Stemming demand: how best to track the impact of interventions?

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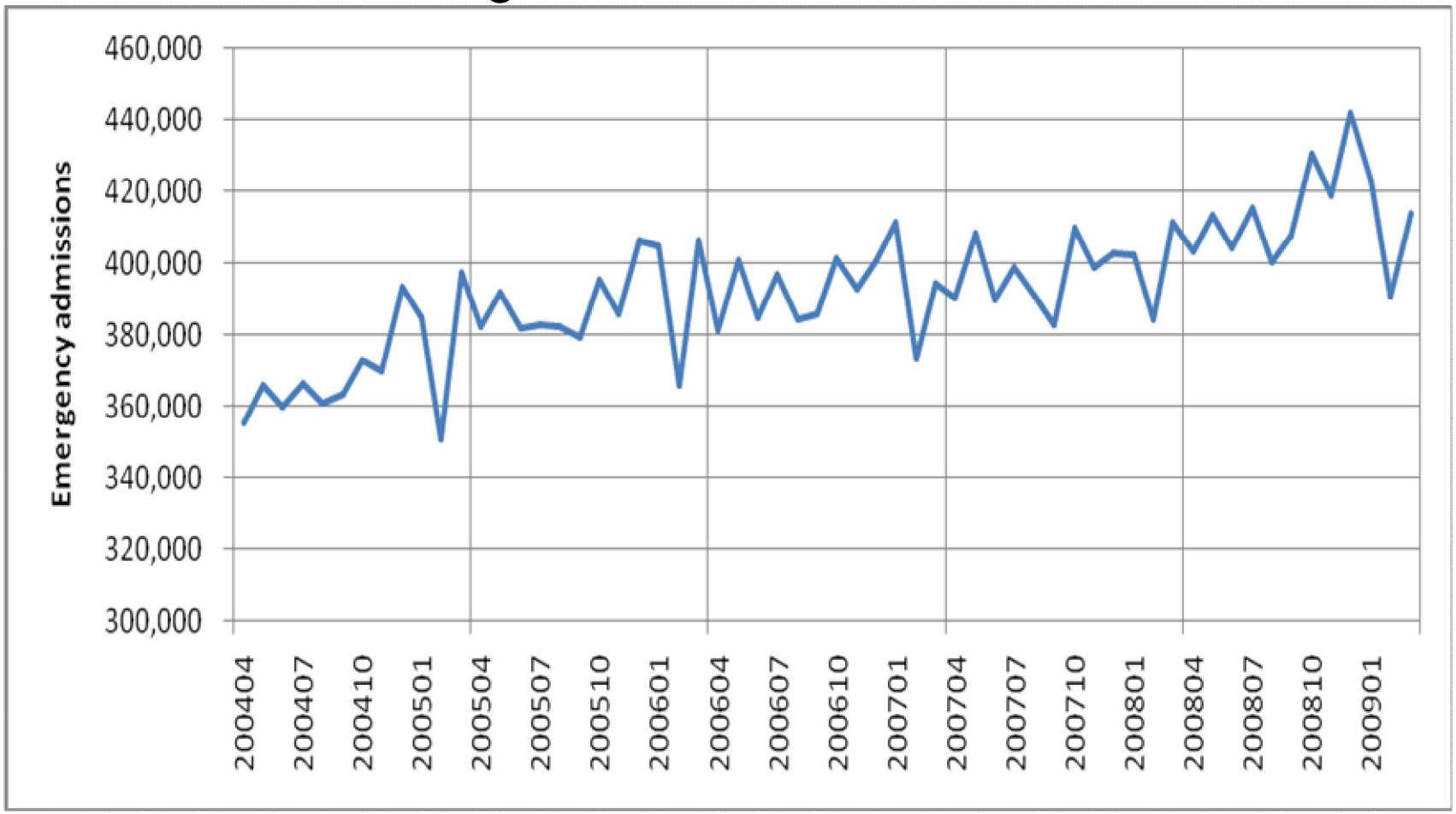
Nuffield Trust

Health Strategy Summit March 24th 2010

Monthly number of emergency admissions in England



Approaches to managing demand...

- self-management education,
- self-monitoring,
- group visits to primary care,
- broad managed care programmes,
- integrating social and health care,
- multidisciplinary teams in hospital,
- discharge planning,
- multidisciplinary teams after discharge,
- care from specialist nurses,

•targeting people at high risk,
•multidisciplinary teams after discharge,
•nurse-led clinics and nurse-led follow-up,
•assertive case management, home visits.

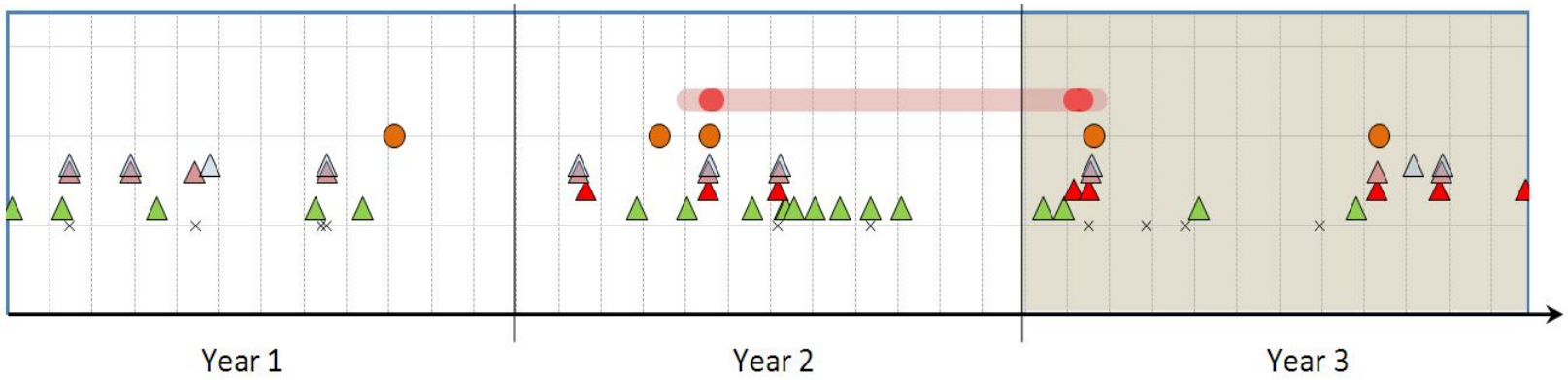
- nurse-led clinics,
- telecare,
- telemonitoring.

But do they work?
In your patch?

Challenges of evaluation....

- Difficult to randomise a distinctive treatment and control group within the same organisations or service.
- Service delivery patterns may change incrementally over time.
- The client/patient group may change over time.
- Randomised trials can be costly and sometimes out of proportion to the investment in the change).
- Can be slow – changes need to be made embedded and cases followed up for a long time.
- Results may only reflect experiences of a subset of users.

Health and social care event timeline



Alternative approaches.....

- Exploits existing data sets – as much as possible. This makes it cheaper and easier to set up though it does create its own challenges.
- Is continuous and timely. Aiming to provide interim results and feedback during throughout the evaluation period. This can potentially help fine tune the service – and the measurement process.
- Aim to capture events and experiences for as broad a group of users and potential users as possible. So looks, to some degree at the majority of service users.
- Develops accurate comparative tools – using the right methods to identify pseudo control groups as the basis for judging changes over time.
- Exploits linked data sets to construct individual patient histories.

Why use routine information?

Advantages

- Relatively inexpensive
- Comprehensive
- Person and event level
- Accessible
- Can be linked into routine management reporting processes

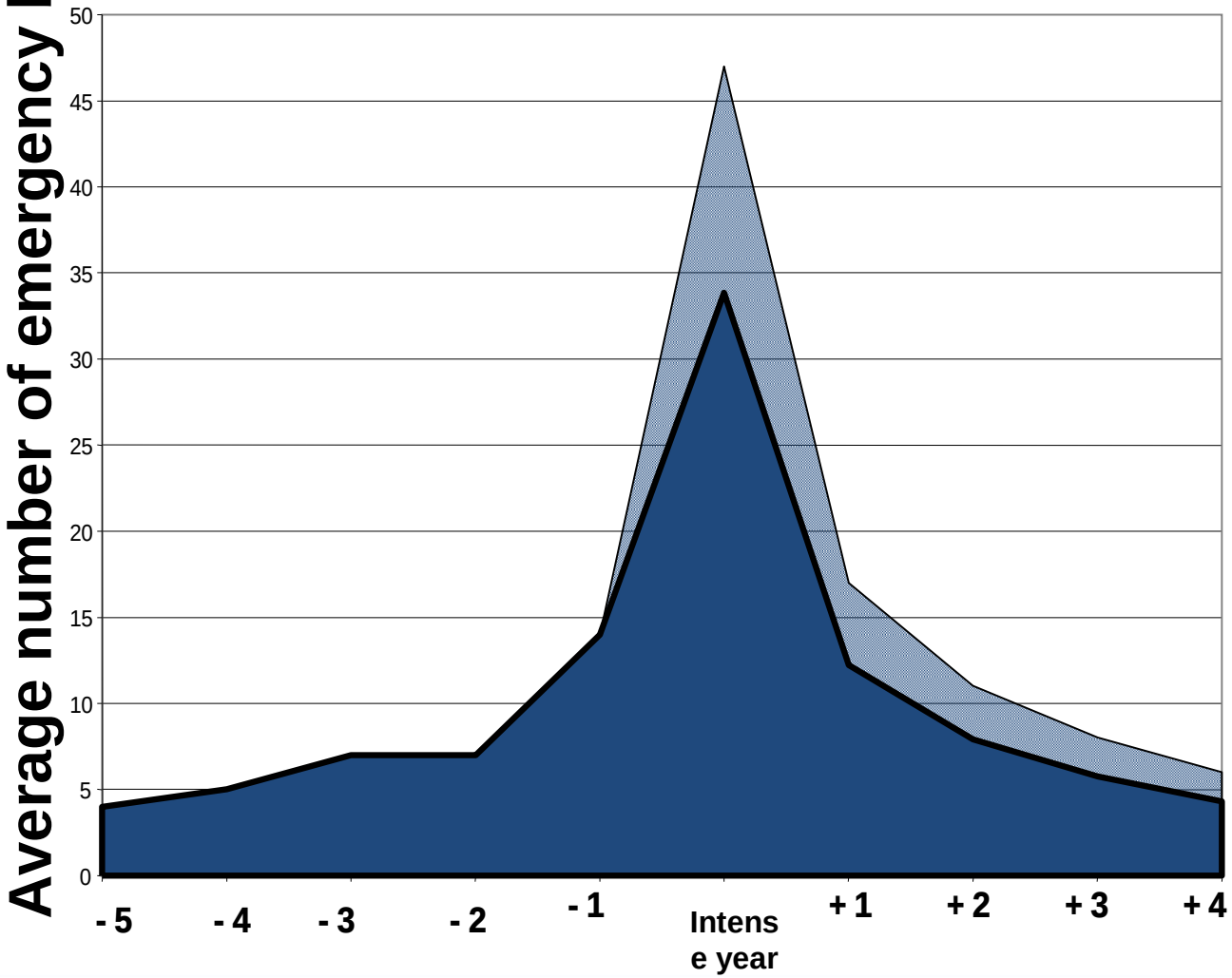
Disadvantages

- May not include the right information
- Rely on prior classifications
- Quality and completeness of recording
- Limited range of outcomes

