# Understanding the impact of regression in children, adolescents, and young adults with Down Syndrome Regression Disorder (DSRD)

Robert Kitchin, Susan Wiley MD, Emily Hoffman

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## Background

- Down Syndrome Regression Disorder (DSRD) is a recently recognized problem with significant health and wellness impact.
- DSRD can cause a loss of numerous skills including language skills, self-help skills such as independent toileting and self-dressing, and a marked decline in academic skills.
- When regression occurs, the cause is often undetermined, and treatment plans are inconsistent.
- DSRD significantly impacts the quality of life of both the individual with Down syndrome (DS) and their caregiver(s). Thus, an understanding of its impact is critical to treatment.
- Many priorities from caregivers are not fully evaluated with current testing batteries.

## Purpose

- To understand family experiences among caregivers of children, adolescents, and young adults with DS who have experienced regression.
- To generate domains of functioning based on caregiver report that can be used to evaluate change with treatment for DSRD.

## Methods

- Children, adolescents, and young adults with DS ages 10-34 were identified through an EMR query for DSRD.
- Identified patients' charts were reviewed to ensure inclusion criteria were met.
- Structured interviews with parents of individuals with DSRD were conducted and transcribed for thematic analysis.
- Interview questions included general experiences around the child's regression, skills lost in specific domains, experiences with treatment, and the impact of regression on both the child and their family

