



## MAN Huddle questions/comments follow up

### Huddle: [JSNA Cohort Model](#) with Abraham George and Peter Lacey, 10<sup>th</sup> May 2024

#### Summary of the Huddle

Kent County Council Public Health provides population health intelligence support for the local health system planning and decision making. With the help of external consultancy support, they have developed a **system dynamic modelling tool to forecast long term conditions prevalence and incidence in the population over the next 5 to 20 years** and scenario test how they would change if we were to implement prevention interventions at pace and scale.

Below are the question and comments raised in the Mentimeter and Abraham and Peter have kindly provided us with some answers/responses.

- **Fascinating, thanks! :) Do your findings align with the HF "Health in 2040" report, that in England the increase in major illness to 2040 is 80% aging-population and 20% less-healthy lifestyles** We haven't interrogated the model in quite this way, but in that our 'what if' scenarios to reduce or even eliminate less-healthy lifestyles still generate rising demand I'd say that this is consistent. It's also worth noting that the cohort model is calibrated to a specific geography and so doesn't give an all-England answer, so the local situation will vary.
- **Great presentation - how do you communicate and get councillors to understand and make decisions on what is quite a technical and complex modelling approach?** Keep the message simple. **Tell a story.** Use simple words and sentences such as 'modelling is broadly right but precisely wrong' 'what if we were invest in intervention A and how much would the prevalence B and hospital admissions C change?' Likely such messaging is also useful for our own PH workforce who are not used to complex modelling as well. **Although I could put my other hat on although that would be cheating. My response might be that as a Councillor myself I know how important it is to 'translate' without dumbing down and that I haven't found it too difficult to get consent when sharing similar complex issues at Scrutiny Committees.**
- **What software do you use to implement the SD modelling?** Stella. **We are working with open source SD modelling software but whilst this might be suitable for small and less complex models open source is a long way from being able to cater for the complexity of the cohort model.**
- **Thank you both - great presentation and model. Could you say a bit more about your integrated dataset?** Linked dataset development is Kent started many years ago with the KID (Kent Integrated Dataset) and we used it for a variety of advanced analytics such as pop segmentation, complex care evaluation and SD modelling. The KID stopped being refreshed in 2019 and it is now used for historical research work eg. Lung cancer

risk predictive modelling <https://doi.org/10.1038/s44276-023-00019-5> . New linked datasets such as KMCR and KERNEL have been developed in Kent for research, which will be through the new regional SDE (secure data environment)

- **Would you like to show some of "under the bonnet" at the SD community of practice? Will send you both an email, Stacey** Sure
- **This is wonderful, thank you. Can you quantify uncertainty in the SD model? The model doesn't enable traditional statistical approaches to uncertainty but we are sensitive to any assumptions that are not firmly rooted in evidence and the 'what-if' questions we ask of such a model factors that in at the human interface rather than under the bonnet. Sensitivity analysis can be carried out in the model but due to the large number of variables in this particular model only limited benefit is likely to be derived compared to the effort required.**
- **Excellent pres - How do you communicate and get councillors to understand and take resourcing decisions based on what is quite a technical and complex approach? See above.**
- **How adaptable is the model to applying to other areas? We have a calibration process that relies primarily on national datasets but would require sense checking with local systems. Local evidence on risk behaviours and on alignment with service access rates by cohort is also advised.**
- **Has the model been used "in anger" yet? If so, who used it and how has it changed patient experience? Many times, although a direct impact on patient experience would be difficult to evidence. The model is primarily focussed on providing an intelligence base for transformation programmes, and it is the latter that changes people's outcomes.**
- **In the overall model roughly how many stocks and flows are there? Tricky one because of the multi-dimensional nature of the model. The core of the model consists of stocks representing no conditions, single conditions, multiple conditions and severe frailty (4) but arrays for age, gender, different single conditions and geography multiply that significantly. Other small model modules are also included to simulate the impact of changes in, for example, weight categories or smoking status.**
- **Is Healthy Life Expectancy a direct model output, or calculated from the 'stocks'? Calculated.**
- **Has validation of the model been carried out? Validation in SD model consists of a number of processes including sense checking with expected outputs, but the assumptions in the model, as well as the 'logic' are all built in a transparent, co-production approach therefore incorporating validation as one proceeds.**
- **Have you been able to validate models based on what has happened to see if what has been modelled has actually occurred? We calibrate the model to forecast total population as this is not a model input. The progression rates and consequent mortality, together with net migration, produce an output that needs to match with ONS or local housing led population projections.**
- **How long has it taken from conception to where you are now? It was being used 'in anger' within 12 months of starting the project but has undergone constant development and use since then. With an efficient calibration process to other areas it could be ready to use in a new location within weeks.**