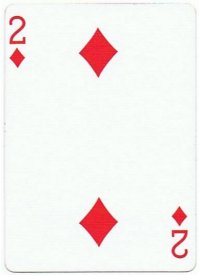
Two methodological problems

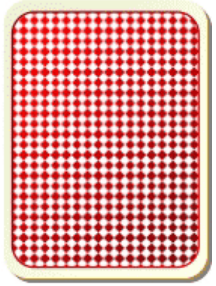
- Regression to the mean: if you select people with high service use, their service use will probably reduce anyway.
- Cost are highly skewed: a relatively small change in very high costs users can have an impact.

Emerging risk

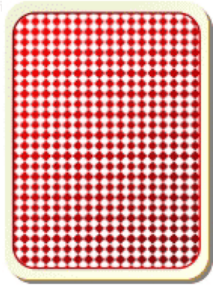


Will the next card be higher or lower?

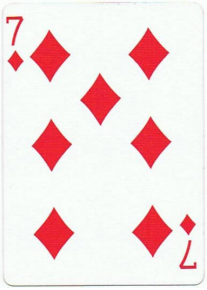


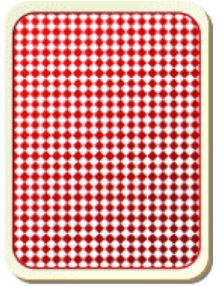


HIGHER



LOWER

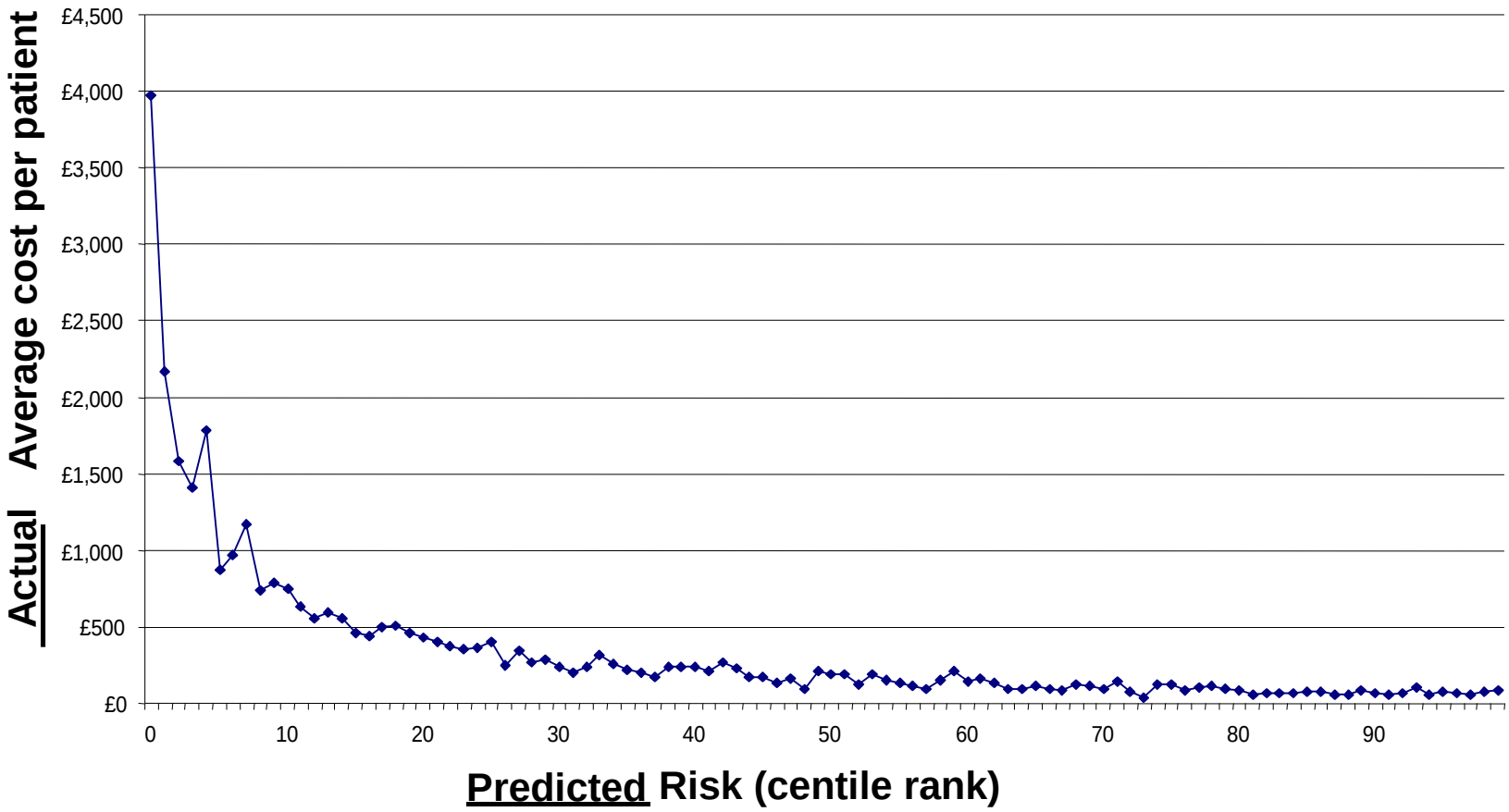




ERRRR??

= Regression to the mean in the style of Brucey

The distribution of future utilisation is exponential



Approach 1 WSD trial.
A randomised trial.

- Study started in 3 sites in 2007. Aim to recruit 6000 patients to the trial.
- Recruitment to the study ended in Autumn 2009. Last trial participant reach 12mnths in 2010.
- Final analyses early 2011.

Are telecare and telehealth part of the solution?

"For every pound spent on telecare, five pounds could be saved on expensive hospital and residential care"
Counsel and Care, 2009

What is Telecare?

Telecare is a system of sensors linked to a monitoring centre. The monitoring centre can call on your carer or a care agency to help you in the event of an emergency.

Base Unit Connects all the sensors to a monitoring centre.

Personal Pendant Puts the user in touch with a monitoring centre.

Falls Detector Alerts a monitoring centre if the sensor detects a sudden impact, for example, a fall.

Smoke Detector Automatically alerts a monitoring centre of smoke in your home.

Natural Gas Detector Gives a warning of dangerous levels of gas in your home.

Temperature Extreme Sensor Detects the rapid rise or fall in temperature in your home.

Flood Detector Warns of a potential flood in your home.

Passive Infra Red Movement Detector Alerts the monitoring centre to movement in your home, for example, a burglar.

What is Telehealth?

Telehealth is a piece of equipment you use to take health readings and record answers to health questions in your own home. The equipment you receive will depend on your needs and could enable you to take one or more of the following measurements:

Blood Pressure
Blood oxygen
Pulse
Blood sugar
Weight
Temperature*
Peak flow*

The monitor plugs into your telephone line and connects to a secure computer. From there your clinician, who may be for example a community matron, specialist nurse, or case manager, can look at your readings.

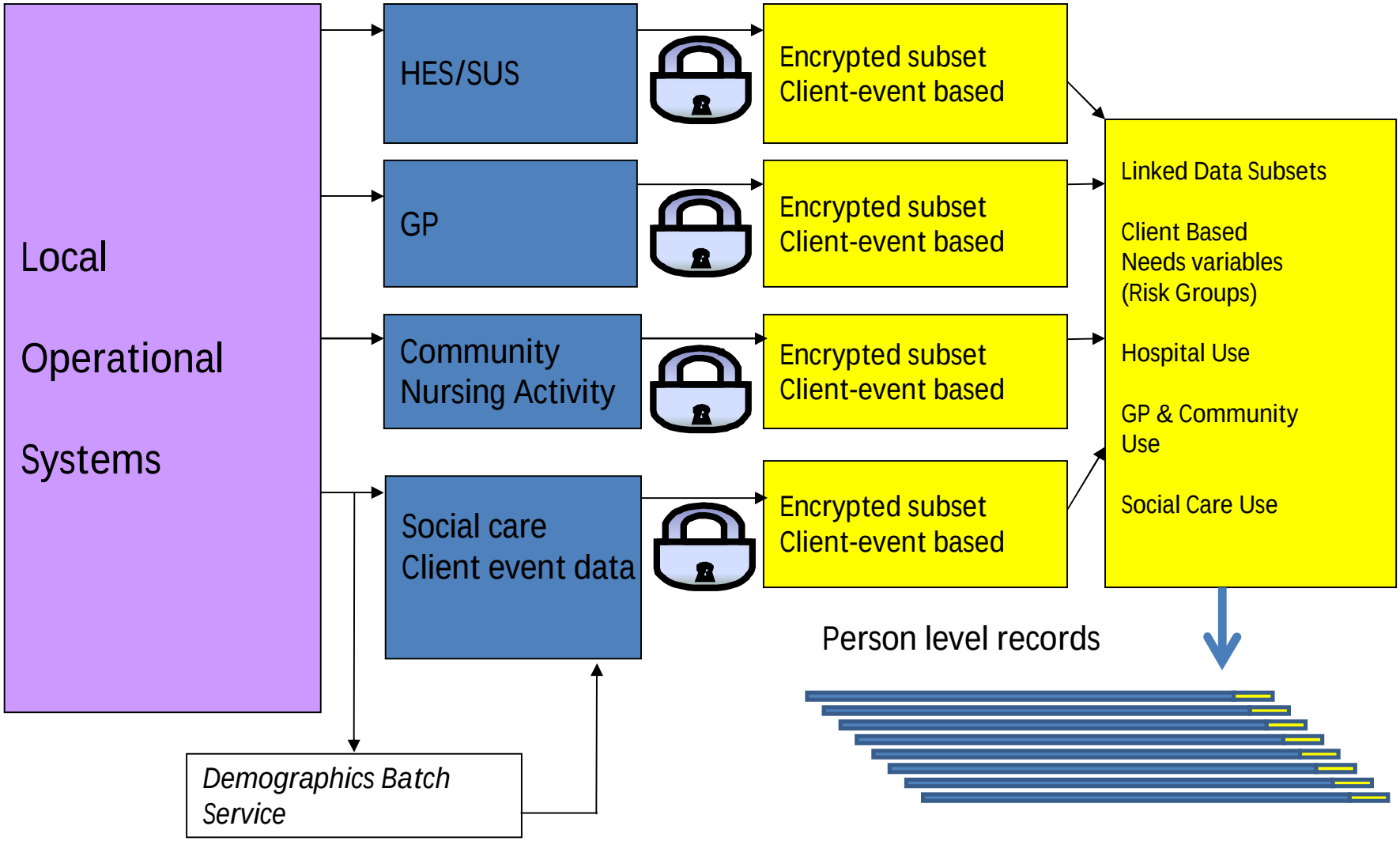
*N.B. Temperature and peak flow are taken manually and the reading is then recorded on the Telehealth monitor.

