

SEQUENCE

INSPIRED BY TRUE EVENTS

CHARACTERS:

SHELLEY LANDEKKER, late 60s and one of the country's most respected geneticists. She's been instrumental in nurturing the idea of genome editing, and she executes practical applications across the world. Smooth and seemingly emotionless. She dislikes Abby Stenz despite never having met her.

ABIGAIL (ABBY) STENZ, a lawyer specializing in bioethics and working primarily out of the Berman Institute of Bioethics at Johns Hopkins University, late 30s/early 40s. She has short hair and speaks with a slight, difficult-to-place accent. She's not a fan of Shelley's, even though she appreciates Landekker's contributions to personalized medicine.

VALVERDE, age open, a non-binary transgender co-CEO and Marketing Head of Gene One, a direct-to-consumer genetic testing company. A brilliant writer, they have published articles and short stories in publications both prestigious and grassroots. Valverde is navigating Gene One's image after their co-CEO vacated to a rival company.

ANJE SHIMURA, a late 20s Japanese-American researcher from Kyoto University, she's using stem cells from a patient's own body (induced pluripotent stem cells or iPSCs) to treat Parkinson's. She's also worked with the NIH (National Institutes of Health) on newborn umbilical cord stem cells. Not one for distraction or entertainment, her sole hobby is welding patio furniture and accoutrements.

DEVIN TASKER, mid to late 20s and Anje's head researcher. He's idiosyncratic and sings movie scores when deep in work. His primary work is with iPSCs, though he worked briefly with Shelley Landekker on CRISPR-Cas9 insertion into wheat to make it bigger and better.

EVAN SEIDLER, a landmark bioethicist in his late 60s/early 70s. He's scruffy, bespectacled, and with an eye of whimsy. A devout Christian, he's also the closest thing to a rock star in his field- he's appeared on television and film, and has become quite wealthy after selling his biotech company. He and Shelley have a bizarrely antagonistic relationship- they just might be soulmates.

JANICE HECHT, apparently in her 50s though she could be older, is a medical anthropologist and the natural mediator in any sort of debate. She's absolutely lovely and would be a perfect ratings boost for any cooking show. She's unerringly human.

ROSALIE ENCINÍAS, our everywoman and window into the world of the play. Age open, she's a single mother to two boys (ten and five), high school history teacher, and cross country coach. Her oldest son has a genetic disease rendering him in a vegetative state.

ONE. GENESIS/AUTONOMY

A CONFERENCE ROOM AT MICHIGAN STATE UNIVERSITY.

ROSALIE ENCIÑIAS stands alone. Passionate, but maintaining control. Only slightly.

ROSALIE

(to Kendrick)

The government should stay out of people's lives.

(beat)

Or. I don't know.

(beat)

If the government had implemented mandatory genetic testing, mandatory *whole-genome* sequencing, on every newborn in America just ten years ago, my son wouldn't be dying.

(beat)

The technology was there, and it was expensive, but it wasn't law and so...

(beat)

So, I don't know. I don't know.

(beat)

More than you bargained for on a first date?

(small laugh)

I don't think this is going to work out.

Where noted, Rosalie and all our characters occasionally speak to an unseen character, different for each of them. They move in and out of memory, but should always be present and active in the NOW of their dialogue.

As each one finishes speaking, they shift into a stylized freeze or pantomime in the background while action continues around them.

Rosalie exists among them, and can perceive them as if reconstructing their actions through her research, though she remains imperceptible to everyone else.

SHELLEY LANDEKKER lectures a small group of colleagues. In her late 60s, she carries herself with an enviable ease. Nothing rattles her, seemingly.

SHELLEY

We hike treacherous terrain, we... what? We sky dive. We climb the misshapen walls of a cliff and drive our supercars at top speed. We hurl our fragile selves through space. We trust that our knowledge of the world will save us because in this day, at this time, we believe all the variables have been factored in and countermeasures have been authored. But they haven't, right? That's why they're variables. Our natural state is one of flux, and that-- that's the intangible variable for which we have no answer. 20 to 25 thousand genes in the human genome, and we understand less than half of them.

(pointing)

I love hiking. I've done, hell, three to four trails a year since I was a kid. I outpace my grand nieces and nephews. I know Elisabetta has been to Albuquerque, NM. I was hiking the La Luz trail there, it's, uh, approximately seven and a half, eight miles one way. It's up in the Sandia Mountains, and I had accounted for every variable. You know me, I'm a list hound. You have to be to hike safely. My pack was light, but it contained anything I might need- I had even stuffed mothballs in my boot laces as a possible deterrent for rattlesnakes. It's an old wives' tale, I know, but it took minimal effort so- why not? Fewer than one in 37,500 people are bitten by venomous snakes in the U.S. and the chances of dying from the bite are around one in 50 million. Statistics swung in my favor. I hit the base of the trail, thrilled. It's gorgeous. About thirty, forty minutes in, I reach for my hydroflask.

(beat)

I'd forgotten to bring water. *Water.*

She continues to speak but we can't hear her. Another woman sitting in our audience, DR. ABIGAIL (ABBY) STENZ, stands and addresses us directly. Hair pulled back or cut short, she speaks with a slight accent, difficult to place.

ABBY

(to Zee)

Well shit.

(laughs)

Yeah, I'm watching it again, Zee. Conference prep.

(pointing)

Doctor Shelley Landekker is one of the most respected geneticists in the country, I'm constantly told. Wired magazine did a spread on her use of CRISPR/Cas9 and targeted genome editing, she had a featured profile in Time last August. I remember when she faced down Tucker Carlson about the ramifications of genome editing. I have no idea why she agreed to appear, nor why Fox would even pursue her, but... well, she certainly flustered that jackass.