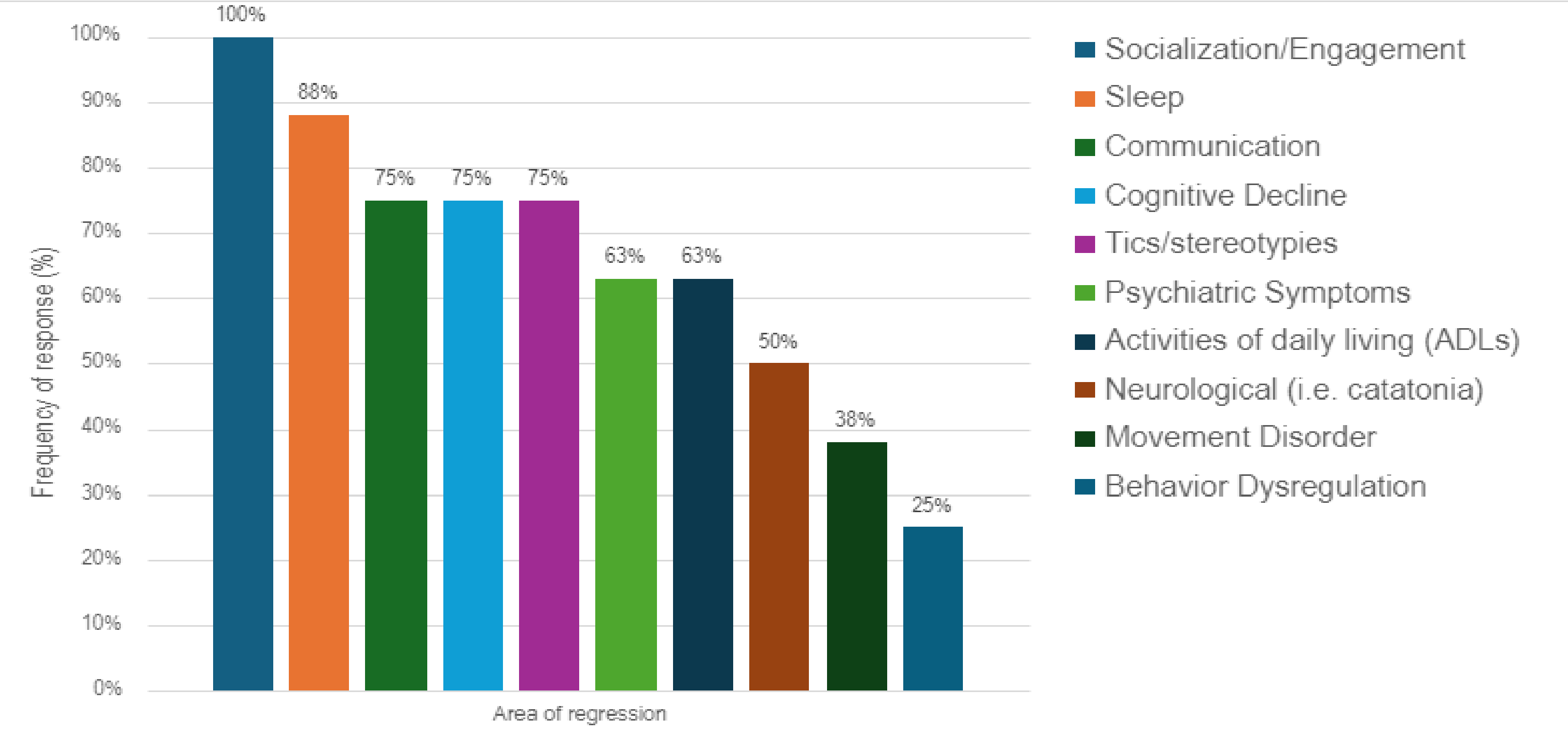
## Participants vs. Non-participants

| | Participants | Non-participants |
|---|---|---|
| **Median age at time of study (range)** | 13 years<br>(10-34 years) | 17 years<br>(12-26 years) |
| **Median age at regression (range)** | 9 years<br>(7-33 years) | 11 years<br>(5-22 years) |
| **Race N (%)** | 88% White (n=7)<br>12% Hispanic (n=1) | 100% White (n=5) |
| **Insurance N (%)** | 75% Private (n=6)<br>25% Public (n=2) | Private: 1 (20%)<br>Public: 4 (80%) |
| **Diagnostic work-up N (%)** | 88% Neurology (n=7)<br>50% Psychiatry (n=4) | 100% Neurology (n=5)<br>60% Psychiatry (n=3) |
| **Treatment N (%)** | 75% Antidepressants n=6<br>63% IVIG n=5<br>50% Benzodiazepines n=4<br>38% Steroids n=3<br>25% Anticonvulsants n-2<br>25% ECT n=2<br>13% Diet change n=2<br>13% NMDA RA: n=1<br>13% Stimulants: n=1 | 80% Antidepressants n=4<br>20% IVIG n=1<br>20% Antiadrenergic n=2<br>20% Anticonvulsant n=1<br>20% Antipsychotic n=1 |