Five evaluation themes

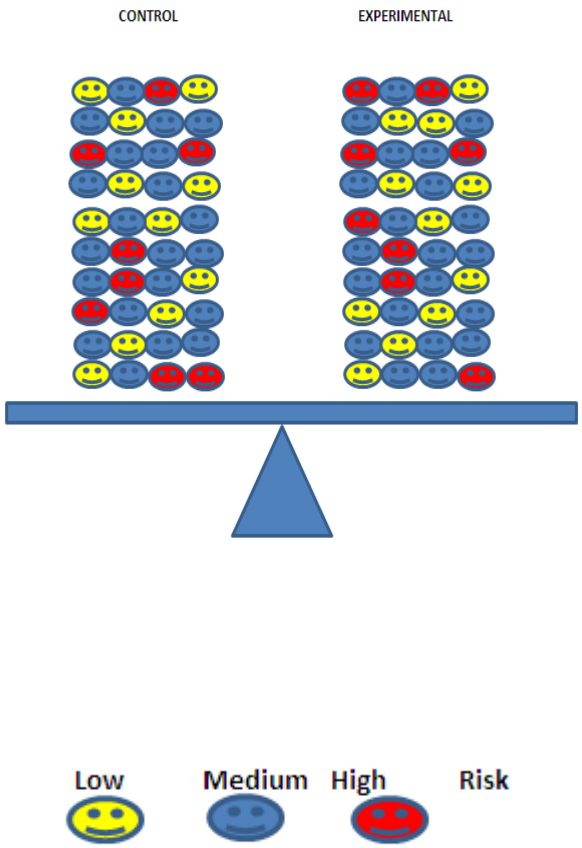
Theme 1 (Nuffield Trust)	Theme 2 (UCL)	Theme 3 (LSE)	Theme 4 (Manchester)	Theme 5 (Imperial)
Impact of service use and associated costs for the NHS and social services	Participant-reported outcomes and clinical effectiveness	Costs and cost-effectiveness	Experiences of service users, informal carers and professionals	Organisational factors and sustainable adoption and integration
All 6,000 people	Subset of 2,750 people plus 660 of their informal carers	Subset of 2,750 people	Qualitative interviews	Qualitative interviews

