7th April every year is celebrated by WHO as the World Health Day. The World Health Day 2016 theme is “Beat Diabetes”. About 350 million people worldwide have diabetes, a number likely to more than double in the next 20 years. In 2012, diabetes was the direct cause of 1.5 million deaths. 90% Type 2 accounts for around 90% of all diabetes worldwide. Reports of type 2 diabetes in children have increased worldwide. India has the second largest pool of diabetes in the world. The Goal of World Health Day 2016: Scale up prevention, strengthen care, and enhance surveillance. The main goals of the World Health Day 2016 campaign will be to: Increase awareness about the rise in diabetes, and its staggering burden and consequences, in particular in low-and middle-income countries; trigger a set of specific, effective and affordable actions to tackle diabetes. These will include steps to prevent diabetes and diagnose, treat and care for people with diabetes; and launch the first global report on diabetes, which will describe the burden and consequences of diabetes and advocate for stronger health systems to ensure improved surveillance, enhanced prevention, and more effective management of diabetes.

Glucose Monitoring is one of the key pillars for proper Diabetes Management, however in India glucose monitoring is far below recommended guidelines. Indian data estimates that on average an Indian Diabetic patient self-monitors, only once a week, while Insulin dependent patients on average measure their glucose 3-4 times a week, where guidelines recommend self-monitoring to be at least 3-4 times a day. Underutilization of glucose data and lack of easy & standardized glucose data collection, analysis, visualization, and guided clinical decision making are key contributors to poor glycemic control among individuals, specially with type 1 diabetes. There are essentially three ways in which a patient can monitor themselves. Either they can self-monitor at home using readily available blood glucose monitors and test strips, or they may choose to visit their local lab and get an episodic fasting or post prandial done. As a third option, glycosylated Hb (HbA1c) tests are to be done once every 3 months, while they give a weighted average over 3 months, most of these episodic tests do not reveal glycemic variability in its true sense.

Glycemic variability is the variation of blood glucose levels in an individual over time. One speculative explanation, based on the discovery that hyperglycemia-induced oxidative stress is the chief underlying mechanism of glucose-mediated vascular damage, was that glycemic excursions were of greater frequency and magnitude among conventionally treated patients, who received fewer insulin injections. Subsequent studies correlating the magnitude of oxidative stress with fluctuating levels of glycemia support the hypothesis that glucose variability, considered in combination with A1c, may be a more reliable indicator of blood glucose control and the risk for long-term complications than mean A1c alone. Several methods can clinically assess postprandial hyperglycemia and glucose variability. Although Continuous Glucose Monitoring System (CGMS) is a precise method, it is an invasive and uncomfortable procedure and has limitations in terms of cost and the reliability. 1,5-AG or FA monitoring may be a convenient method for evaluating short-term glycemic excursion. These biomarkers may be useful parameters for tight glucose control and for detecting postprandial and glycemic variability in patients with well controlled diabetes mellitus.

Despite advances in insulin preparations, insulin delivery devices, and glucose monitoring technology, glycemic control in
many Type 1 patients remains suboptimal. In type 1 diabetes and gestational diabetes, glucose monitoring technology is most relevant.

Retrospective CGMS is another way in which a patient may be monitored. CGMS technology has greatly advanced now. Physicians in India, have the option today, to choose between 3 systems. The Ipro-2 system by Medtronic, The FreeStyle Libre Pro system introduced by Abbott, and the real time CGMS introduced by Dexcom. While all of them have their merits and demerits, a physician needs to evaluate what applies to a given patient and thus choose between them wisely. In India, where most of our patients pay out of their pockets for their treatments, one has to weigh the costs of these CGM systems, to the value they offer.

The Ipro-2 system, featured in this issue has some limitations. The system sensor last up to 6 days, while we now have on market sensors that last up to 14 days. The ease of application and start up procedures are more complex than the newer system introduced by others. The Ipro-2, sensor requires finger stick calibration of 3-4 finger pricks per day, and missing such calibration may result in lower MARD accuracy (13.6 to 15.5%) while The FreeStyle Libre Pro system has accuracy of 11.1%. Features like ease of use, simplicity of application, lower costs, easier reporting formats in my view will be key deciding factors to the broader use of the retrospective CGM systems.

Retrospective CGMS while great in giving insights into the patient’s past glucose profile, can be too overwhelming at times. To solve this complexity, a concept called the AGP (Ambulatory Glucose Profile), developed by the International Diabetes Centre (IDC), seems to be the way forward when interpreting the dense glucose data that one gets with a typical retrospective CGMS. This concept is very much similar to the Holter used by cardiologists for constant rhythm monitoring, and thus AGP could be termed as the “Diabetes Holter”. AGP reports can visually help simplify complex data, and give meaningful insights, that makes clinical decision making easier (an example of a typical AGP graph is shown in Figures 1 and 2).

The IDC has developed a data-analysis software program (capture AGP™) that statistically and visually represents glycemic exposure, GV, glycemic stability, and TIR over a period of time using downloaded CGM or SMBG data. The visual report allows clinicians, educators, and patients to identify glucose patterns and areas of highest clinical concern so that lifestyle and pharmacologic therapy can be appropriately adjusted. The panel members were asked to evaluate a preliminary draft of the AGP and provide input regarding its content, statistical default settings, graphic elements, and overall functionality. The primary focus was a “simplified” single-page document to be used in clinical practice or in communicating with a patient.

Personalized action plans, based on glucose monitoring, hypoglycemic risk, current metabolic state, and other factors are advocated since the 2012 joint Guidelines of the American Diabetes Association and the European Association for the Study of Diabetes. The Ambulatory Glucose Profile (AGP) reflects features of glycemic control beyond the simple median blood glucose. It graphically shows the amplitude and frequency of changing glycemic values. Compared with knowing what happened in the past, the AGP gives the clinician current information about the additional factors to support clinical decisions.
Asian Indian Diabetic is Different from other Ethnicities

Asian Indians have a cereal based diet which is high in total carbohydrates as compared to international recommendations (Figure 3). Foods like rice, wheat and millets are staple across country (Figure 4). Besides this additional carbohydrates come from starch vegetables like potato, sugary high glycemic fruits like mango, sapota and sweets. Cross-sectional data across India showed that carbohydrate constitutes 64.1% of total energy from diet of type 2 diabetes.9

Such imbalanced diets contribute to a high prevalence of insulin resistance, metabolic syndrome, and type 2 DM both in South Asians and Asian Indians. In diabetic population there was clear link between carbohydrate intake and post-prandial glucose level. The amount of carbohydrates consumed affects blood glucose levels and insulin responses.

Thus in Asian Indian population there is a higher area under the curve which will be seen if we use AGP and both in Diabetic and nondiabetic population. Recently we have shown impact of flavoured (masala) oats on AGP in Indian Diabetics how modulation of dietary carbohydrate impacts glycemic variability. It is clear that the beta glucan in the flavoured (masala) oats blunts the glycemic surge after breakfast and helps to reduce GV. The role of GV and AGP therefore in the Asian Indian population will be most relevant and needs to be studied both as a pattern recognition tool for therapies of diabetes as well as understanding lifestyle and diet issues including functional foods. GV and AGP in Asian Indians will help us to device low cost interventions in our resource limited healthcare environment.

References
2. Overview of Self-Monitoring of Blood