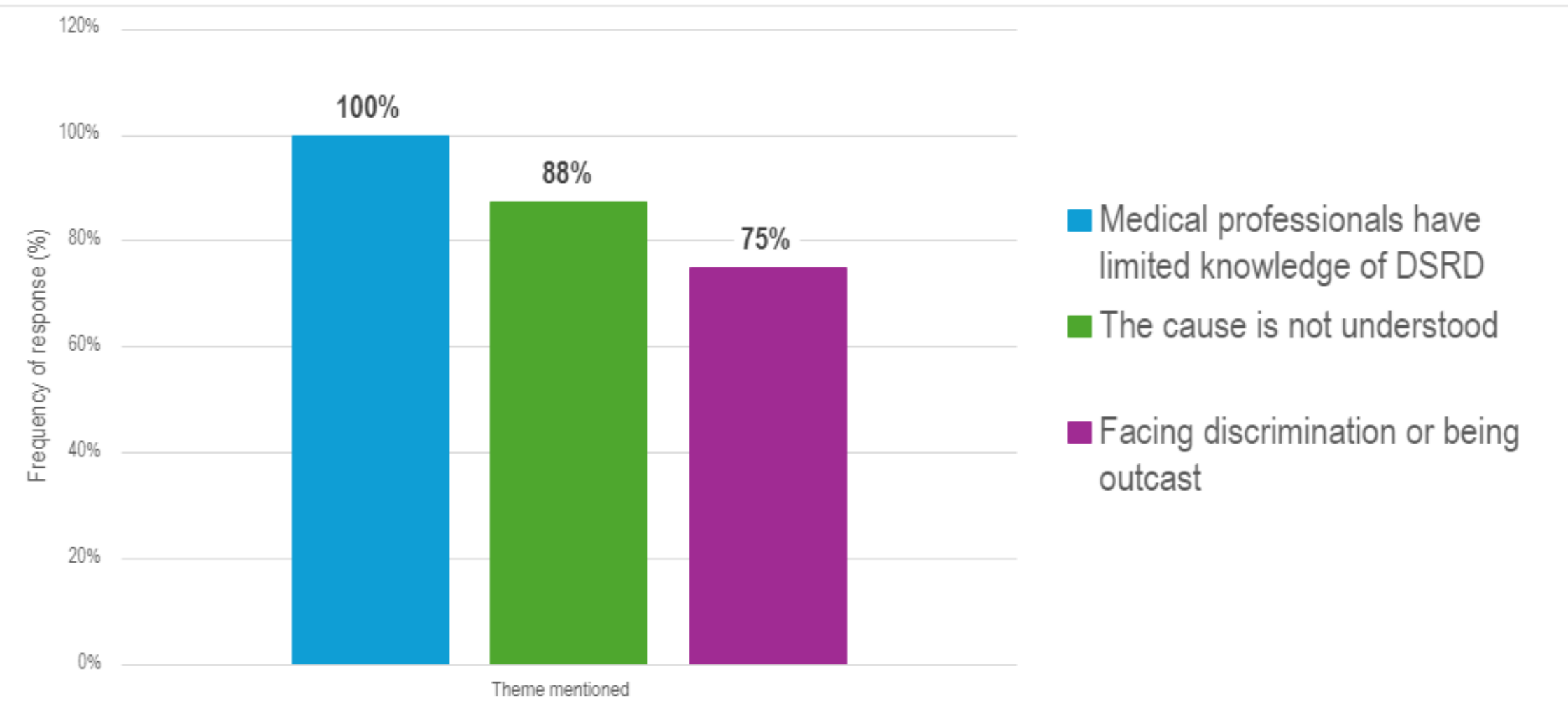
## Patient Characteristics

| Patient | Areas of regression | Diagnostic findings | Treatment | Response |
|---|---|---|---|---|
| 1 | Socialization/engagement, sleep, communication, cognitive decline, tics/stereotypies, toileting, confusion. **Minor criteria met** | Potential catatonia, bradycardia on EKG<br>**Abnormal lab results**: elevated TPO antibodies | Escitalopram, lorazepam, diet change | Improved engagement |
| 2 | Socialization/engagement, sleep, communication, cognitive decline, tics/stereotypies, toileting, confusion. **Minor criteria met** | Abnormal EEG | IVIG, oxcarbazepine, diet change | IVIG improved engagement, ADLs, cognition, and socialization |
| 3 | Socialization/engagement, sleep, communication, cognitive decline, tics/stereotypies, movement disorder. **Minor criteria met** | Hypothyroidism<br>**Abnormal lab results**: elevated TSH, elevated lipoprotein, elevated vitamin B12 | Citalopram, sertraline, trazodone, IVIG | Trazodone improved sleep<br>IVIG improved engagement, communication, and cognition but not to baseline |
| 4 | Socialization/engagement, sleep, tics/stereotypies, hallucinations, neurological deficit, confusion, movement disorder. **Major criteria met** | Potential catatonia, Hashimoto's encephalopathy, hypothyroidism<br>**Abnormal lab results**: elevated TSH, elevated TPO antibodies, elevated TG antibodies | Escitalopram, IVIG, lorazepam, prednisone | IVIG improved all symptoms greatly but not to baseline |
| 5 | Socialization/engagement, sleep, communication, cognitive decline, aggression/agitation, inappropriate laughter. **Major criteria met** | Catatonia | Escitalopram, lorazepam, ECT, risperidone, multiple stimulants | Improved engagement, communication, cognition, and behavior |
| 6 | Socialization/engagement, sleep, communication, cognitive decline, tics/stereotypies, aggression/agitation, depression, toileting. **Minor criteria met** | Autism spectrum disorder, catatonia, autoimmune encephalitis, Landau-Kleffner syndrome<br>**Abnormal lab results**: elevated C-Reactive protein, elevated prolactin, elevated vitamin B12 | Escitalopram, citalopram, IVIG, lorazepam, prednisone, risperidone, ECT, multiple anticonvulsants, memantine | Improvements in engagement, communication, stimming, and ADLs |
| 7 | Socialization/engagement, cognitive decline, anxiety, obsessive tendencies. **Minor criteria met** | Autism spectrum disorder, autoimmune encephalitis, hypothyroidism | Steroid burst with taper | Improvements in engagement and rigidity |
| 8 | Socialization/engagement, sleep, communication, cognitive decline, tics/stereotypies, aggression/agitation, self-feeding, neurological deficit, movement disorder. **Major criteria met** | Positive MOG<br>**Abnormal lab results**: elevated TSH | Escitalopram, IVIG | Improvements in communication, cognition, behavior, stimming, obsession, and movement |

## Results: Priorities for treatment



## Results: Themes from interviews



### Medical professionals have limited knowledge of DSRD

**Doctors are not aware of DSRD**

"No doctors in our area could help us whatsoever. Nobody knew anything." - Caregiver 1

**Doctors are dismissive of DSRD**

"This could happen to anyone and [doctors are] labeling it Down syndrome." - Caregiver 4

Every caregiver (n=8) has mentioned a barrier in accessing care due to limited medical knowledge of DSRD. This reflects the need for an increased understanding of DSRD.

### The cause of DSRD is not understood

"Okay, she had a regression, but what happened? We don't even know what triggered it." - Caregiver 2

88% of caregivers (n=7) have mentioned difficulties understanding the cause of their child's regression, serving as a call for more research to be completed.