Universities of Oxford and Birmingham

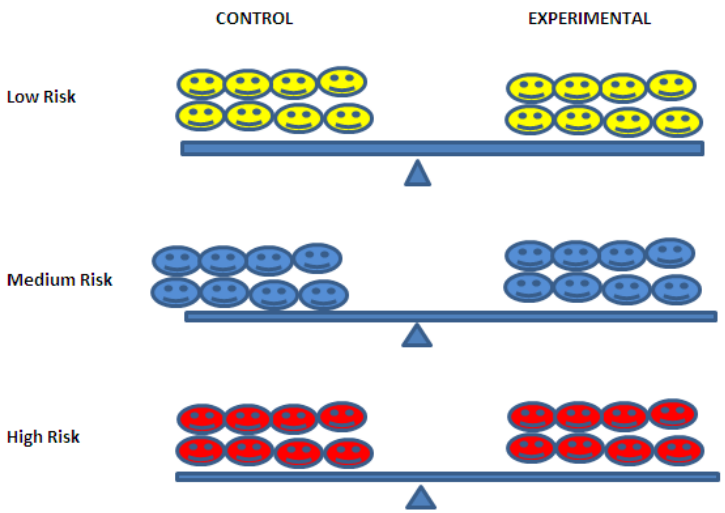
Information Flows



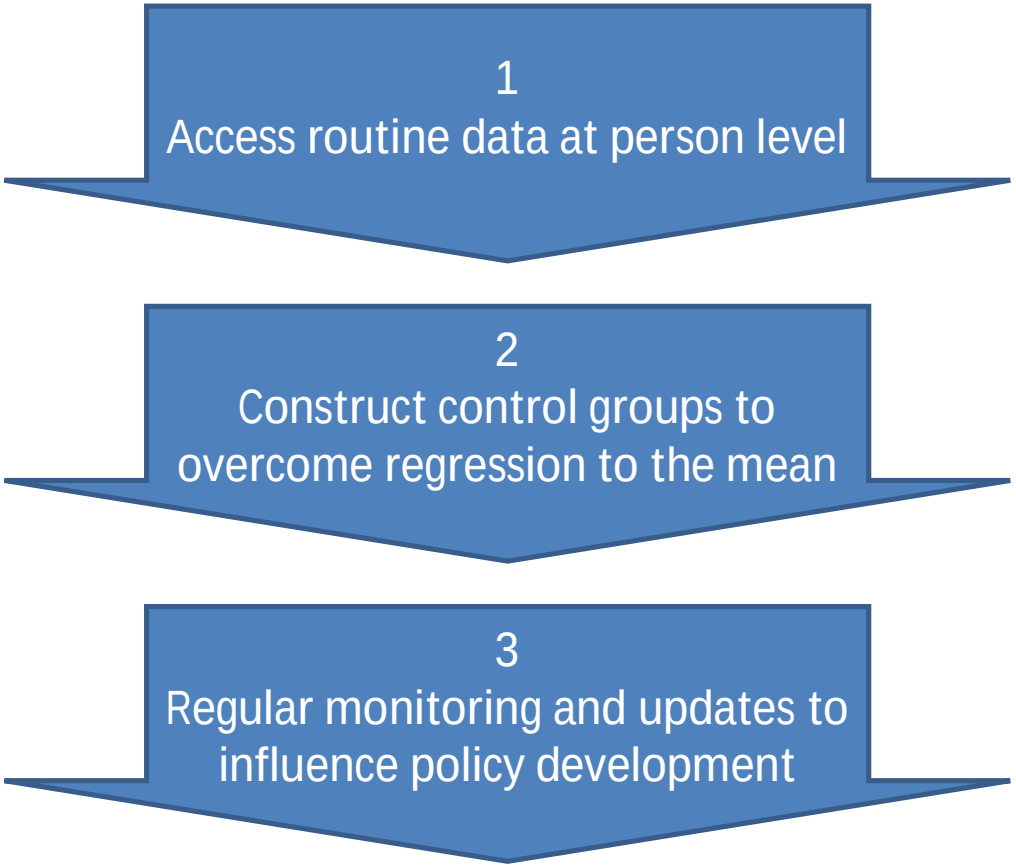
Ensuring even mix of patients



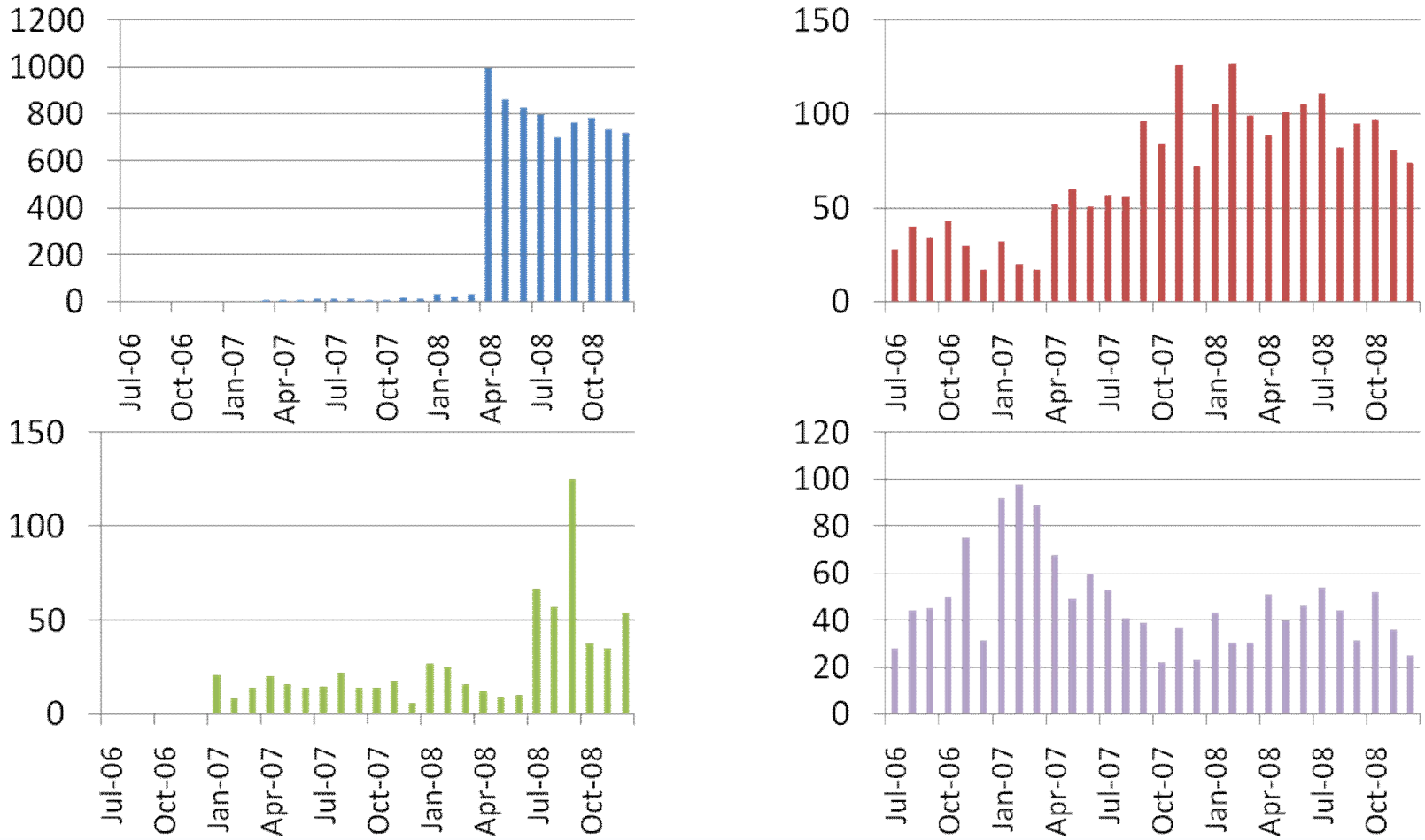
Analysis by risk subgroup



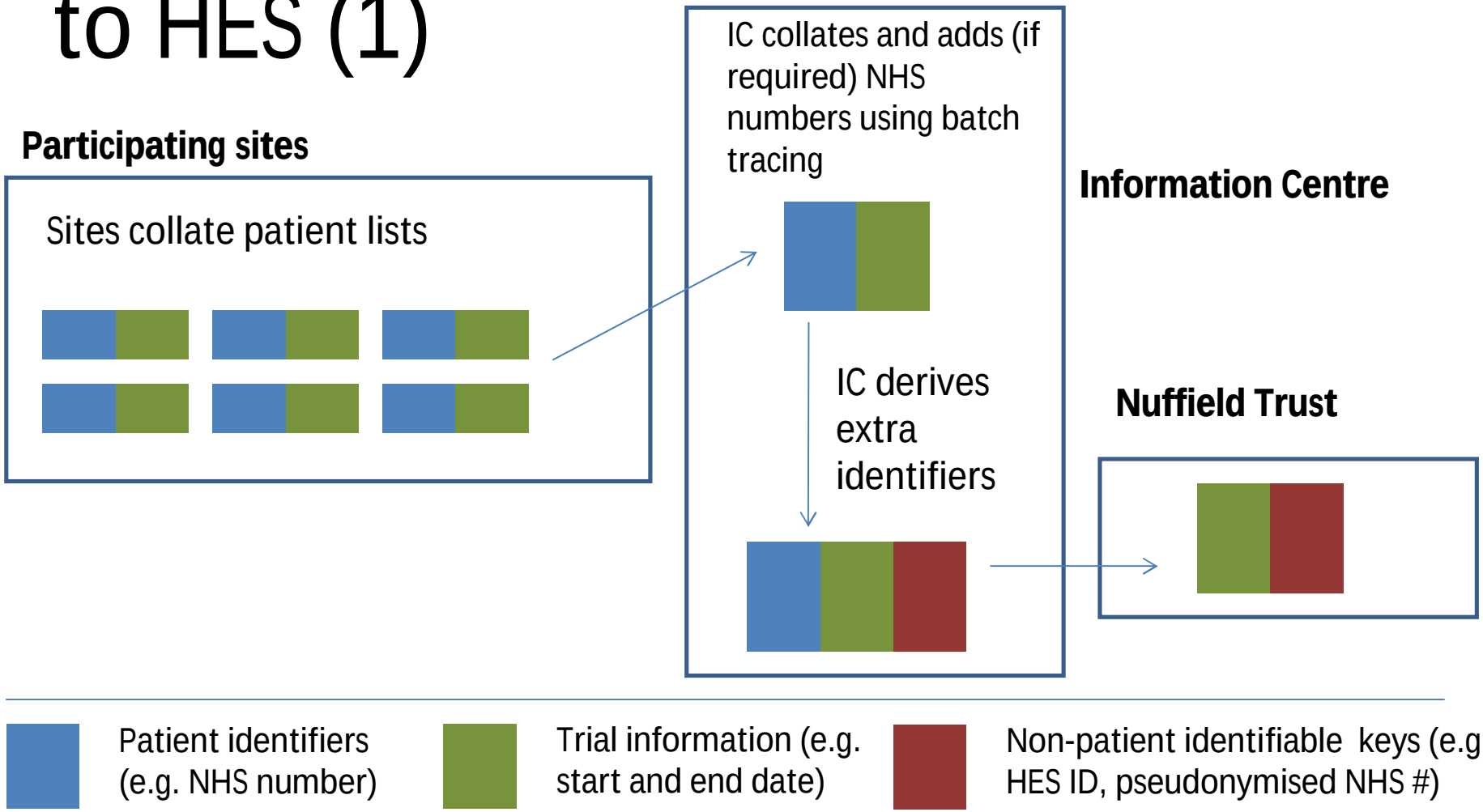
Approach 2. Using case controls derived from routine data.



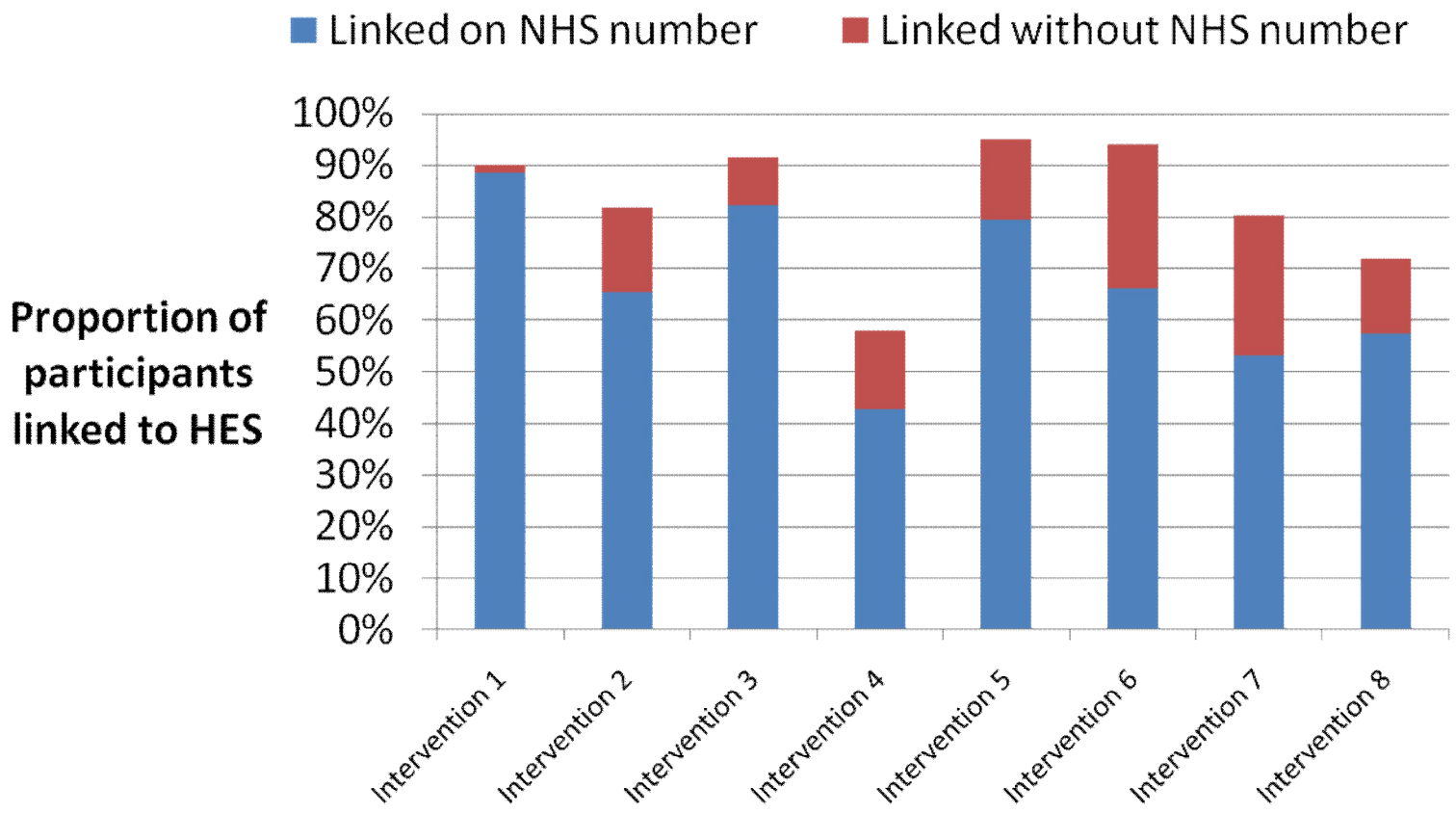
Number of people receiving intervention per month (4 sites)



