# Use Case Development: Ideas for Study & Data

<https://www.youtube.com/watch?v=wUleeGAEjw8>

## Title Slide

Use Case Development: Ideas for Study & Data

Logo of the All of Us Research Program

## Scene Change

Eric Dishman standing next to a slide presentation. The first slide is titled “Use Case Development for Requirements Gathering.” It features a diagram of a use case with seven segments that form a horizontal cone that increases in size from right to left. The segments are labeled “Health Condition,” “Key Problem,” “Research Question,” “Proposed Study (to answer research question),” “Data Types (for proposed study),” “Methods (to obtain the data types),” and “Specifications (for using the methods).” The last three form a subgroup labeled “Requirements.”

## Mr. Dishman:

Let me do a little bit more of a deep dive. I’m talking about what a use case is, with some examples, and then how we’re going to use this information to inform the *All of Us* resource. So if you think about a health condition that you’re interested in or some research area, you’ve got these big buckets, but we need it to winnow down to a very specific set of data types, methods, and specifications about how we would collect that data for us to know what we might ultimately do with our platform.

## Scene Change

The slide now encompasses the entire screen.

## Mr. Dishman:

So what’s the key research question that—from that—what kinds of studies could answer this? Well, what kinds of data would you need to do, or what methods to collect that data? And is there something very specific about how that data would need to be collected to be useful to accelerate the science?

## Scene Change

Camera view of Mr. Dishman standing next to the slide projected onto the wall behind him.

## Mr. Dishman:

I’ll give an example using Parkinson’s, with some work that we did with…

## Scene Change

The slide next to Mr. Dishman changes to one titled “Framework for requirements generation: A neuromuscular example.” This new slide spells out the progression: “Key problem,” “Research questions to address key problem,” “Proposed study to answer research question,” “Data types for proposed study,” “Methods to obtain the data types,” and “Specifications for using the methods.” Each step in the progress has an arrow pointing downward to the next step, as well as an arrow pointing to a corresponding bullet list at the right. Each bullet list has an arrow that points downward to the bullet list for the next step in the progression.

Key problems points to the following bullet list:

* *Priority area: Neuromuscular disorders (lots of them)*
* *Research opportunity: Early detection and progression monitoring?*

Research questions to address key problems points to the following bullet list:

* *Chemical changes?*
* *Movement and ADL changes?*
* *Cognitive changes?*
* *Genetic risk factors?*
* *Microbiomic causes?*
* *Voice changes?*

Proposed study to answer research questions points to the following bullet list:

* *Diary on movement changes?*
* *Physical exam on range of motion?*
* *Test voice energy and fundamental frequency variability?*

Data types for proposed study points to the following bullet list:

* *Movement measures*
* *Voice samples*
* *Walking speed*
* *Reports of stiffness*
* *Tremor log*

Methods to obtain the data types points to the following bullet list:

* *Biannual physical eval?*
* *Wearable sensor?*
* *Smart phone voice app — embedded or explicit?*

Specifications for using the methods points to the following bullet list:

* *Smart phone file recorded at XYZ in non-noisy conditions of natural speech once every week for 30 seconds*
* *3D vibrational sensor with XYZ sample frequency and on board noise filtering*

## Mr. Dishman:

… Parkinson’s patients, researchers, as well as providers some many years ago, and we went through a process very much like this.

## Scene Change

The slide now encompasses the entire screen. The key problem section is highlighted.

## Mr. Dishman:

So we had a bunch of neuromuscular disorders we were interested in, but we were very interested in Parkinson’s specifically and a key problem around how do we do better early detection and tracking the progression of the disease?

## Scene Change

The research question section is highlighted.

## Mr. Dishman:

Well, there were lots of different research questions that could be asked of that, but we focused in on are there changes in the voice that would indicate that Parkinson’s is advancing—and, obviously, movement and tremor and those kinds of things?

## Scene Change

The proposed study section is highlighted.

## Mr. Dishman:

Well, how would we go about doing that? Well, we could bring people in for a physical exam, but that’s very expensive. We could test the energy in their voice, which may be one of the measures of the progressions of Parkinson’s.

## Scene Change

The data type section is highlighted.

## Mr. Dishman:

Well, there would be different data types if we did that: some voice samples and some ways of capturing movement measures.

## Scene Change

The method section is highlighted.

## Mr. Dishman:

Well, how would we do that? Maybe a wearable sensor for the movement measures or a smartphone, because it’s collecting your voice, and that would be a way to look at changes in your voice over time.

## Scene Change

The specification section is highlighted.

## Mr. Dishman:

And in fact, we dove down into those two and came up with some very specific—we need a very specific sensor to track that movement and a very specific way in which the audio was recorded on your phone.

## Scene Change

The progression steps on the slide are highlighted rapidly in a cycle.

## Mr. Dishman:

And what we want to do is go through this process many times for the same condition, with another idea for studying data, another idea for studying data.

## Scene Change

The slide next to Mr. Dishman changes back to “Use Case Development for Requirements Gathering.”

## Mr. Dishman:

And what we’re going to do with this over time, as hopefully thousands of people have done this for many different health conditions, is, we’re going to line up all these cones…

## Scene change

The slide encompasses the entire screen.

## Mr. Dishman:

…and say, “Hey, down here in the data types that people want or the methods of how to capture that data or—yeah, they want a very specific kind of movement. Can we do that across lots of fields and conditions?”

## Scene change

Camera view of Mr. Dishman standing next to the slide.

## Mr. Dishman:

What the All of Us Research Program is going to do is synthesize all of these ideas, and we’ll share all of this knowledge publicly with institutes and centers and foundations and advocacy groups that want to know it, but we’re going to select out of this those ingredients or those requirements that are going to impact multiple fields. We want this resource to be able to have impact on lots of different people. So we’ll say, “Hey, this particular data type can be used in cancer, can be used in movement disorders, can be used in dental challenges.” That’s going to have big impact.

And also, what’s affordable and practical to do for a million people? There are lots of things that we would love to do for science and research, but when you scale it up to a million people, which ones can be affordable and practical to do, and how do we share that data back with individuals?

Once we’ve done these use cases and this requirements-gathering process for our workshop—and we’ll synthesize and share all of that, but this is an ongoing process. We’ll be doing this kind of requirements gathering forever, for decades and decades to come. And as new technologies or new scientific fields or new problems occur, we’ll probably have more and more workshops over time to say, “Help us think through these use cases. What should we bake into this resource that’s going to make it really valuable for all of us?”

## Fade-out