(beat)

No, I know why she appeared. It was ego, it was... she...

(beat, veers back on topic)

She worked on the study of seasonal affective disorder, and helped link the gene ZBTB20 with the affliction, which Potash later perfected.

Abby turns and watches Shelley's lecture for a spell. She laughs, ironically.

ABBY (cont'd)

(still to Zee)

She does that. She probes, then hands it over to others to expand.

(points)

I've never been there. MSU Center for Ethics.

(gesturing to finish the full title)

And Humanities in the Life Sciences. The full, you know, title. Good program. Great program. I've never been to Michigan, oddly enough. I've been most everywhere else in the states. This lecture she's giving is only about a month, maybe five weeks ago.

(quietly)

Five weeks before this conference.

(MORE)

ABBY (CONT'D)

(shakes her head, rubs her eyes; she never sleeps)

We wrote a paper. Not together! Christ, no. No, she and I wrote our papers, independent of one another. Essentially dealing with the same basic tenet of bioethics: The ethics incumbent on a family member who has had their genome mapped and, you know, discovered a propensity toward a specific genetic malady. Do they tell their family? Should they? And... well.. that was the paper. Anyone could write this, right? Yeah, it's general, but it was the goddamn language. Beat by beat, nearly identical. She didn't copy me, and I sure as shit didn't copy her. Just one of those flukes. Hers beat me to publication.

(beat)

She's an asshole.

(shakes head)

No, I know this is irrational. I know it's weird telling you this. I know it's my own insecurities coming to bear. She and I have never met. We're not even in the same field. She's a focused geneticist and I practice medical law. I still can't fucking stand her.

(laughs)

Your mother is irrational. Sorry about that. Big surprise.

Abby and Shelley rapidly shift positions. Abby works with her colleagues on a case at the Berman Institute while Shelley watches. After a spell:

SHELLEY

(to Katie)

I adore Abigail Stenz. She's a, a woman of conviction. Her work at the Berman Institute has really changed how we look at bioethics.

(wincing)

That's what I tell colleagues, the press, when asked about this upcoming conference. Between us? I know of her of course, in a few circles, but she's not really on my radar.

Abby breaks to speak to us.

ABBY

(to Zee)

She sent me an email some years ago.

SHELLEY

(to Katie)

Well, I did send her an email some years ago.

SHELLEY/ABBY

“Ms. Stenz-”

ABBY

(aside, to Zee)

I have my Master’s in Bioethics and Health Policy Management from the University of Zurich, my LLM from KU Leuven in Belgium, and my doctorate in Law from the University of Washington. So, you know, even though I’m a lawyer-- technically I’m *Doctor* Stenz. She didn’t even Esquire it or anything.

(sighs)

Anyway ...

SHELLEY/ABBY

(continuing)

“Congratulations on your recent paper *Asparagus Urine--*”

ABBY

(aside, to Zee)

Not its title.

SHELLEY/ABBY

(back to the recitation)

“Its publication proves anything is possible. Regards, Dr. Shelley Landekker.”

ABBY

(to Zee)

Why would she do that?

She returns to the case.

SHELLEY

(to Katie)

We'll meet in person at this conference. She seems to be against mandatory whole-genome sequencing for newborns, which, you know, I'm currently in favor of.

(beat)

Well, I'm sure it'll be fine. That's why we're having this conference, right? Why I'm not just making the recommendation myself.

She takes a final look, then shifts to a different part of the stage. Abby lectures and VALVERDE stands up. Valverde's pronoun is they/them. They preside over a conference room at GENE ONE BIO INNOVATIONS.

VALVERDE

(to Tatiana)

Abby and I are, well, friends, I guess. We've been out for beers a couple times. She doesn't drink, but we've been out. I'm the Co-CEO and marketing head here at Gene One Bio Innovations. Co-CEO is more of a vanity title. I prefer marketing. Well, I'm actually a bioinformaticist, analyzing genomic information, designing databases, but I use it all for marketing. Marketing for our company is a breeze because I believe we're the best. 14% of Illumina's people work for us through a mutually-beneficial partnership with the company. Illumina recognized Gene One's importance in the field and our whole-genome sequencing techniques inform theirs, and vice versa. As a side note, I'm bringing Gene One messenger bags for everyone at the conference. I found them in this, uh, pavilion, I guess, in downtown L.A. They're from the square of street vendors at Figueroa and 9th in the lot by the Denny's, and their work is, well, it's exceptional.

(a wry smile)

My Co-CEO, Bill Erikson, started the company, but he wasn't invited to the conference because... look, I don't want this section of your article hijacked by Bill Erikson. He did plenty of that in trying to oust me from Gene One.

(attempts to laugh it off, fails, beat)

I'm happy to be representing Gene One at the conference, and am confident my presentation will help our group push through the mandatory newborn sequencing issue.

(MORE)

VALVERDE (CONT'D)

(beat)

So Abby ... she consults for us, serves as our primary legal counsel, as she does for most of the other big private, direct-to-consumer genome sequencing companies. She's been published more than Stephen King, but I especially liked her paper on folx who can smell asparagus in urine because of chromosome 1 genes, and who subsequently tend to dislike cilantro. It was whimsical, less dry than most academic papers I read, and she quite brilliantly illustrated the bioethics principle of respect for autonomy while listing the recipe for the perfect guacamole.

(beat)

More cilantro, basically.

