

Extended 20-Minute Training: New Ways of Using Your Health Data to Keep You Healthy,

Objective:

Equip young participants with an understanding of innovative health data methods and empower them to consider how their data contributes to health advancements, particularly in rare and paediatric diseases.

1. Introduction: What Is Health Data? (2 minutes)

- **Quick Discussion:** “When you go to the doctor, what information do they collect about you?”
- **Explanation:** Health data includes information like your age, symptoms, allergies, and treatments. This information helps doctors understand and improve healthcare for people, especially young patients.
- **Link to INVENTS Context:** Emphasize how health data is particularly valuable for understanding rare conditions like those seen in the INVENTS Paediatric Patient Expert Group (PEG) project, which includes young patients with chronic conditions like arthritis and multiple sclerosis .

2. Digital Health Records and Smart Check-Ups (2 minutes)

- **Explain:** Digital Health Records allow doctors to securely store and access your health data across hospitals or clinics.
- **Interactive Example:** “Imagine an app that knows your health history and gives you reminders about check-ups or vaccinations.”
- **Quiz:** “Why would it be helpful for doctors to have digital access to your health records?” (Answer: They can quickly understand your history and help you better.)

3. Wearable Health Tech for Young Patients (2 minutes)

- **Explanation:** Wearable tech, like fitness trackers, collects data on steps, heart rate, and sleep. This can help doctors monitor important lifestyle factors for patients, even from afar.
- **Activity:** Show a smartwatch image and discuss how these reminders promote healthier habits (e.g., reminders to drink water).
- **Complementary Example from INVENTS:** Reference how wearable data can be used in “real-world data” (RWD) collection for medical research, supporting safer and more convenient health tracking .

4. Predictive Models for Preventing Illness (3 minutes)

- **Definition:** Predictive models are like a recipe that combines lots of different pieces of health data (or “ingredients”) to make a “prediction” about someone’s future health. These models help doctors make smart guesses, like who might need extra check-ups for asthma or diabetes, based on patterns they see in health data.
- **Formulation:**
 - **Collecting Data:** Doctors collect information from many kids, like how often they get sick.
 - **Identifying Patterns:** Doctors then look for patterns, like kids who play outside a lot in the cold might get sick more often.
 - **Building the Model:** They use math and computers to combine these data patterns into a model that can predict health outcomes.
- **Analogy: Weather Forecast**
 - **Explanation:** Think of predictive models like weather forecasts. Just like meteorologists use temperature, wind, and cloud data to predict rain, doctors use health data to predict if someone might get sick.
 - **Example:** If it’s cloudy and windy, you might need an umbrella. Similarly, if a child’s health data shows certain patterns, a doctor might suggest preventive care.

Story: Helping Alex Stay Healthy During Allergy Season

Story Setup:

Alex often gets sick with allergies in springtime, especially around blooming trees and flowers. His doctor wants to help him avoid these problems, so she uses a predictive model based on data from other kids with similar allergies.

Story Details:

The doctor gathers information on weather patterns, pollen counts, and Alex's health data from past years. Using this model, the doctor predicts that Alex is most likely to have allergy symptoms during certain weeks in spring. With this prediction, Alex can start taking preventive medicine and avoid outdoor activities on high-pollen days. As a result, Alex stays healthier during allergy season with fewer symptoms!

Lesson:

Predictive models use data to make smart guesses that help people prepare ahead of time, reducing symptoms and making life easier.

5. Artificial Intelligence (AI) in Health Data (1 minute)

- **Introduce:** AI can analyze tons of data quickly to find patterns in things like growth charts or rare health conditions.
- **Activity:** Play a “spot the pattern” game with students, showing how AI does this with complex health data to help doctors find issues early.
- **Quiz:** “What does AI help doctors do faster?” (Answer: Identify patterns and possible issues in health data.)

5. Artificial Intelligence (AI) in Health Data (2 minutes)

- **Introduction:** AI helps doctors analyze tons of data quickly and find patterns in things like growth or rare health conditions. It speeds up the process of diagnosing and finding solutions.
- **Activity:** Play a quick “spot the pattern” game, explaining that AI does this with much larger and more complex data sets.

