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kHealth: A Personalized Healthcare Approach for Pediatric Asthma

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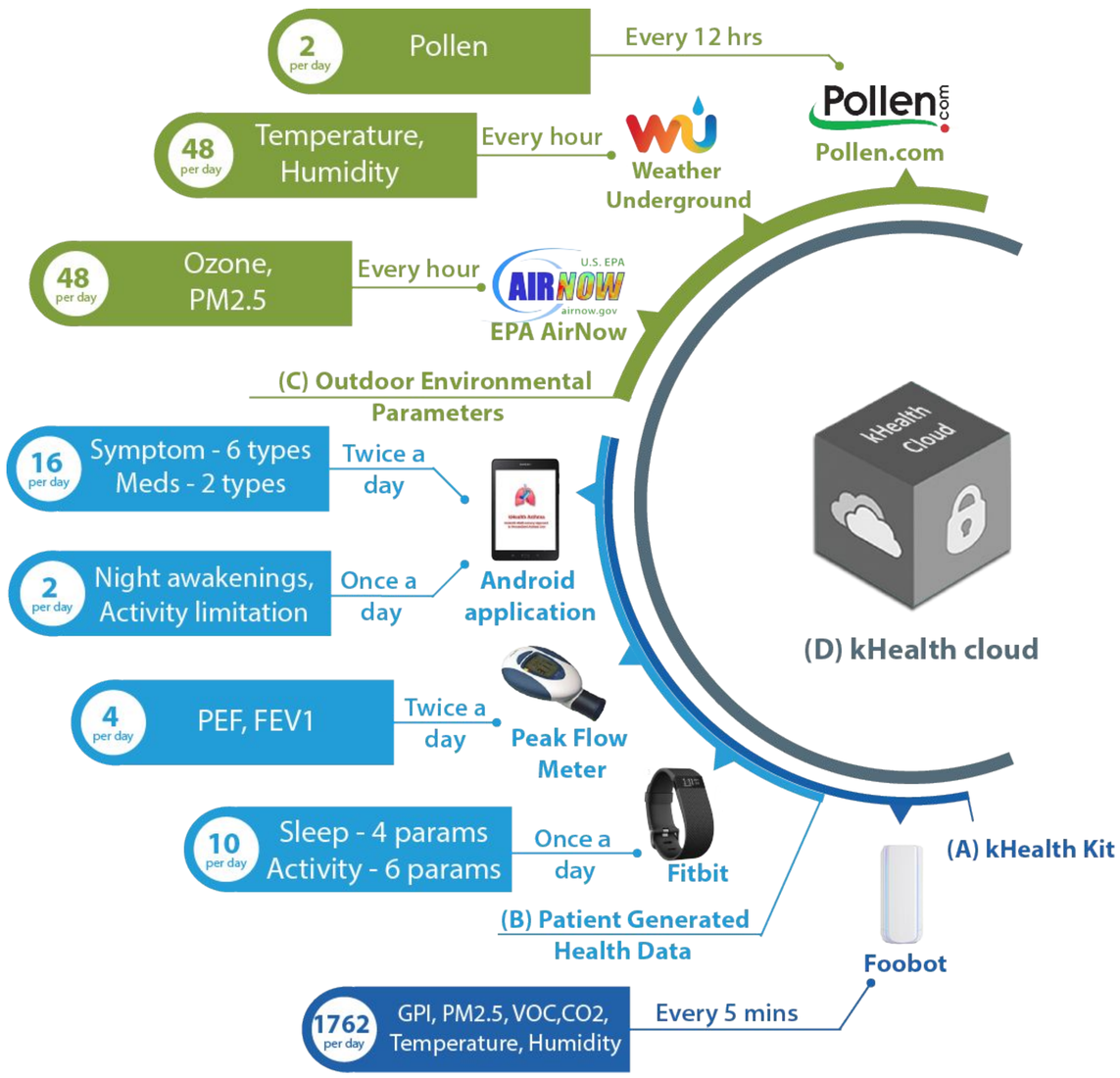
kHealth

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

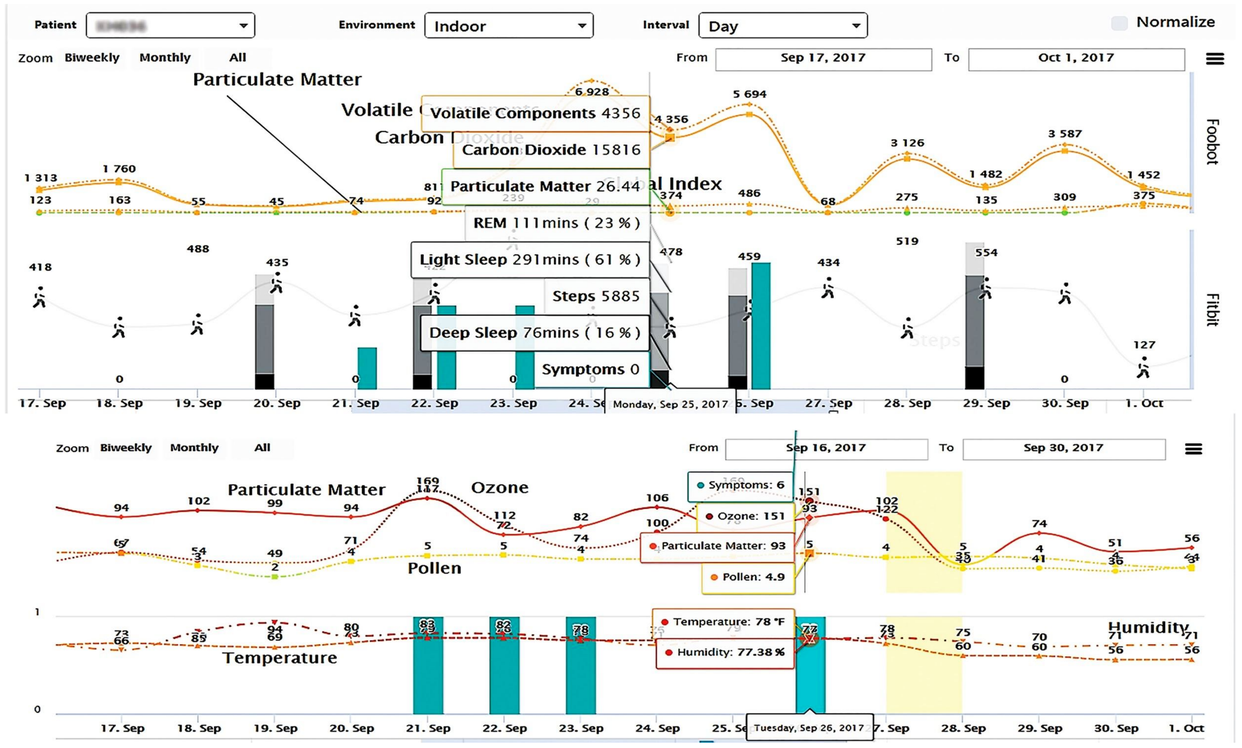


kHealth Kit for Pediatric Asthma involves multi-sensors collecting personalized multimodal data streams (clinical notes, mHealth application, PGHD and outdoor environmental observations); > 30 parameters involving up to 1852 data points/day, collected throughout 1 or 3 month patient participation

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?

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.

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