They move upstage. Two more stand up together. ANJE SHIMURA and DEVIN TASKER. Both are in their mid to late 20s, with Anje slightly older, and they work in front of lab equipment (micron imagers and the like).

ANJE

(to Asako)

I've spoken about Valverde to you, I'm sure.

(beat)

That's Valverde's name. Just... Valverde. You know, I read an early draft of Valverde's rebuttal to California's gay marriage ban-

(beat)

Yes, Prop 8. The rebuttal never got printed in voter pamphlets. I think it was due to their/they/them being Valverde's pronouns of choice.

(beat)

Well, the anti-Prop 8 people, despite fighting for gay marriage, thought that a non-binary trans person might be too "fringe" to sway conservative liberals or liberal conservatives.

(beat)

The proposition was approved. Maybe it wouldn't have been if Valverde's rebuttal had been published. Who can say?

(beat)

Yes, it was later overturned. It was deemed unconstitutional.

(MORE)

ANJE (cont'd)

(beat)

I'm glad it was. How do you feel about that, okaa-san?

DEVIN

(to Gene)

No, Dad. Anje's my colleague.

(beat, sounding it out)

AN-JE SHI-MU-RA (no relation to Takashi)... I know that's like being surprised that two people with the last name of Jones aren't related. She's never seen a Kurosawa film, despite my insistence. Do you know him?

(beat)

I didn't know you don't watch movies. I always remembered as a kid you'd take me...

(beat)

Well, Takashi Shimura's a brilliant actor and was in, like, 20 of Kurosawa's films. Anje doesn't watch movies, either. I remember, early on when we started working together, I pulled Seven Samurai up on my tablet in the lab, just swiped the iPSCs and their models right off the screen. The Induced Pluripotent Stem Cells.

ANJE

(to Asako)

The iPSC work is going well, I'd say.

(beat, a laugh)

Well, I never wanted an article, but if it gives you something tangible to show your friends how well your daughter's doing, then I suppose I should be happy.

(beat)

Yes, they're still created from a patient's own skin cells, but we've refined it even further here. We use them for neuron cell replacement, looking toward a cure for Parkinson's, then MS, Alzheimer's, hopefully heart disease-

DEVIN

(to Gene)

Anje was on the team from Kyoto University using iPSCs on primates with Parkinson's. They found increased dopamine production, more mobility, and no brain tumors.

(MORE)

DEVIN (CONT'D)

I ride her coattails, gladly.

(beat)

We work together in various labs along the west coast. The Loring Lab, UC San Francisco... we're working at the Salk Institute in San Diego now, but, I mean, she has an international reputation for brevity and accuracy. She also brought incredible new techniques to the Newborn Umbilical Cord Stem Cell project, for which the NIH made her the poster, ah, child. Person. This is in addition to contributing to the hardware of the Solexa DNA sequencing systems. She's complex.

(beat)

That's a lot of- information for you, I know. Sorry. I wanted to give you as full an idea as possible of-

(beat)

Thanks for- well, it's been... we haven't seen...

(beat)

It's good to talk to you, Dad. This conference is a big deal and... I'm not sure if it's a good idea or not, but that's what we'll hash out when we're all together. It's intimidating- the only person I really know is Anje, though-

(beat)

-it's good to talk to you, too. Maybe we can talk again soon when you have more time?

No answer. Devin shrugs it off and heads upstage to join the others. Anje shakes her head.

ANJE

(to Asako)

His name is Devin. He's... difficult. It's difficult. I'm one of a handful of people who can stand to work with him. Shelley Landekker used him as a research lead with CRISPR-Cas9 insertion into wheat at her Philadelphia lab until he she could no longer stomach his singing.

(wrinkles her forehead, some endearment
there)

He, uh, he sings when he's looking in the micron imager. Only then, though. It's odd. He sings movie scores.

(MORE)

ANJE (CONT'D)

(demonstrating)

Ba-ba, ba ba ba BA BA! Star Wars. But he goes on for as long as he's glued to it. It's fine with me, in doses. He's damn good, he does the work, so... it's mostly fine.

(beat)

I suppose. Yes. Yes, I'd consider him a friend.

She puts a hand up to Devin who motions for her to join him. She moves upstage, making way for Dr. EVAN SEIDLER. Late 60s, early 70s. Scruffy, bespectacled, and with an eye of whimsy. Befitting his look, he sits in a high wingback chair in his home study, smoking a cigar.

SEIDLER

(to Leonore)

NIH wanted me. They got me. I have to go, love.

Shelley breaks from the tableau and laughs.

SHELLEY

(to Katie)

Sure, the National Institutes of Health wanted him. There's a reason Francis Collins is director of NIH. He isn't stupid. But Evan forced his way in. Simple. He's our field's resident celebrity.

(beat)

Yes, I know him well. That's why he's "Evan" to me and not "Dr. Seidler." That's gotten me into trouble before.

(beat)

Multiple interviews on every NOVA and 60 Minutes even remotely related to genomics. Quoted by all of us in our various publications. He manages to be both charming and insufferable with every word out of his mouth. You'll meet him, I'm sure. As talented a researcher as you are, you'll meet him.

SEIDLER

(to Leonore)

Well yes, remember he reached out to me for input when I worked on the tail end of the Human Genome Project in 2003. I bought you some more of that Marlborough Sav Blanc you like.

(beat)

I know. I'm sorry. I'm shopping when I can.

(beat)

You're welcome. Wanted you to have an ample supply of wine.

(beat)

Love, that's why my team and I have been prepping for seven months in advance of this conference. This is about a policy shift for our nation and I want a word. I have to be there. But it'll be quick.

