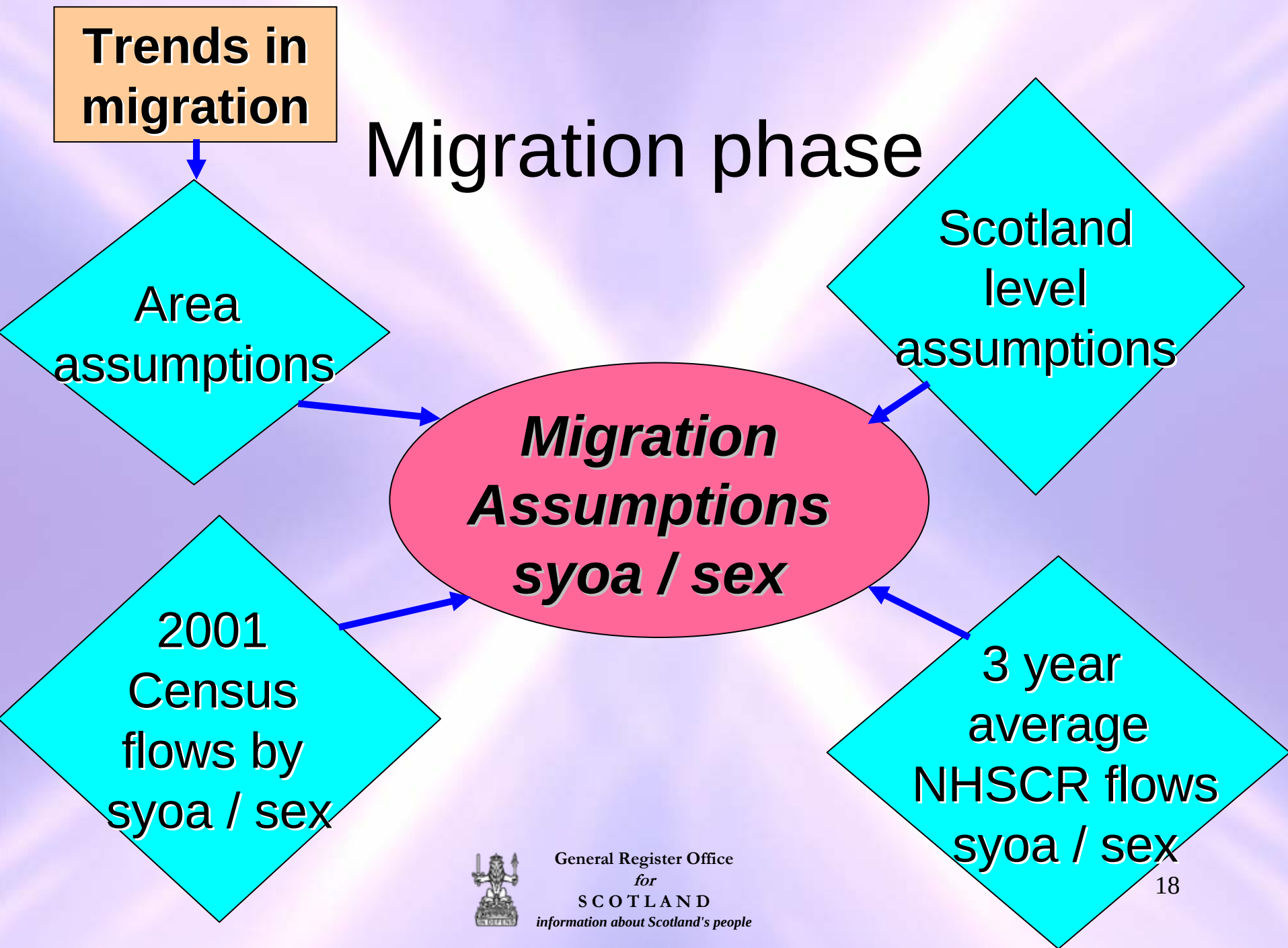
Inputs:

- 2001 Census in and out flows syoa age and sex
- National Health Service Central Register (NHSCR) – moves by syoa and sex for base year and previous two years
- Assumed Council and NHS Board migration consistent with GAD's Scotland migration