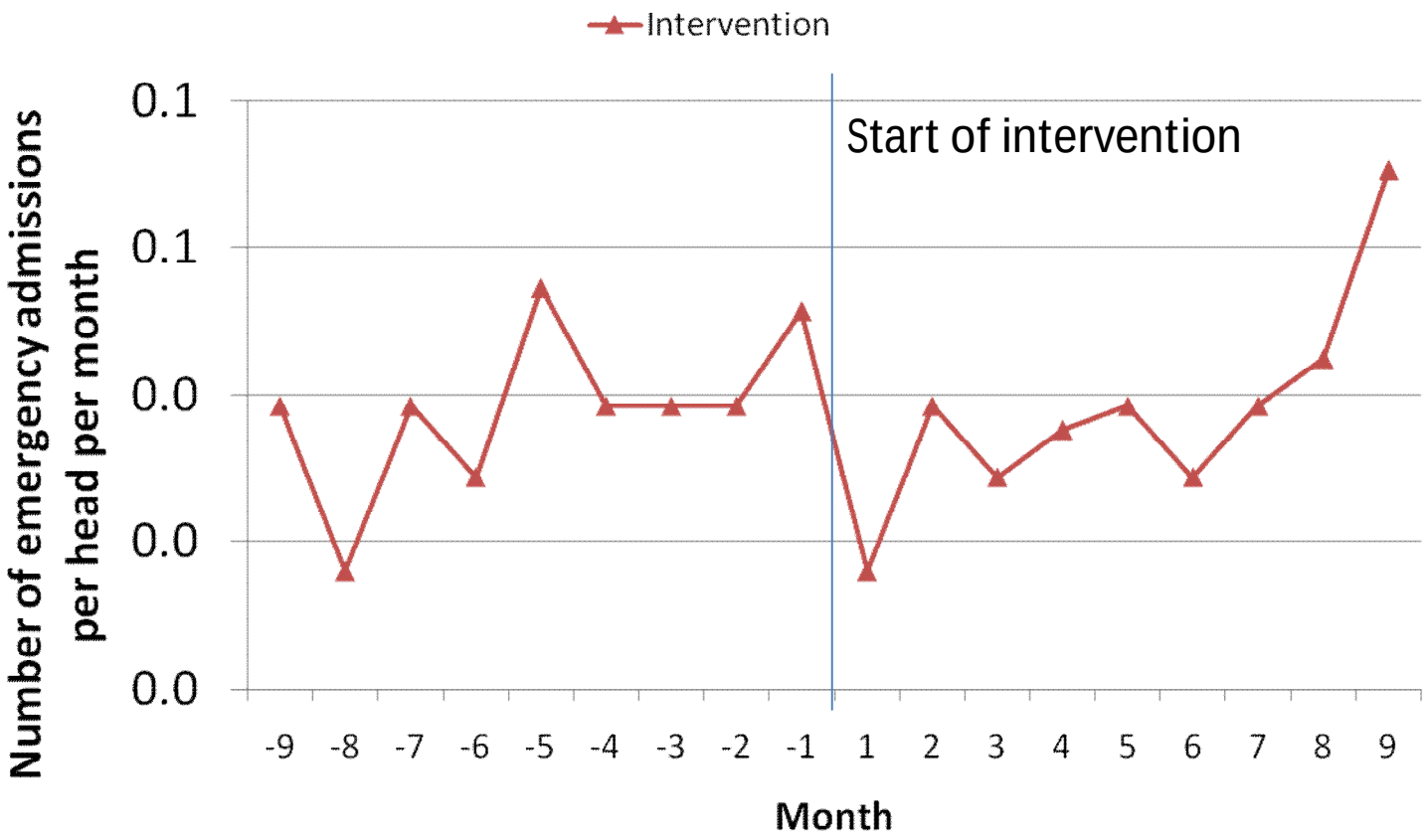
Linking participants to HES (1)



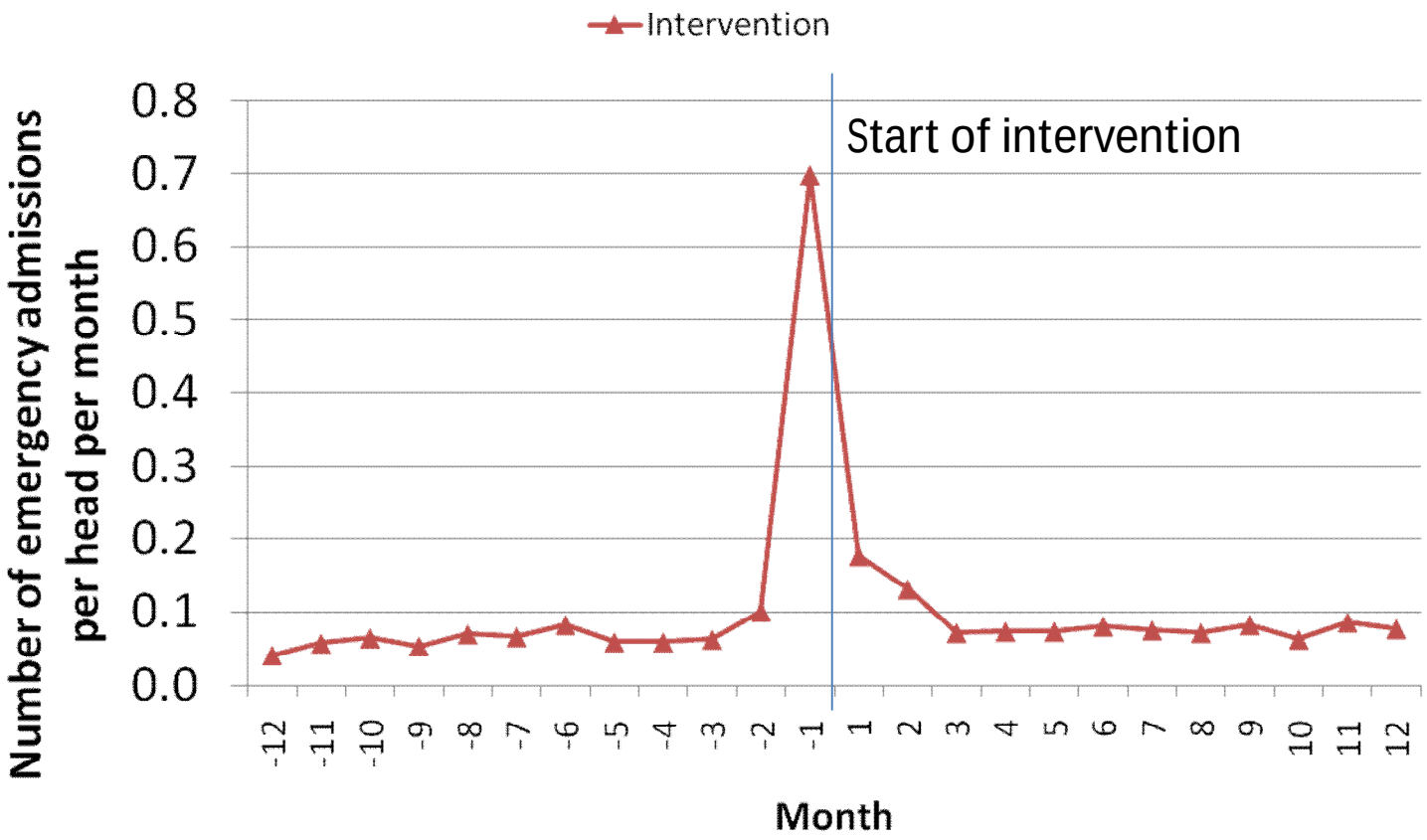
Linking participants to HES (2)



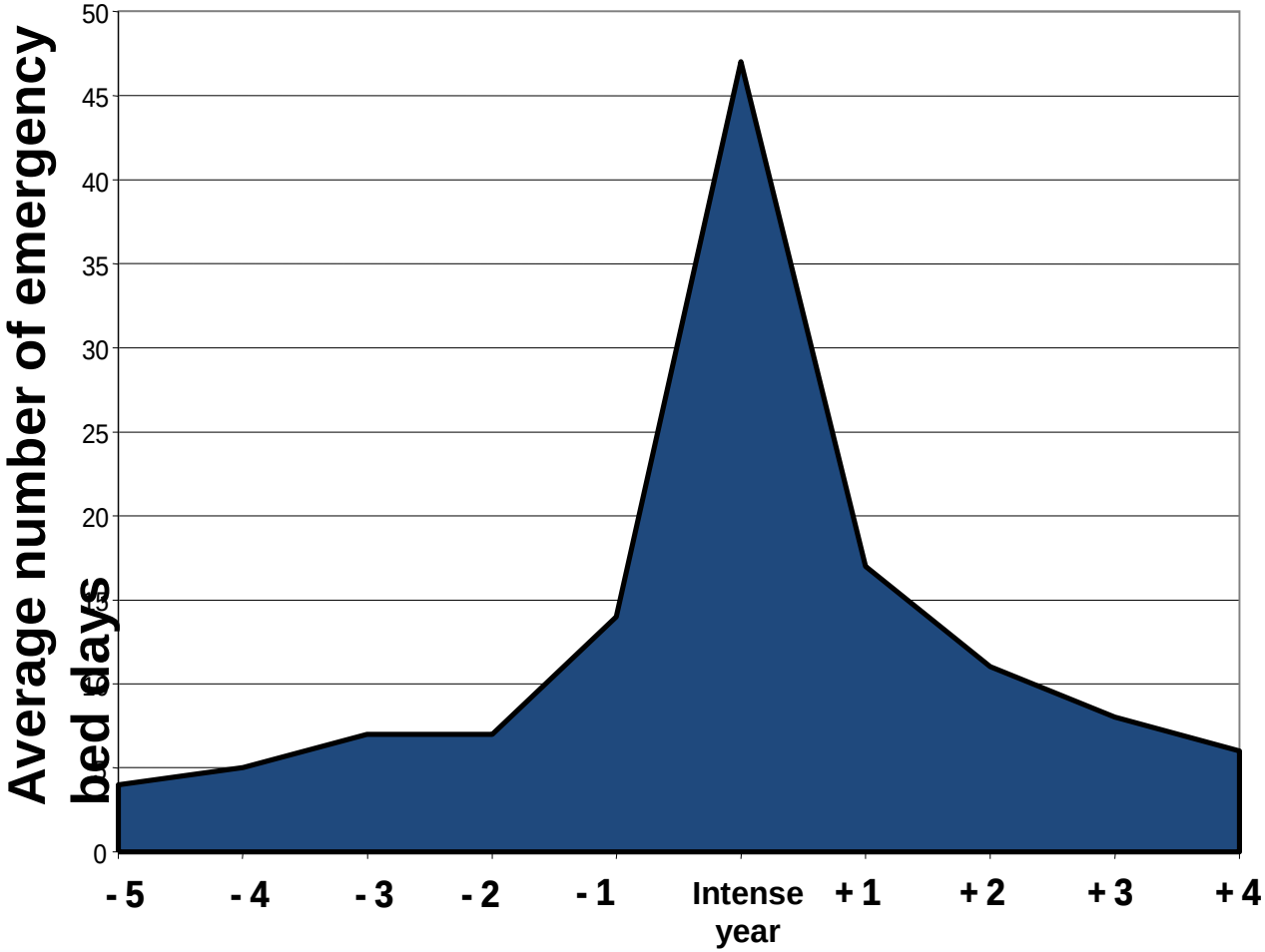
Profiles of emergency hospital admissions (1)



Profiles of emergency hospital admissions (2)