SHELLEY

(to Katie)

The man is also loaded. He started a biotech company, sold it-

(beat)

Sure, that probably had something to do with it. Founding Director of Boston Medical Center's Division of Bioethics sounds good to the public.

(beat, a smile)

He's okay. I can handle him in small doses. I wish I could take you with me.

JANICE HECHT jumps in.

JANICE

(to Schnitkopf)

Shelley Landekker and Evan Seidler actually like each other.

Seidler and Shelley pull back upstage. Janice exudes warmth. She's a professor but on appearance alone you'd think she was a host of The Great British Bake Off.

JANICE (cont'd)

Well, Shelley thought it best to keep Evan on the... side... line. Look, he brings religion into his work, and Shelley didn't think that would fly as we discussed policy. NIH left Shelley alone on her picks, but we all pressured her to keep Seidler active. If Potter coined the term "bioethics," Seidler remolded it. He was outspoken on the implications of research on recombinant DNA at Asilomar in the mid 70s. He was the wunderkind, the upstart crow of the bunch. Now he's ubiquitous. Lay persons know him.

(beat)

Well there you go! I'm not surprised. You seem a bright man. I'm not religious, but thank God for that man's work.

(beat)

Should I call you Rabbi Schnitkopf, or Arthur?

(beat)

Artie. All right. Artie. Oh! Uh, please keep calling me Janice. It doesn't go well when folks call me "Jan."

(beat)

Well, so, those of us working directly in university look to Evan on every bioethical issue.

(sighs)

This is going to be a difficult conference.

Janice sees Abby, waves, and moves up to her into the tableau. She sits and raises hands over her head as if on a roller coaster. Pure, but calm, joy on her face.

Abby continues downstage.

ABBY

(to Zee)

People like Janice are anomalies. You talk about gene variants but those are much more common than Janice. She's kind, enthusiastic, supportive, passionate about her viewpoint but willing to shift if the evidence supports it. You'd think we'd all be like that. Evidence-based. Hell, most scientists I know allow some emotion to show. They need it; their humanity. Janice represents the best of us. She understands us as humans. Her medical anthropology degree took her far longer than it should've, because she didn't feel she quite *got us*. She has identical doctorate degrees from two different universities.

(MORE)

ABBY (CONT'D)

It boggles my mind, but there it is. There *she* is.

(turns to look at Janice)

She loves amusement parks, but especially tilt-a-whirls, I think they're called. I once had a meeting with her over cotton candy at a state fair. It was delightful.

(beat)

No, she's definitely against mandatory testing. That's one of the only things on which we agree. You know how much I hate amusement parks.

Shelley counters across stage from Abby.

SHELLEY

(to Katie)

One trailblazer, one medical anthropologist, one mail-in genetics company CEO, one bioethics lawyer, two researchers, and me. On paper, it works. That's why I brought all of them in.

(beat)

Except for Abby Stenz. NIH specifically wanted her. I didn't think we needed her, but...

(beat)

It'll be fine.

ABBY

(to Zee)

Why would she write me that email? What does she have against me?

SHELLEY

(to Katie)

I don't have anything against her.

ABBY

(to Zee)

I had to have done something to her, right? You'd think.

SHELLEY

(beat, to Katie)

Honestly? She doesn't have the- at this level... she... she's too young. And this conference is too important.

Shelley and Abby melt back into the tableau without acknowledging each other.

Rosalie, back in the deep end of the dating pool.

ROSALIE

(to Kendrick)

I can't keep going on about-

(beat)

Uh, well, if you really want-

(beat)

You're kind. Far kinder than I... the conference? You've heard of it?

(beat, nods)

That's a decent summary. I know it was in the paper, online. But you got it right, for the most part.

(beat)

It was a conference to determine a major course of human history -- whether or not the United States should enact mandatory genome sequencing of every newborn in the country. I'm not a scientist. I'm a high school history teacher and cross country coach. I'm an average American with a whole lot of skin in the game.

(beat)

You're my first date in a looooooong time.

(smiles, steeling herself for what comes next)

My oldest son, Santiago, he's ten now, he would come to practices with me until his younger brother was born. At that point, he stayed home a lot more. He loved being my little coach assistant on the track, he was, uh, he was a fast runner, but he loved being a big brother a lot more. Santiago has, uh, he has ALD. Have you heard of that?

(MORE)

ROSALIE (CONT'D)

(her date hasn't)

Well, our genetic counselor explained that it's a genetic disease that destroys myelin, which is this shield that protects our brain's neurons. Santiago, uh, he got headaches, nagging migraines and we'd tried, well, we tried a lot. He began having vision problems. His MRI revealed brain lesions, and that was that. He was nine when we discovered it. It had progressed too far for him to have a stem cell transplant, though, so...

(switching gears quickly)

Seven states in the U.S. screen newborns for ALD. Here in Oklahoma we don't screen for it. So yeah... skin in the game.

(beat)

I don't... it's so damn tough and hope is hard to hang onto... I'd like to be strong, and I know that I am, but... I'm tired. I'm just... I'm tired.

(beat)

You're a librarian, you said? Tell me more about that, please.

Shelley, from where she stands, takes a phone call.

SHELLEY

This is Dr. Landekker.

(to Katie)

And that was the phone call; the one you get where you're simultaneously anxiety-ridden and invigorated. An NIH grantor, straight out of NIH Director Francis Collins' office. My team... soon you'll be on that team, that's why I want you prepared. My team and I have been working off a grant for about three years now, a grant covering our focus on NGM, newborn genome mapping. It's been quite successful. The other group leaders are coming together in a couple weeks at the conference and presenting their work. Well, they're exploring tangential aspects of NGM: genotype tissue expression, phenotypes and exposures, and archiving genomic records.