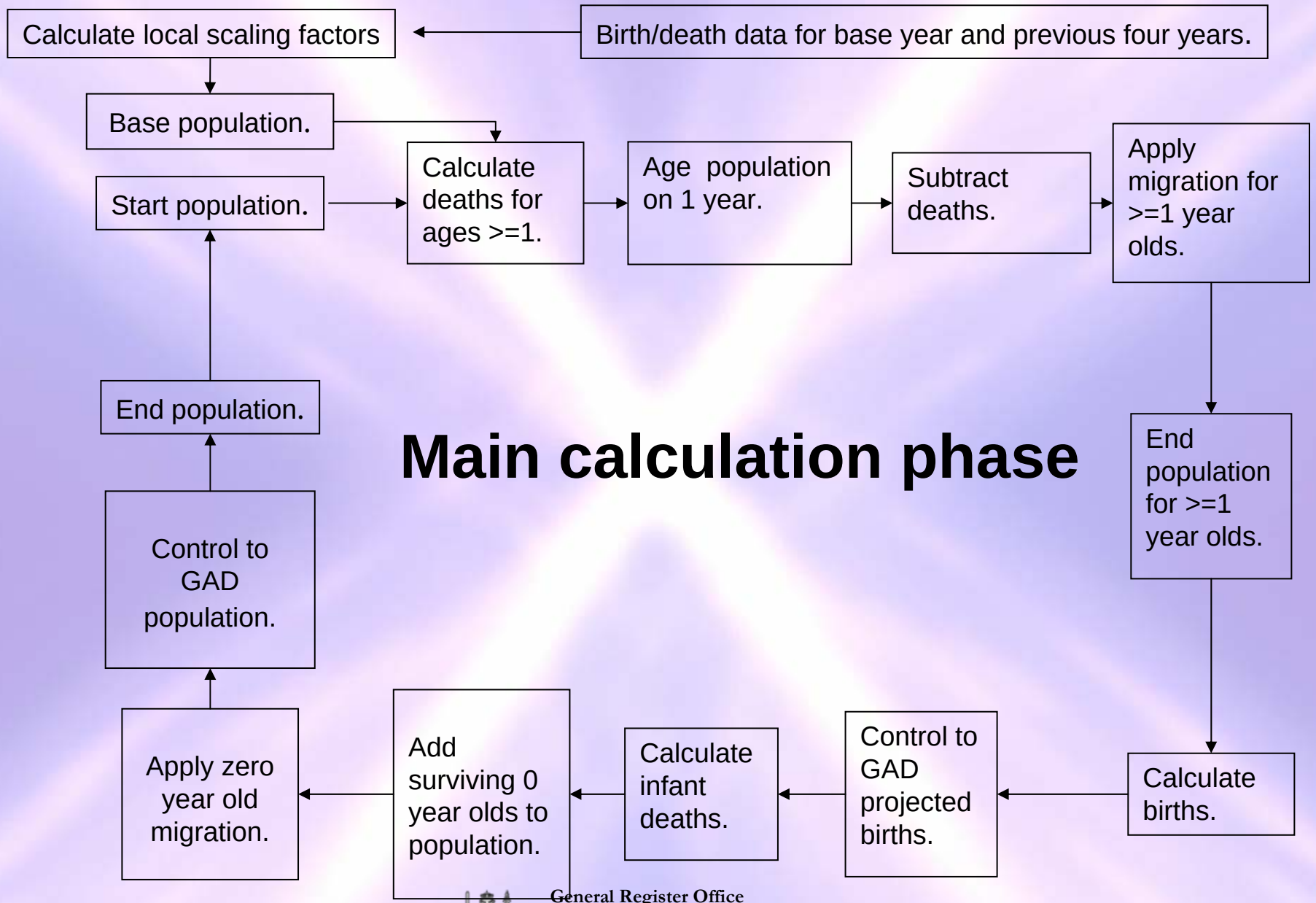
Method:

- Average NHSCR flows are used to give an age and sex distribution to health board moves
- 2001 Census flows are used to give an age and sex structure to council areas
- Made consistent with assumed national flows

Migration phase



Main phase


Calculate local scaling factors
Birth/death data for base year and previous four years.
Base population.
Start population.
Calculate deaths for ages >=1.
Age population on 1 year.
Subtract deaths.
Apply migration for >=1 year olds.
End population for >=1 year olds.
Calculate births.
Control to GAD projected births.
Calculate infant deaths.
Add surviving 0 year olds to population.
Apply zero year old migration.
Control to GAD population.
End population.
Main calculation phase

Births

Births are calculated at the end of each cycle.

- obtained by applying fertility rates to the numbers of women at each childbearing age.
- Because births are being predicted for local areas, the assumed national fertility rates are adjusted by a ‘fertility scaling factor’ to take account of local variations observed in the 5 year period preceding the projection.

Deaths

Numbers of deaths of those aged one and over are calculated at the beginning of each cycle.

Infant mortality, however, is calculated after the numbers of births in the cycle has been finalised.

- The projected number of deaths each year is calculated by applying mortality rates by age and sex to the appropriate sub-populations.
- Because deaths are being predicted for local areas, the assumed national mortality rates are adjusted by a ‘mortality scaling factor’ to take account of local variations observed in the 5 year period preceding the projections.

Migration

Migration is assumed to occur evenly throughout the year.

- For computing purposes, this is equivalent to assuming that half the migrants in a given year at a given age migrate at the beginning of the year and half at the end of the year. The number of net migration to be added to obtain the population aged x+1 at the end of the projection year therefore consists of half those migrating during the year at age x and half of those migrating during the year at age x+1.

The RAS principle - a method of controlling matrix cells to desired row and column totals

- The (integer-valued) desired row and column totals must be pre-specified and must sum to the same value. Initial cell values must also be assigned, but these need not sum to the desired totals. The initial cell values should be integer valued.

Has 2 steps:

- multiplying the initial cell values by row and column factors;
- controlling any residual difference that might remain after the first step.

NHS Boards

- The system runs on parts of council areas
- The input data for these areas is aggregated from datazones i.e. best fit for NHS Boards
- An adjustment is made to get projected population for the ‘correct’ NHS Board boundaries i.e. it is assumed that the difference between the published MYE for NHS Boards and the ‘best fit’ NHS Boards is the same throughout the projection period.

Output Phase

Output Phase

- Produces detailed output files for each administrative area by single year of age and sex and are available on the GROS website

Demonstration of system

Summary

- Cohort component method
- System Excel based

Thank you.

Questions?