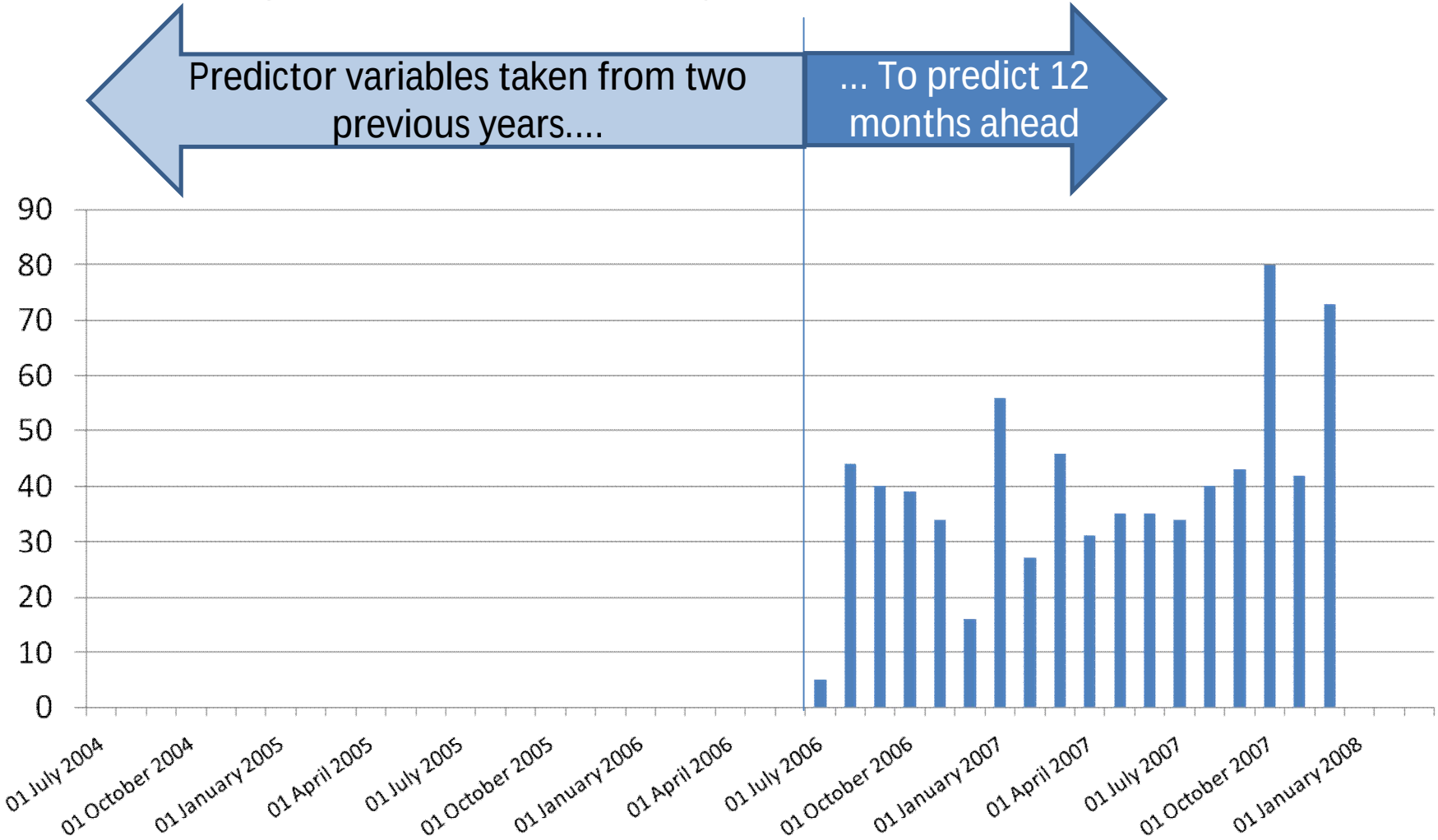
Regression to the mean?



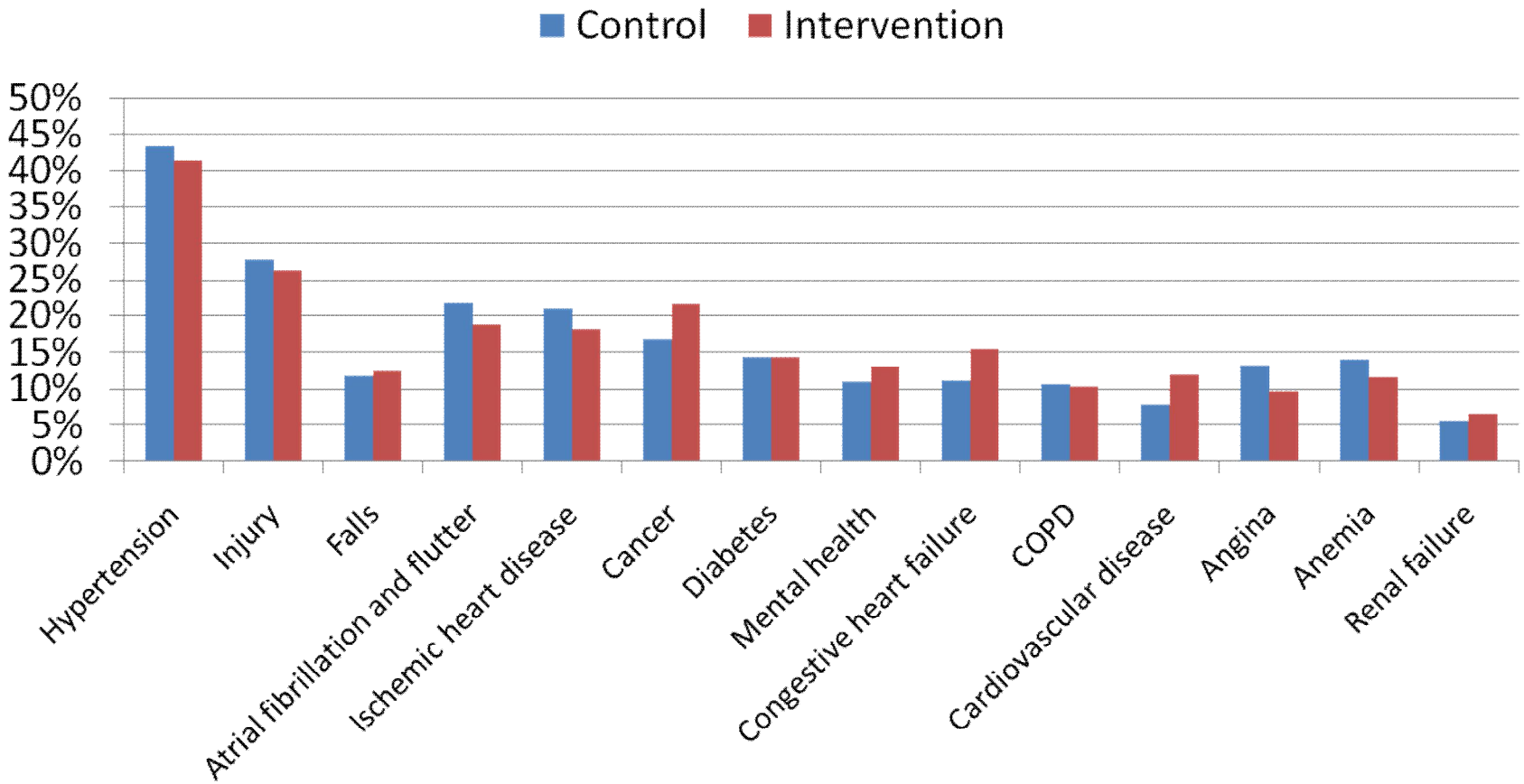
Choices about multivariate matching

- Draw controls from local area, similar areas or nationally?
- Which variables to include?
- What weight to attach to each variables (distance measure)?
- With or without replacement?
- 1-1 matching or 1-many matching?
- Caliper matching on certain variables?

Building models every month



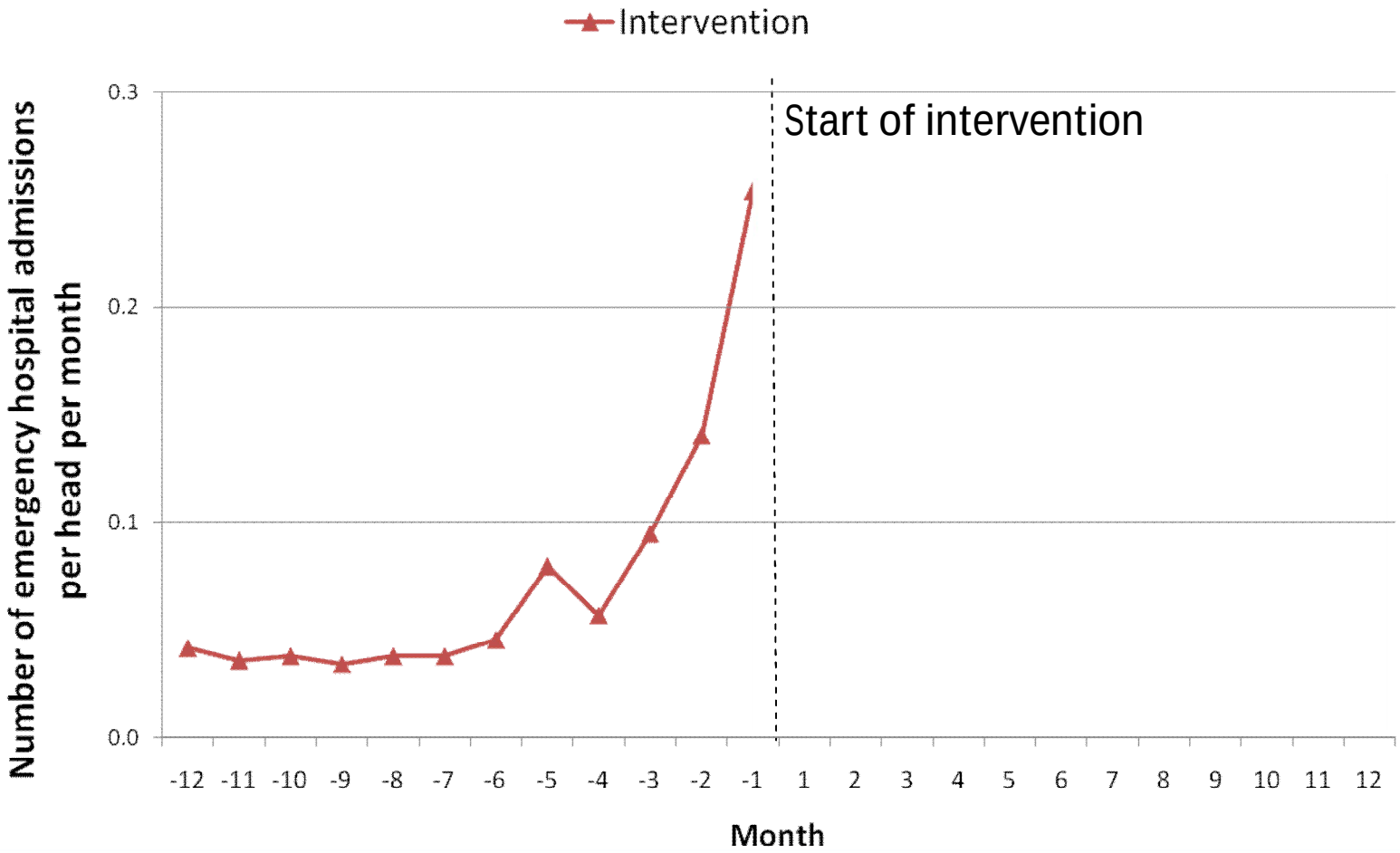
Prevalence of health diagnoses categories in intervention and control groups