(beat)

Katie, this conference is, well, it's the big one. We'll come together and NIH wants us to determine if it's ethically sound to require newborn genome sequencing. Not just targeted sequencing for symptomatic infants--every child born in the United States will have their genomic secrets unlocked. And that... well, I think that's exciting. Don't you?

The stage SHIFTS. We're in a new location, and the conference is beginning to appear all around us.

We end up at RADY CHILDREN'S HOSPITAL, San Diego, California. People on stage overlap with images of patients.

SHELLEY (cont'd)

The conference is being held at Rady Children's Hospital in San Diego, California.

ROSALIE

(to Kendrick)

Okay. But, I still want to, ah, I want to hear about your work. I like Dewey Decimals and microfiche. Remember that?

(laughs)

We, ah, travelled to Rady Children's Hospital in San Diego for Santiago's treatment. Back when they thought something might still be done. They were trying whatever they could. This was about, five, six months ago. August? We're in August now?

(disarming laugh)

I can't keep track.

(smiles)

Thanks. I like your smile too.

(inhales)

The conference happened while we were there. I didn't know that then. I was, ah, focused on Santi.

Rosalie moves to sit beside an empty hospital bed at Rady Children's. She stays focused on it. She's out of the date and fully back at Rady Children's with her son.

TWO. RECESSIVE ALLELE/NON-MALEFICENCE

RADY CHILDREN'S HOSPITAL. PATIENT ROOM AND CONFERENCE ROOM.

Throughout the entirety of this scene, Rosalie goes about caring for her bed-ridden son. She leaves the room periodically, returns with food, sleeps next to his bed, etc. She'll break out of this near the completion of the scene.

ABBY

(to Zee)

Those of us who knew one another reconnected fondly.

Valverde motions to Abby.

VALVERDE

Should I get you a cup of coffee? You still pack in the sugar?

ABBY

No, I did it for that one summer session we had.

VALVERDE

The... insurance for-?

ABBY

The one to determine insurance augmentation for your ancestry product.

VALVERDE

Yeah, yeah. You drank a shit-load of coffee during that.

ABBY

Yes well, that wrecked me. I stopped drinking caffeine after that. My oldest daughter started. Thanks anyway.

(back to Zee)

We really are friends. We've been to a bar, twice, to meet because of its proximity to work. No, I didn't drink. It's fun to order water at a bar. We're just not the kind who go out on the weekend to have, I don't know, ice cream or something.

SEIDLER

(spying Shelley)

Are we going to start soon? This thing was-

SHELLEY

-Slow down-

SEIDLER

-supposed to kick off at-

SHELLEY

We're all-

SEIDLER

Hi Shelley.

SHELLEY

Hi.

SEIDLER

I have to get back to New York tonight for-

SHELLEY

You gave us the entire day.

SEIDLER

For the day, with the implication being that the night belonged to me.

SHELLEY

Oh, I see. You've never done one of these before.

SEIDLER

Smartass. No, I-

SHELLEY

You thought we'd let you come in, drop some knowledge, dictate policy guidelines, and scoot.

SEIDLER

No, I'd never presume...

(off her look)

Fine. That's exactly what I thought. It's courtesy.

SHELLEY

So is staying for the session until we've finished. We're scheduled until 5.

SEIDLER

We may finish early.

SHELLEY

Sure.

Waves at Janice.

SEIDLER

Hi Janice!

Janice heads over.

JANICE

Hello Evan. Hello Shelley.

She hugs Shelley. Seidler extends his hand for a shake, but Janice gives him a hug.

JANICE (cont'd)

Oh come on, Evan.

SEIDLER

Good to see you.

JANICE

You too. Are you staying for the whole session? You tend to run out early on these things.

Seidler and Shelley exchange a look.

SEIDLER

I have to be back on the East Coast tonight, but I might be able to-

JANICE

Good. This is a big one, and we need you here.

Anje and Devin grab coffee just as Valverde heads off to talk to Abby.

DEVIN

It's odd.

ANJE

(stirring her coffee)

What?

DEVIN

Just, you know, the cliques.

ANJE

We have ours. You and me.

DEVIN

Yeah but, we're...

ANJE

I know what you mean.

DEVIN

It's like I'm some average schmuck butting into a jam session of U2, Aretha Franklin, and...

ANJE

Michael Bublé.

(off his look)

I'm casting Seidler as Bublé.

DEVIN

Ah. Yeah. It's like, "Hi music icons! I'm ready to jam! I brought spoons."

ANJE

You can jam with spoons.

She mimes slapping the spoons on her thigh and imitates the noise.

ANJE (cont'd)

You're not out of place. You're here for a reason.

DEVIN

Yes, because I work for you.

ANJE

With me.

DEVIN

Sure, Anje. Sure. Valverde just nodded at me, and I've read all their stuff. I submitted my DNA sample to Gene One and-

ANJE

I know.

(beat)

They lost it, right?

DEVIN

Yeah, or it became contaminated when I mailed it in. I forget what form letter I got. I emailed Valverde and they hooked me up with a new one.

ANJE

Ah.

DEVIN

Not gonna ask me the results?

ANJE

No. That's your business.

DEVIN

Okay. So, I've communicated with these people, but I don't know them.

(pointing across)

Dr. Landekker and I worked together for five months and I never got to know her.

ANJE

Well, we don't get to really know anybody at work, do we? I mean, we work. That's what we do. Then we go home.

