

# Survey of Ototoxicity Monitoring Practices in VA

## Development Plan

Rachel Polaski

Trisha Milnes, Au.D

Jake Hulswit, BS

Dawn Konrad-Martin, Ph.D

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# Keeping it legal

- The information presented and the opinions expressed herein are those of the authors and do not necessarily reflect the position or policy of the Department of Veterans Affairs, