Introduction:

The Scottish Government and Scottish General Practitioners Committee have supported the development of a predictive tool to help GP practices identify their most vulnerable patients who are predicted to have complex needs in the next 12 months. The ‘High Health Gain’ potential tool is designed to support practices by identifying people who are most likely to benefit from a supported anticipatory care planning approach to ensure optimal personal outcomes and quality of life.

Professional judgement is crucial to the interpretation of the results generated using the predictive tool.

Some individuals identified using the tool will not require additional intervention, and not all people requiring intervention will be identified by this tool.

Practices are encouraged to review their patient lists generated via this tool and consider:

- Whether the patients identified would benefit from an anticipatory care planning approach, if not already in place.
- Which individuals or groups of patients identified would benefit from additional support, multidisciplinary discussion and/or review.

How to gain access:

Information on how to access the PCI dashboards can be found here: [http://www.isdscotland.org/Health-Topics/General-Practice/PCI/Accessing-PCI/](http://www.isdscotland.org/Health-Topics/General-Practice/PCI/Accessing-PCI/)

How to use the dashboards:

A video demonstrating how users can navigate the PCI dashboards can be viewed here: [http://www.isdscotland.org/Health-Topics/General-Practice/PCI/Accessing-PCI/](http://www.isdscotland.org/Health-Topics/General-Practice/PCI/Accessing-PCI/)

Please contact NSS.HighHealthGain@nhs.net if you require further assistance.

Background

It is estimated that 5-6% of the population have a complexity of need where they would benefit from a supported anticipatory care planning approach to ensure optimal personal outcomes and quality of life.

The pHHG predictive tool has been developed by ISD and is aligned to the GMS Contract to support ongoing quality improvement led by GPs. It identifies patients with the potential for "High Health Gain" (pHHG) over the next 12 months. The predictive tool is informed by the inclusion of a range of factors, for example, morbidity, prescribing information, emergency admissions, costs associated with hospital and prescribing activities, length of hospital stay and outpatient appointments.

The patient list that the pHHG tool generates includes patients that are predicted to become vulnerable or have complex needs in the coming 12 months, therefore having the potential for ‘High Health Gain’. Each patient on the list has a pHHG risk score ranging between 20% and 99%. This quantifies their potential for becoming a high intensity service user in the next 12 months. The
higher the pHHG score, the higher the potential. The list is presented as a matrix that highlights factors that have influenced the individual’s inclusion on the list.

The information is updated quarterly by ISD and will be refined over time using your feedback. This patient group is diverse and includes the frail elderly, those with palliative care needs, younger people with complex physical and/or mental health problems, and a significant number of individuals with chaotic lifestyles. As a result of their complexity of need, individuals on the practice list will by necessity use a significant amount of health and care resources. We expect that the complexity of need found in these groups will result in these patients being amongst the top 5% of service users who will ultimately account for 65% of our hospital and GP prescribing expenditure. As well as being considered at Practice level it is suggested that this information will be useful to help GP Clusters to consider how services can work most effectively locally and to identify gaps in service provision.

The information will evolve in the near future to include community and primary care information (see below, ‘Next Steps’).

Previously, patient lists were provided to each practice through individual health boards, however, practice-specific lists are now available on the National Primary Care Information (PCI) Dashboard. NHS ISD would like to thank colleagues at health boards for their support on this.

Changes made recently following your feedback:

Improving the predictive ability of the model:

We have implemented ‘machine learning’ statistical methodology to improve the predictive ability of the model. The Positive Predictive Value (PPV) is one of the key indicators of how reliable the model is. This is the proportion of individuals on the pHHG list that would benefit from the interventions highlighted above. With the improvements implemented, the PPV has significantly improved to 80%.

Other changes to the model and output:

Taking on board feedback from GPs using this tool, we have refined the way in which we use prescribing data in the model as a risk factor. Previously, we counted the number of items prescribed in the previous year. Instead we have now re-calibrated our model to count the number of British National Formulary (BNF) sections from which a prescribed item was paid in the same time period. In this way, the model includes those with multi-morbidities (more than one prescribed item from a different BNF section) and not multiple prescriptions relating to one condition (e.g. multiple bandages).

Feedback we received from GPs asked for pHHG patients to be grouped by common conditions. We now group the pHHG patients into one of the following 10 demographic sub-cohorts according to their highest level of relative need:

1. **Frailty**: These people are older adults, with episodes of care in Geriatric Medicine.
2. **High Complex Conditions**: Any person with one of the following Long Term Conditions: Alzheimer’s, cancer, dementia, heart failure, renal failure and chronic liver disease.
3. **Medium Complex Conditions**: Any person with one of the following Long Term Conditions: CVD, COPD, CHD, Parkinson’s disease or MS.
4. **Low Complex Conditions**: Any person with one of the following Long Term Conditions: epilepsy, asthma, arthritis, diabetes or atrial fibrillation.
5. **Maternity:** Women who were pregnant or delivered within the year.

6. **Mental Health:** People who suffer from a mental illness.

7. **Substance Misuse:** People who suffer from a Drug or Alcohol addiction.

8. **Adult (18+) Major Conditions:** Adults aged 18 years of age and older, who had either £500+ of community prescribing costs, or at least one acute hospital (SMR01) episode.

9. **Child and Youth (0-17) Major Conditions:** Children aged 0-17 years of age, who had either £500+ of community prescribing costs or at least one acute (SMR01) episode.

10. **Healthy and Low Service User:** People who have at least one SMR record and were ‘low users’ of NHS services, but not otherwise defined in the other cohorts.

In addition to the above, a flag has been included to highlight patients who had been classified as having potential for High Health Gain in the previous data release.

**Next steps:**

The ‘High Health Gain potential’ tool, which supports the identification of vulnerable patients and those with complex needs, is developmental and evolving.

- We intend to include community and primary care information in this model as this information becomes available over the next year.

- Comparative analysis of other tools: It is recognised that there are several other predictive and case finding tools currently in existence. ISD are currently working with partner organisations to compare the pHHG tool with other tools currently being used to aid GPs understanding of these tools and what they are designed for.

- Evaluation: In addition to your feedback (NSS.HighHealthGain@nhs.net), we will consider a more formal evaluation involving the Scottish School of Primary Care.

**How does the High Health Gain Potential model differ from SPARRA?**

It is important to note that the ‘High Health Gain Potential’ model differs from the SPARRA model. The SPARRA model predicts the risk of a patient being admitted or re-admitted to hospital in the next 12 months as an emergency patient, whilst the High Health Gain model predicts the risk of a patient being a high-intensity user of NHS healthcare services in the next 12 months. The latest SPARRA score of a patient is provided within the pHHG tool, for information.

**Methodology**

For the purposes of model building, a patient-level history comprising health information about each patient during a pre-prediction period was developed. This was compared with whether or not the patient became a vulnerable patient or a patient with complex needs in the next 12 months.

The following data are used to inform the building of this model:

- Acute hospital data (elective admissions, emergency admissions, psychiatric admissions, A&E attendances, outpatient attendances), associated acute hospital costs, community and hospital prescribing, associated prescribing costs, age of patient, and deprivation.

Predicting vulnerable patients or those with complex needs accurately requires very complex statistical modelling. We have staged the tool development work into three phases:
**Phase 1**: Treat patients with complex needs as one cohort without distinguishing between sub-categories.

**Phase 2**: Employ more advanced statistical methods to enhance the pHHG model. Make the pHHG information available via the National Primary Care Information (PCI) dashboards to aid interpretation and accessibility.

**Phase 3**: Incorporate primary care data and social and community care data.

**Feedback**

We need your feedback. The pHHG tool, which supports the identification of vulnerable patients with complex needs, is developmental and evolving. Therefore, we encourage you to provide your feedback to ISD Scotland to help us improve and enhance the predictive tool further. To provide feedback please contact: NSS.HighHealthGain@nhs.net.