DEVIN

You wanna watch a movie tonight? I know you don't like them, but I found-

ANJE

I'm so tired. Aren't you?

DEVIN

Sure. But let's finally watch a movie together. Or we can, you know, platonically, grab a bite somewhere.

ANJE

I'm- I'm welding tonight.

DEVIN

You've used that on me at least twice before.

ANJE

It's real.

DEVIN

No.

ANJE

Yeah.

DEVIN

... I had no idea that was a serious thing. But you- you're serious.

ANJE

Yes.

DEVIN

Okay.

(beat)

What are you welding?

ANJE

An arbor for my front yard.

DEVIN

Cool.

Everyone shifts and moves quickly into seats around an oval conference table.

ABBY

(to Zee)

Shelley and I didn't say hello to one another. We seemed to find reasons to talk to people on opposite ends of the room. That's on me as much as it is on her. I know! It's not who I am at all.

(shakes her head, back in the recollection)

Here's how this usually goes: Each group works on a certain aspect of an umbrella NIH grant, they present in front of the larger group, and then it's opened up to debate, questions, or a consensus recommendation.

SHELLEY

(to Katie)

This one worked a little differently. As policy influencers, we needed to focus our scope on newborn sequencing. I was optimistic we could stick to an agenda. We'd have a bit of discourse, then move on to the next topic.

VALVERDE

(to Tatiana)

That lofty idea went ass-up just before the fourth hour.

SEIDLER

(to Leonore)

The first three and a half hours or so were wonderful. There was such optimism for this idea. I thought I'd be back in New York before you even got home from work. Shelley's presentation was clear, if a bit dry. I initiated conversation on the benefit to an entire family if a newborn is sequenced.

We're into the conference. Food has been consumed, and remnants of the repast lie scattered about. The mood is upbeat- everyone enthused to contribute.

We get images of dry data: lots of numbers and statistics, black text on white bgs. Every so often we get a limited Flash-style animation circa 2000.

SEIDLER (cont'd)

(to the group)

I want to address Shelley's point about- nice presentation, Shelley -

SHELLEY

Thank you, Evan. My team added the animation to make it a bit more entertaining.

SEIDLER

(biting his tongue)

Yes.

(shifting back on course)

So, to the point of the immediate benefits to family members: in the waning months of the Human Genome Project, mid 2002 or so, we'd positively identified this idea of long-term, wide-reaching benefit for not just the patient but the patient's family. We began to think of the family as a single unit rather than a collection of genetically similar individuals. This family unit could encompass hundreds of beings with like genetic material. When you perceive them as a single unit it, I tell you, it shifted my perspective. Personalized medicine that can lead to further targeting. But you have to have the information, and that information can only come through sequencing.

SHELLEY

Yes! You keep looping around to the same point, but yes- a newborn in the NICU should be sequenced. That information should be shared with the parents-

ABBY

But relayed via a certified genetic counselor. They have to know their options regarding the information.

SHELLEY

(quickly, dismissive)

That's the presupposition.

ABBY

But we're talking about all infants, not just those in the NICU.

SHELLEY

(off-course)

I was talking about... ah, yes. Yes. It's incumbent on the parents to distribute that information to their family members to create actionable-

ABBY

Well, to distribute the information and follow up with-

SHELLEY

Please let me finish. My team included Diane Paul's work with PKU. PKU, highly heritable, but providing the information to a family following a screening can make a huge impact.

VALVERDE

We've seen it. I mean, Massachusetts knew the value of mandatory PKU screening when they became the first state to implement it. It has saved lives since then-

SHELLEY

1963.

ABBY

'64?

SEIDLER

1963.

VALVERDE

Yes, that was the date. It's saved lives since then and it has continued to do so.

ABBY

Well, that's not a direct parallel. Every newborn is tested for PKU. When we're talking about non-targeted, genome-wide sequencing, on healthy babies as well as the sick ones, we need to consider-

VALVERDE

You're right. But at present we're discussing the value in-

ABBY

I understand.

SHELLEY

(to Janice)

You're quiet.

JANICE

I'm cautiously optimistic.

SHELLEY

No surprise there.

JANICE

It's early. Give me till lunch and I might flip.

(smile)

You all know me, or at least my work... I've expressed my skepticism for whole genome sequencing, but-

ANJE

I read a quote by you in Wired. You were more than skeptical.

JANICE

True. I was quite vocal. But I'm- well, I'm cautiously optimistic. But it *is* early.

SHELLEY

Well, let's go around and, right now, let's look at the family benefit through our own lens. Janice?

JANICE

I have a big family.

SHELLEY

Exactly.

ABBY

Exactly what? Each individual in the family should be permitted to determine whether or not they want that information, that burden of knowledge. I know that's how you feel, Janice.

JANICE

You have... two children?

ABBY

I do. One daughter, one son.

JANICE

I don't have any children, but my husband has two from his first marriage, and one from his second. I think of them as my kids, though.

DEVIN

I don't have any children.

All look at him.

DEVIN (cont'd)

I don't.

(quietly, to Anje)

You can't jam with spoons.

JANICE

(smiles, then continues)

It's fascinating to me that my younger step-child is more health-conscious than her older half-siblings. Neither of them are particularly interested in being genotyped, or any kind of personalized health for that matter. What's good for the goose is good for the gander. But my youngest has been genotyped-

VALVERDE

Genotyped by Gene One?

JANICE

No.

VALVERDE

Well, shit.

JANICE

(smiling)

Veritas Genetics. She's nineteen. She does what she wants. But after being typed she wanted Virgil to get his done immediately. She called her mother, her cousins, and her Grandmother on Virgil's side, asking them to be typed.