Pattern Sets and Questions**Set 1: Sleep Patterns and School Performance****• Example Cards:**

1. Card 1: A bar chart showing students with 8+ hours of sleep generally scoring higher on tests.

2. Card 2: A timeline showing students sleeping less than 6 hours and reporting feeling tired during the day.
 3. Card 3: Health data indicating better mental focus for students getting regular 8-hour sleep.
- **Question:** "What pattern do you see? How could this information be useful for schools or parents?"
 - **Answer:** Students who get 8+ hours of sleep tend to do better academically and feel more focused. AI could suggest reminders or tools to help students get adequate rest for improved performance.

Set 2: Screen Time and Headaches

- **Example Cards:**
 1. Card 1: A daily log of screen time showing 4+ hours correlating with more frequent headaches.
 2. Card 2: Survey data showing students with over 3 hours of screen time report eye strain.
 3. Card 3: Health records indicating that limiting screen time reduces headache complaints.
- **Question:** "What pattern do you see? How might an AI-powered app use this information?"
- **Answer:** Increased screen time seems to correlate with headaches. An AI app could suggest screen breaks and limit daily screen time to help reduce discomfort.

Set 3: Allergy Patterns

- **Example Cards:**
 1. Card 1: A pollen count graph showing high pollen levels in April and May.
 2. Card 2: Health data showing an increase in allergy symptoms among patients during spring.
 3. Card 3: Weather data showing warmer days in April and May.
- **Question:** "What pattern do you see? How could this help doctors and patients manage allergies?"

- **Answer:** Higher pollen levels in spring lead to more allergy symptoms. Doctors might advise patients to take preventive medications or stay indoors on high-pollen days.
- **Quiz:** “What does AI help doctors do faster?” (Answer: Identify patterns and possible issues in health data).

6. Modelling and Simulation in Children’s Healthcare (2 minutes)

- **Introduce:** Modeling and simulation use computer programs to see how a treatment or disease might affect a person before trying it on a real person. This is especially helpful for kids and teens, whose bodies are different from adults.
- **Example:** Imagine creating a “virtual body” that shows how a medicine might work differently for teens than for adults. This helps doctors test safety without affecting a real person.
- **Activity:** Show a simple diagram or describe a simulation, like a “virtual body” with asthma or a cold.
- **Quick Question:** “Why is it useful to test a medicine on a virtual model first?” (Answer: It’s safer and lets doctors learn more before trying it in real life.)

7. Virtual Clinical Trials (1 minute)

- **Introduce:** Virtual clinical trials let doctors test treatments digitally first, using data models to evaluate treatments safely before involving young patients directly.
- **Example:** Imagine a virtual trial for an asthma treatment using data from hundreds of kids, letting doctors see early results and decide if it’s safe for real trials and reducing the need for extensive initial testing on real people.
- **Activity:** Show a flow diagram of a virtual trial, starting with data, creating a model, and seeing if it’s ready for testing with real people.
- **Link to INVENTS:** These trials are particularly useful for rare diseases or conditions like juvenile arthritis, where traditional trials may be difficult due to fewer patients .

- **Quick Question:** “How does a virtual trial make testing safer?” (Answer: Testing treatments on models and simulations first reduces risk.)

8. Wrap-Up Quiz and Interactive Discussion (2 minutes)

Quiz Recap:

1. Why are digital health records helpful?
 - **Answer:** They give doctors a complete, accessible history of a patient’s health.
2. What do wearables track?
 - **Answer:** Steps, heart rate, sleep, etc.
3. How can predictive models help doctors?
 - **Answer:** They can predict health risks and provide preventive care.
4. How do virtual trials keep testing safe?
 - **Answer:** By testing treatments on models first to reduce early-stage risks.

Final Discussion:

- **Question:** “What was the most interesting method you learned today? How could it help you or someone you know?”
- **Goal:** Reinforce understanding and get participants to think about how these tools might impact their lives.