### Facing discrimination or being outcast

**Within the DS community**

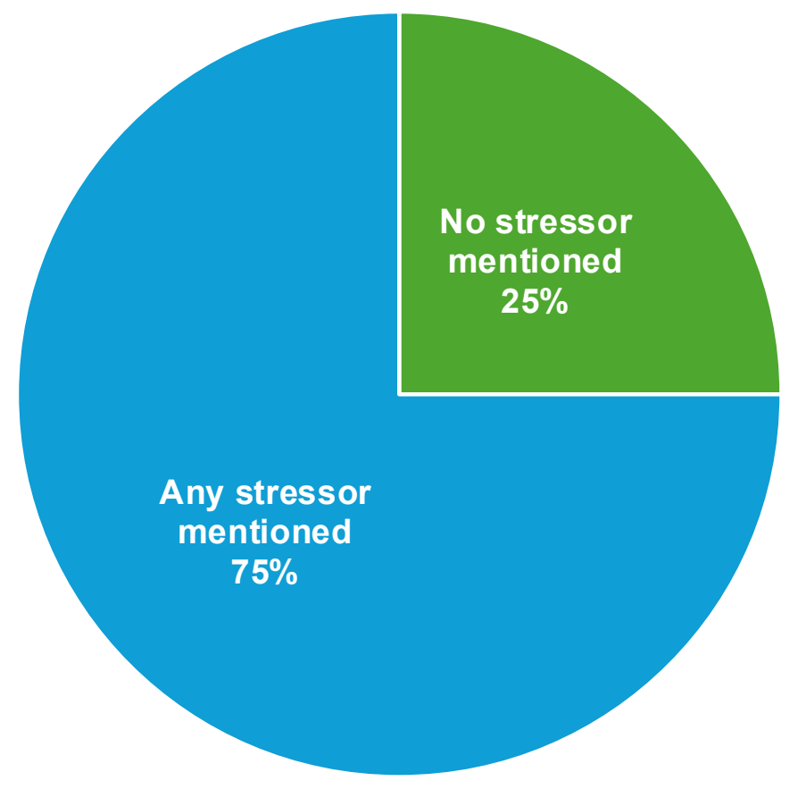
"You know that they are calling you [a quack] as a parent." - Caregiver 7

**From outside the DS community**

"Nobody had anything to say besides, well, this is just Down syndrome." - Caregiver 7

75% of caregivers (n=6) have faced discrimination from within and/or outside the DS community. Such experiences emphasize the low awareness surrounding DSRD.

## Results: Stressors preceding regression



**75% of individuals (n=6) have experienced a psychosocial stressor preceding regression.**

- 33% COVID-19 pandemic (n=4), 25% changes at school (n=3), 25% severe illness (n=3), 8% traumatic event (n=1), 8% puberty (n-1)

## Advice and words from caregivers

88% of caregivers (n=7) have mentioned that their child's regression caused an inability of their family to function as previously able. Their stories are integral to painting a complete picture of DSRD.

"I just felt like we were losing our daughter. She was not in this world, not connecting at all." - Caregiver 4

"I have dreams that he'll talk to me... I'll always have hope for my child." - Caregiver 3

"I have dedicated my whole life to find therapy for her." - Caregiver 7

Advice to medical professionals:
DSRD is not "just Down syndrome."

Advice to other parents:
Do all of the workup steps because it takes so much time

## Conclusions

- When a child, adolescent, or young adult with Down syndrome experiences regression, the effects are felt by the individual, family, and community.
- Domains of functioning to be used to evaluate change with treatment for DSRD: socialization/engagement, sleep, communication, cognition, psychiatric symptoms, ADLs, neurological functions, movement, and behavior.
- Common themes from interviews include: (1) medical professionals have limited knowledge of DSRD, (2) the cause of DSRD is not understood, and (3) facing discrimination or being outcast
  - In caring for these patients and their families, these ideas must be forefront in a medical professional's mind to aid in understanding what they are going through and identify supports and resources.
  - Continued research on DSRD is necessary for increasing awareness among providers.
- Families frequently describe difficulties determining if treatment is helping and how frequently treatment should occur as well as the best duration of treatment, suggesting the importance of defining treatment protocols and durations of treatment.
- The experiences of these families are paramount in understanding DSRD and providing care to those affected.

## Limitations

- Small sample size, highly knowledgeable parents
- Not all subjects met full diagnostic criteria for DSRD
- Missing families with limited knowledge about DSRD

## Acknowledgments

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- Research Team

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