SHELLEY

And they all refused.

JANICE

(a laugh)

All but two of them. And Virgil and I were proud of them for refusing. My youngest can be aggressive, to say the least, and the choice to be typed should be deeply personal.

ANJE

This brings up an interesting point.

(quickly)

Sorry to interrupt you, Janice. We're talking about reading the whole book with sequencing. You're using genotyping as an example, but we know that's just like reading one word in the middle of each chapter and claiming you know what the book's about.

JANICE

An important word. One that could unlock the rest of the story.

ABBY

"Could" being the operative word.

JANICE

Yes. But let me get back to...

(gesturing)

Shelley and Valverde know, my ancestry... I wanted to know as soon as tests became available. I've used Helix, 23andMe, Veritas-

(pointedly)

-and Gene One. I know who I am, I know my health highway but, see, my brother won't get typed.

ANJE

Privacy?

JANICE

Yes, that and information storage concerns. But Dillon... that kid knew the benefit of knowledge and bless her, she wanted to know everything. She'll do a whole genome sequence soon through ABM.

ABBY

At a cost of what? \$1600?

JANICE

I'm not sure.

SEIDLER

(to Janice)

Now imagine if she'd had that knowledge from birth. If Virgil had it!

JANICE

Well, very few things were actionable, but-

SEIDLER

Actionable or not, knowledge builds the foundation of understanding. And future action.

SHELLEY

That it does.

ABBY

The issue of privacy. I want to explore the-

SHELLEY

We can get into that when Valverde presents.

Abby nods.

SEIDLER

You love your agendas.

SHELLEY

I love sticking to the plan.

ABBY

(beat)

Me too.

(back to Zee)

First thing in common. Beyond, you know, our reason for being at the conference.

(MORE)

ABBY (CONT'D)

(to the room)

We've all, I think, worked directly with cases where a genome sequencing, even a genotyping, for one patient helped another in the family unit. For me it was the Torino family in Wisconsin. Their little boy, Wayne, at about a week old, was nearly blue, had uncontrollable seizures-

ANJE

Pyridoxine-dependent epilepsy. I remember it.

SHELLEY

You remember a lot.

DEVIN

Photographic memory.

Shelley laughs.

DEVIN (cont'd)

Really.

ABBY

Yes. They asked for a miracle, wanted DNA sequencing to determine what was wrong, were denied initially-

SEIDLER

You came in, advocated for the family, saved the boy. I remember it too. My memory is less photographic than Anje's. It's more of-

SHELLEY

Here comes the pun.

SEIDLER

What? I wasn't going to...

(to Leonore)

I was, Leonore. You know me. But it was going to reference darkrooms and developing, so...

(back to Abby)

Please continue, Abby.

ABBY

Well, I advocated for the test, yes. But that's not the point of it. His mother's sister gave birth to his cousin less than a year later in, Provo Utah, I think it was... yes, Provo. Her child, against the odds, exhibited the same symptoms, but thanks to Wayne, his mother asked to have him sequenced, the disease was identified and treated, and both spent this past winter at a cabin. Playing in the snow, living their lives. Doing cousin stuff.

The characters shift into different positions around the room. Most at the table, but others replenishing their coffee and food plates. Anje and Devin move to the front.

ANJE

(to Asako)

We continued on this track, for a bit. There was, for the most part, a consensus on the benefit to families. Devin and I were up. We ran our presentation on sequencing technologies-

DEVIN

(speaking to the group)

-and let's say the Oxford Nanopore sequencer is only the beginning. It's a pocket-sized sequencer now, but say the cost comes down considerably in the next year or so, it gets even smaller, and the public is able to sequence large chunks of their own DNA themselves. That's a very cool prospect.

ANJE

(to Asako)

-and Devin didn't start humming, incredibly. Between our presentation and Shelley's and the ensuing discussions, we'd only taken about three hours. The issue of cost and access to genotyping met with general agreement.

JANICE

I generally agree that we need to make it more affordable, but that also ties in to the U.S. medical system as a whole-

ABBY

Which is part of my presentation.

SEIDLER

And mine. At this rate we'll all be home shortly after lunch.

ANJE

(back to Asako)

Which is what we all thought. Abby closed that door toward the end of Evan Seidler's presentation on sequencing costs to both the consumer and the state.

Seidler moves to the front, miming a presentation in a slow, stylized fashion. Most of the group are attentive. Something is sticking in Abby's craw, however. Seidler turns to point something out on his projection.

SEIDLER

-and our focus group, aside from privacy issues, commented that sequencing paid for by their providers could lead to a lack of insurability, though they conceded the necessity of-

ABBY

Earlier you said the technology needed to be more affordable, or, ah-

SEIDLER

Accessible.

SHELLEY

Abby, we should-

ABBY

Yeah. But that's the trick, isn't it? This is what we talk about with medical insurance in this country. Accessibility is not affordability.

SEIDLER

No, it's not. But applicable to-

ABBY

And working off the current system, I don't see how this technology will ever be affordable, truly, or fully covered, unless a system of single-payer or some kind of universal healthcare becomes prevalent.

SEIDLER

Socialized medicine.

ABBY

Sure.

SEIDLER

That's a whole other ballgame. Let me get back to you-

ABBY

I understand but I-

SHELLEY

Evan, you were saying about sequencing costs borne by-

SEIDLER

It doesn't work, Abby. That's the problem.

ABBY

What? Socialized medicine?

SEIDLER

Yes. It doesn't work.