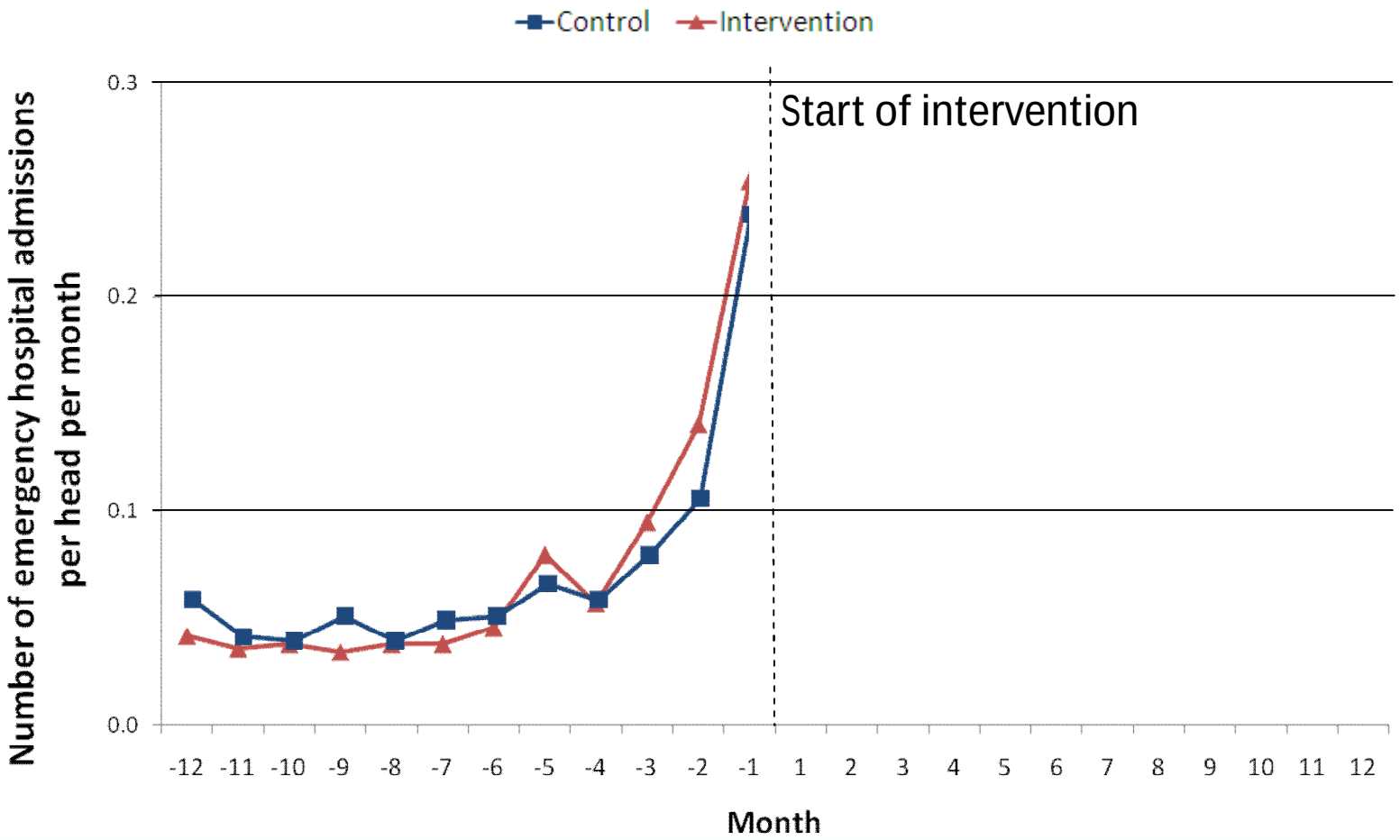
Comparison of intervention and control group

	Intervention (N=378)	Control (N=378)	Standardised difference
Proportion aged 85+	47%	47%	0.0%
Proportion female	68%	68%	0.0%
Mean area-level deprivation score	16.6	16.2	4.8%
Mean number of emergency admissions in previous year	1.0	0.9	3.0%
Mean number of emergency admissions in previous 30 days	0.3	0.3	4.0%
Mean emergency length of stay in previous year	8.6	8.7	0.7%
Mean number of chronic conditions	1.6	1.5	4.3%
Mean predictive risk score	0.25	0.25	0.2%

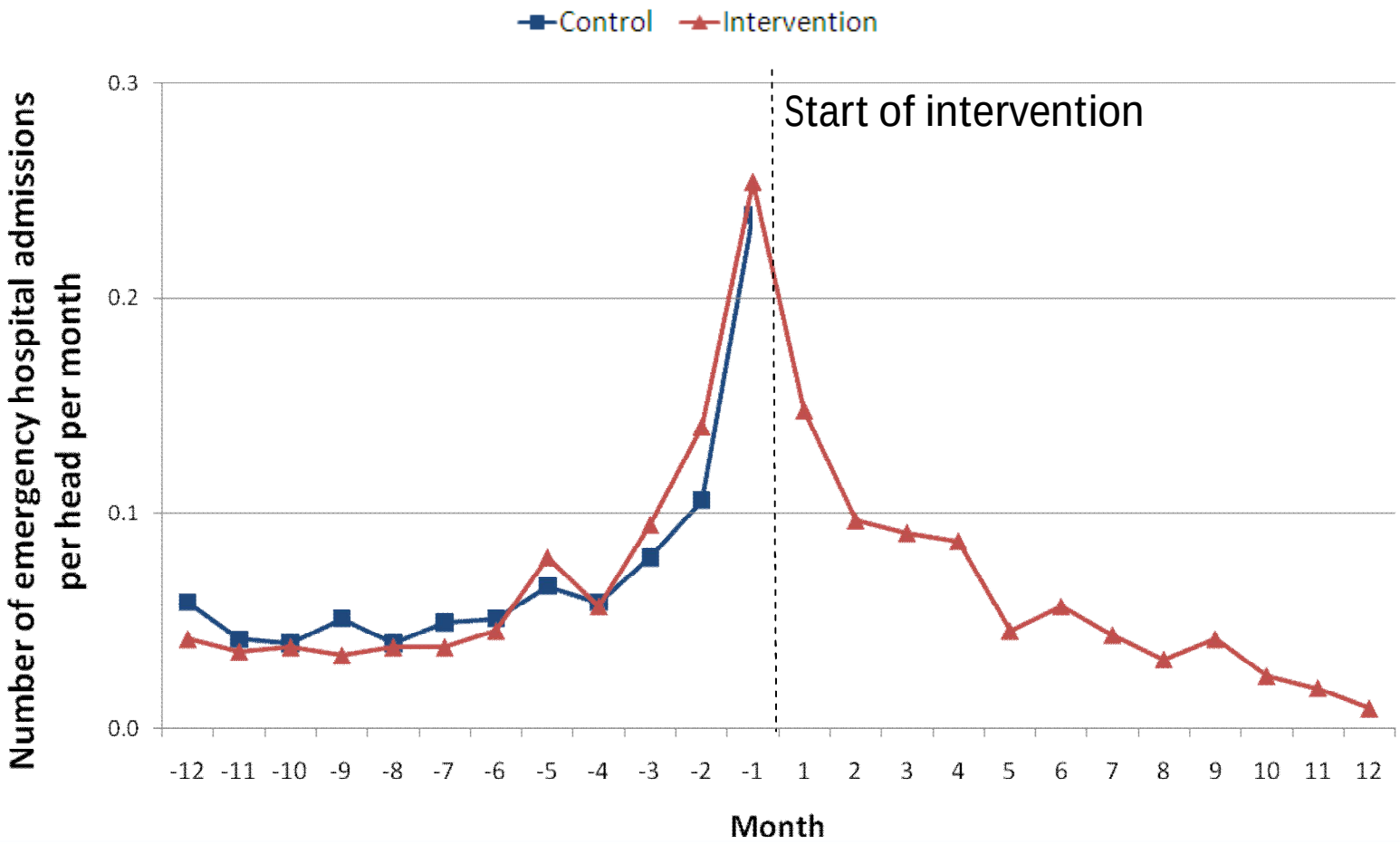
Overcoming regression to the mean using a control group (1)



