The gluco-phenotype
Sanjay Kalra,1 Yashdeep Gupta2

Abstract
This article describes the concept of gluco-phenotype, i.e., the clinical and biochemical attributes, which allow characterization of the glycaemic status, understanding of the etiopathogenesis of dysglycaemia, and planning of therapeutic strategies, in an individual. It emphasizes the need to take a detailed history, conduct a comprehensive physical examination, and assess various glycaemic parameters, including fasting glucose, postprandial glucose, and HbA1c, while planning diabetes management.

Keywords: Diabetes, person-centered care, individualized care, insulin, premixed insulin, prandial insulin, basal insulin.

Approach to The Person With Diabetes
Prescribing appropriate glucose-lowering therapy, whether oral or injectable, in a particular clinical situation is always a challenge. The decision to choose one class of drugs over another is often subjective, and based upon personal preference and experience, or upon patient choice and affordability. Yet, current guidelines do suggest consideration of factors which influence both glycaemic targets, as well as strategies to achieve those goals.1 These factors have previously been classified as modifiable and non-modifiable, or according to the biopsychosocial model of health.2

Though most guidelines are well-conceived, well-written, and rational in their approach, they may not be appropriate for all primary care physicians. They also do not provide a simple answer to this (simple) question: which is the best glucose-lowering therapy (or therapies), for a particular person, at a particular time?

Phenotype
Such challenges are faced by health care professionals in every patient encounter. In acute care, physicians follow a basic hierarchy while approaching any clinical situation. A detailed history-taking is followed by a general and systemic physical examination, which allows a provisional diagnosis to be made. Supported by the results of rationally ordered, relevant, investigations, required treatment is then begun.

In diabetes care, too, a similar approach is followed. Comprehensive information gathering, including medical, dietary, physical activity, drug, and social history, is the bedrock of any management plan. This step, if conducted with due diligence, allows identification of the probable etiology of diabetes, cause of lack of control, and co-morbid complications and conditions. This knowledge is confirmed by a physical examination, including a general and systemic workup. The sum of information gained by this can be termed the ‘phenotype’ of a particular person. This is concordant with the dictionary definition of this word: "the observable constitution of an organism" or "the observable physical or biochemical characteristics of an organism, as determined by both genetic makeup and environmental influences".3

Gluco-Phenotype
Simple glycaemic markers used in everyday clinical practice: fasting plasma glucose (FPG), postprandial plasma glucose (PPG), and HbA1c (the glycaemic triad)4 add to our understanding of the diabetes phenotype. In conjunction with each other, they allow calculation of indices and ratios which inform the relative contribution of fasting and prandial glycaemia,5 and help plan therapy. Recently, two more markers of glycaemic control have gained recognition. These are hypoglycaemia and glycaemic variability. Together with the glycaemic triad, they form the glycaemic pentad.6 The knowledge gained from history and physical examination, along with information about glycaemic markers, can together be termed the ‘gluco-phenotype’.

We therefore define gluco-phenotype as the clinical and biochemical attributes, which allow characterization of the glycaemic status, understanding of the etiopathogenesis of dysglycaemia, and planning of therapeutic strategies, in an individual. Gluco-phenotype may be classified as predominant insulin deficiency or insulin resistance; non-obese or obese; predominant fasting, prandial or combined hyperglycaemia; with or
without acute/modifiable precipitating factors.

The concept of gluco-phenotype is relevant from a practical, as well as a pedagogic viewpoint. The gluco-phenotype helps in learning and teaching the clinical skills which are so essential to the practice of patient centred diabetology. The model highlights the importance of adequate patient-physician interaction, comprehensive physical examination, and a rational prescription. It helps one choose between insulin secretagogues and sensitizers, and between basal, premixed, or rapid-acting insulin, based upon an assessment of individual needs. It makes diabetes therapy responsive to the needs of the individual patient, rather than enforcing an algorithmic solution upon every person with diabetes. In this regard, the gluco-phenotype concept supports and strengthens the patient-centred approach suggested by modern guidelines. It builds upon these guidelines by helping physicians implement them in their day-to-day practice.

Summary
While this framework is an 'experience-based', rather than 'evidence- based' model, we hope that it will simplify the subject of diabetology. This in turn, will facilitate rational prescription by the many primary care physicians who are now being called upon to manage diabetes, and contribute to better patient outcomes.

References