ABBY

Except in Canada-

SEIDLER

Single payer.

ABBY

Sweden, Finland, Japan-

SEIDLER

Same.

ABBY

Right. Single payer *is* socialized in the sense of universal healthcare , but-

SEIDLER

It's a different structure than, say-

ABBY

New Zealand, Two Tier. Israel-

SEIDLER

Health insurance tax, so basically, paying for-

ABBY

We're debating semantics of socialized medicine. You understand what I'm saying, but you're-

SEIDLER

Okay, okay. So let's say, Abby, let's say this country suddenly changes to, I'll give you single payer, a single payer system. And it contracts healthcare from private organizations. Contracts sequencing technology.

ABBY

Okay.

SEIDLER

One of these private organizations is Illumina.

ABBY

Okay. They'd be government regulated, as they are now, but they'd be one of many companies consumers will have under their government-sponsored plan, a plan they pay into with taxes. What are we debating?

SEIDLER

I don't see socialized medicine, any form of it, functioning like that when it comes to whole genome sequencing. This isn't genotyping.

SHELLEY

Right. It's whole genome sequencing and it's going to get cheaper, but before we can recommend mandatory sequencing for every newborn, we have to figure out how those who can't pay for it will still receive it.

SEIDLER

Insurance.

ABBY

What level?

SEIDLER

They'll have access to the testing they need.

ABBY

Who pays for it?

SHELLEY

I'm with Abby on this point. The onus of payment is unclear.

ABBY

(to Zee)

That shocked the shit out of me. She seemed gung-ho for mandatory testing prior to the conference, and during the first few presentations. I pressed my luck.

(back to the room)

Who pays for it?

SEIDLER

The patient does.

ABBY

And if they can't?

SEIDLER

They'll still- it's still accessible. The Human Genome Project spent 13 years of computing power to the tune of 12.7 billion dollars, to sequence the genome. Now it can be done in a day for a thousand bucks. Two years from now? It'll be less than a hundred bucks. We have to assume all people will be able to pay for it.

JANICE

But, Evan, they can't. We can't make that assumption on their behalf.

SEIDLER

Individual insurance companies will cover it, but free enterprise demands that they create their own parameters. It's not up to the government.

ANJE

Then it shouldn't be up to the government to impose mandatory, whole-genome sequencing of newborns on family units. Based on this model.

VALVERDE

I would have concerns if the current marketplace model remains after a newborn genome screening was imposed. Gene One would have to reevaluate its position as a direct-to-consumer company. We'd be phased out eventually.

DEVIN

Or you'd be absorbed into the system.

VALVERDE

That could happen.

DEVIN

Go international.

VALVERDE

We are.

DEVIN

But the impact on your U.S. profits-

VALVERDE

-We'd take a hit, yes.

SEIDLER

Okay. I can grant you a single-payer system could function better for these purposes than what we currently have. But no patient can currently be denied care, and I'd propose we extend those provisions-

SHELLEY

No, that wouldn't work.

SEIDLER

We have private and public hospitals, right? Private hospitals can turn patients away in a non-emergency, so we implement mandatory testing at public hospitals and medical facilities only.

ABBY

Patients can't be turned away, they'll receive treatment, and then they'll receive a hefty bill, which they can't pay.

SEIDLER

They still have access to-

ABBY

Access! Jesus! Can you please stop-

SEIDLER

We're talking access, Abby. That's what it is. The idea of it falls in line with "do no harm."

ABBY

Yet harm is what could happen if people are unable to pay. We'd need a form of universal healthcare that doesn't ask for a genetic profile yet provides one at birth.

A beat.

SHELLEY

(looking at her watch)

Let's take a break. It's well after lunchtime.

ABBY

No, I'd like to continue.

SHELLEY

I think we've hit a wall with-

ABBY

Show of hands if you think the issue of affordability dampens prospects for a recommendation to NIH of "yes."

They all raise their hands except for Seidler and Shelley. Shelley locks eyes with Abby. She's not thrilled with the aggression, but she has to agree. She raises her hand after a beat. Seidler sighs and raises his hand. They freeze briefly.

Rosalie puts a hand on the bed, whispering a silent prayer. She exits the room and looks forward. The scene behind her shifts.

ROSALIE

(to Kendrick)

I walked into the next building across from Santiago's ward. They have a Subway sandwich shop. The last time I ate Subway, several years ago, I puked it up. I've had an aversion ever since. Sorry for that image.

(beat)

But I'd been in Santiago's room for nine hours. I had a few more hours before I needed to pick up Brandon. I was craving a meatball sub.

She moves with her food to a table.

ABBY

(to Zee)

We all scattered for a bit. There was lunch available in the room, sandwiches and soup, but I didn't want to stay in the room, so I made my way out to the foyer. We were up on the third floor and had unobstructed views of Rady Children's.

(crossing DS)

I looked out the wide windows into the building across the way. I saw this woman at a corner table. She was eating a... well, not eating. Holding. She was holding a sandwich, looking out the window. She seemed anguished. I wondered if she was a mother, a family member of a sick child. What was wrong with her child? How long had she been in the facility?

(beat)

Maybe she was an employee.

SHELLEY

(to Katie)

I'd had enough of Evan barking in my ear, so I made an excuse to exit the room. He barks. You'll discover that when you work together. We were on an official break, but everyone was staying inside. I overheard Devin explaining to Janice his latest iPSC breakthroughs... that kid is damn good. I always thought so. His singing was even endearing, to a point. Not sure why he left my lab.

(beat)

I walked around the corner from the conference room, they have comfortable chairs and sofas, you know?