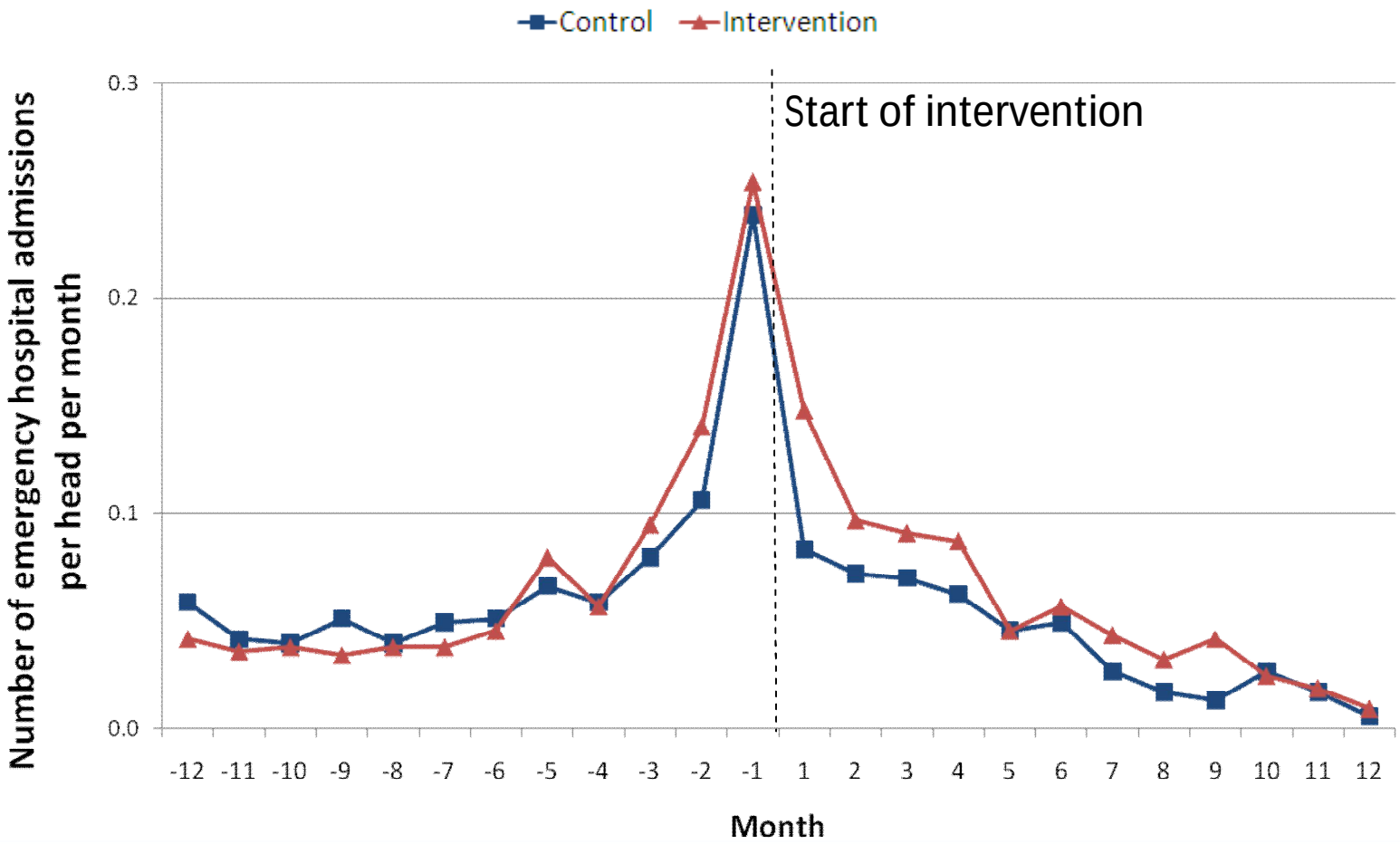
Overcoming regression to the mean using a control group (2)



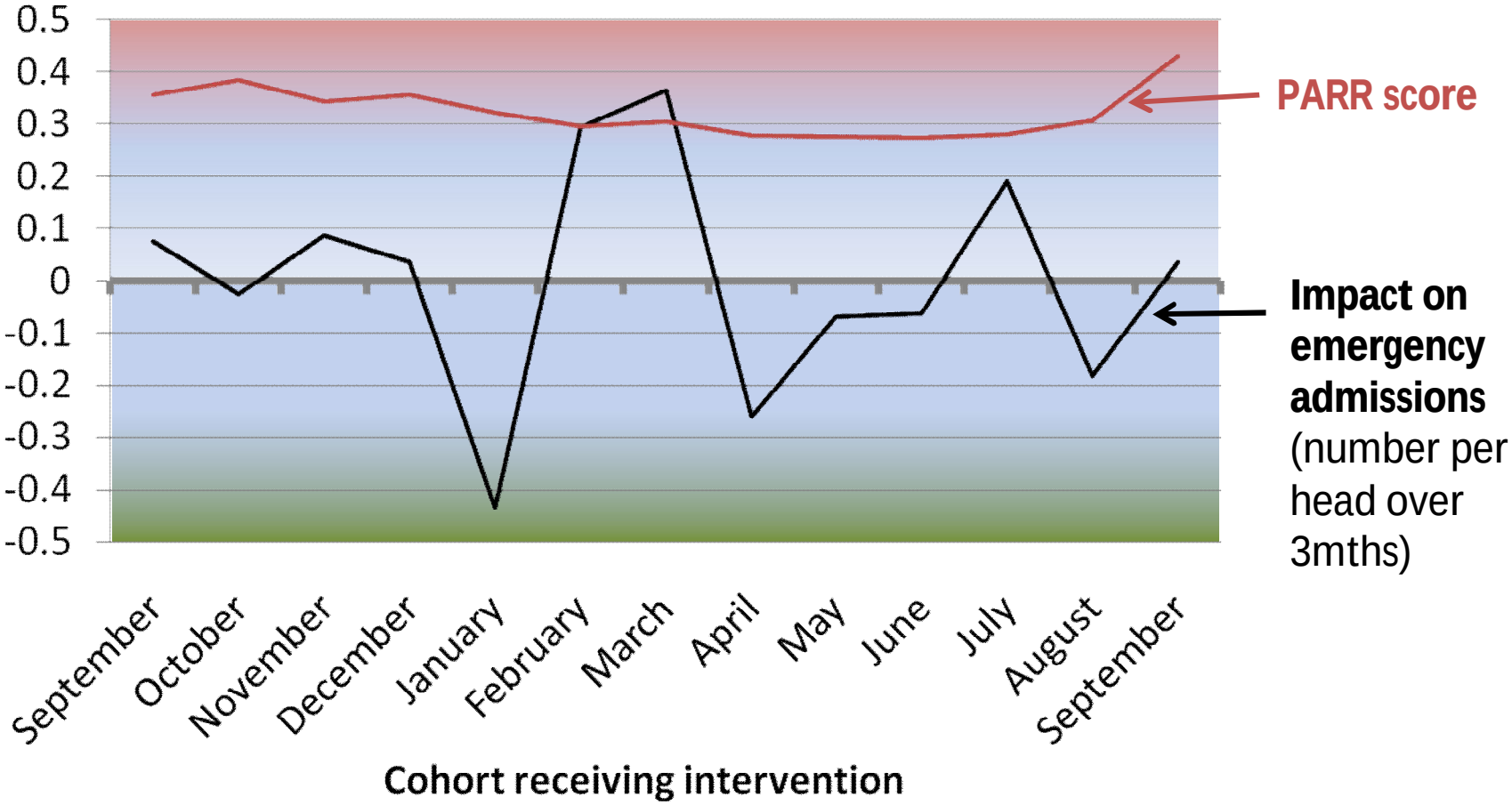
Overcoming regression to the mean using a control group (3)



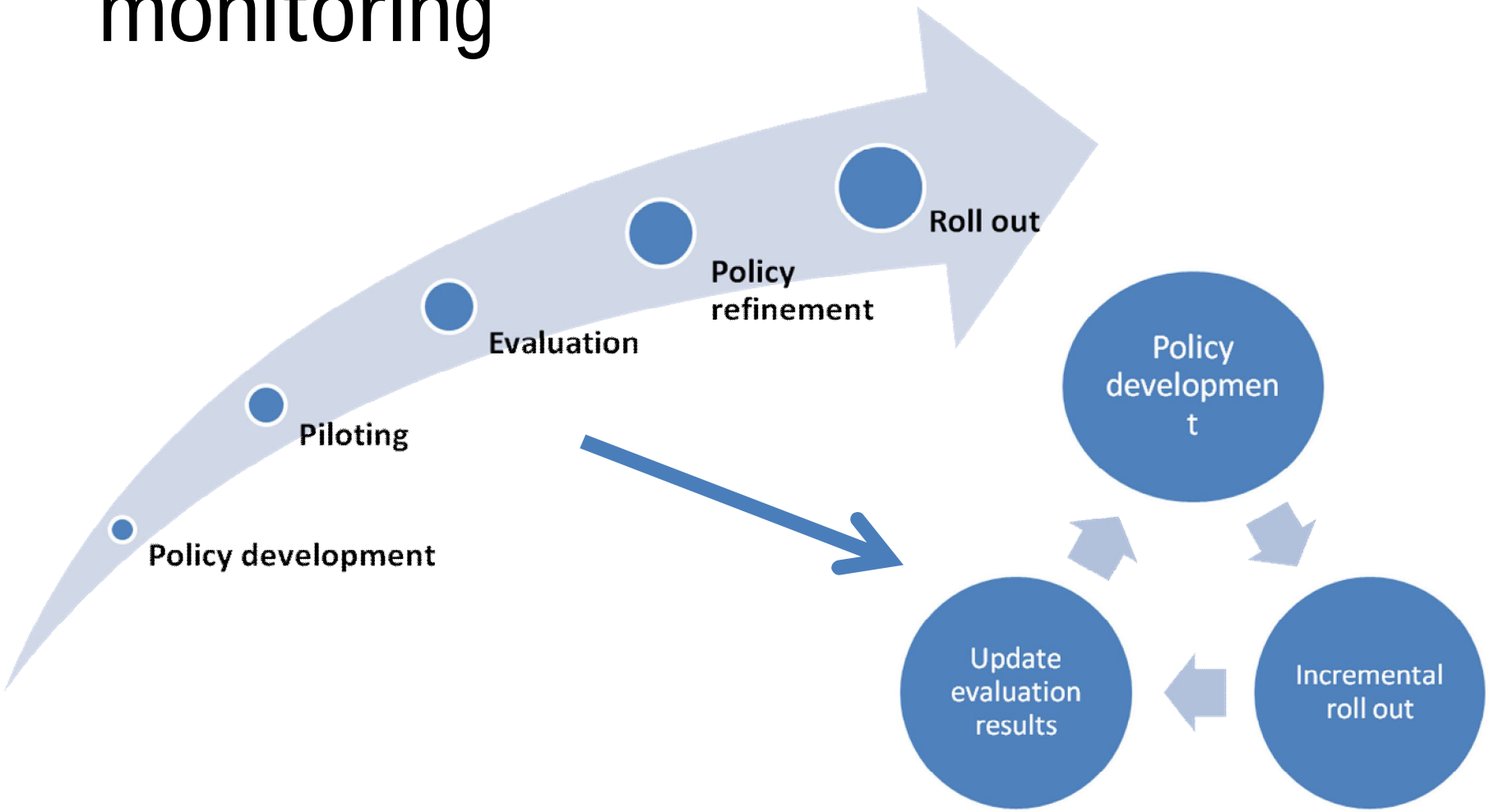
Overcoming regression to the mean using a control group (4)



Almost real-time tracking of intervention



Regular evaluation and monitoring



Discussion points

- What are the rate limiting steps?
  - Data being available?
  - The right data to measure what you want?
  - Skills to analyse data locally?
  - Analytical resources locally?
- What are the priority interventions for routine tracking?
- How should feedback be organised and delivered?
- What should only be assessed with randomisation?

Thank You