**kHealth: A Personalized Healthcare Approach for Pediatric Asthma**

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**kHealth**

A knowledge enabled analytical framework for continuous monitoring of chronic disease, its progression, and the patient's health.

- **Temperature, Humidity**: Every hour
- **Temperature, Weather Underground**: Every hour
- **Ozone, PM2.5**: Every hour
- **Pollen**: Every 12 hours
- **Symptom - 6 types, Meds - 2 types**: Twice a day
- **Night awakenings, Activity limitation**: Once a day
- **PEF, FEV1**: Twice a day
- **Sleep - 4 params, Activity - 6 params**: Once a day
- **GPI, PM2.5, VOC, CO2, Temperature, Humidity**: Every 5 mins

**kHealth Kit for Pediatric Asthma** involves multi-sensors collecting personalized multimodal data streams (clinical notes, mHealth application, PGHD and outdoor environmental observations); > 30 parameters involving up to 1852 data points/day, collected throughout 1 or 3 month patient participation.

**Questions investigated (Goals)**

- Can we assess the asthma control level, determine vulnerability, and medicine compliance for a patient?
- Can we understand the causal relationship between the asthma symptom and possible factors responsible for it?
- Can we reduce the number of asthma attacks through continuous monitoring of the patient’s health condition?

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**kHealthDash (secure, anonymized cloud hosted RT monitoring/analysis)**

Visualize Multimodal Data Streams & Patient Data for Correlation Analysis interpreted with the help of knowledge graph (relevant medical knowledge)

**Findings (subset)**

From the ongoing trial involving pediatric asthma patients, based on 110 patients out of 150 study cohort, with over 75% patient compliance:

- **At Cohort Level**: (1) 36.6% of the children’s asthma was Very Poorly Controlled, 25.6% was Not Well Controlled, and 37.8% was Well Controlled. (2) Among the Very Poorly Controlled, 30% were Highly Compliant towards their controller medication intake suggesting their re-evaluation for change in medication/dosage, but 50% were Poorly Compliant and candidates for more timely intervention to improve compliance to mitigate their situation.
- **At Personal Level**: (1) For 28% of the patients deployed in winter - Particulate Matter (PM2.5) was the major contributor for 80% of them. (2) For 21% of the patients deployed in spring - pollen was the major contributor for 63% and PM2.5 for 19% of them. (3) 18% of the patients deployed in Fall - pollen and PM2.5 was the major contributor for 29% and 21% of them, respectively. (4) For 7% of the patients deployed in summer - PM2.5 and Pollen were the major contributors for 40% and 20%, respectively.

Insights for **Augmented Personalized Health**: Strategies for Self Monitoring, Self Appraisal, Self Management, and/or Intervention.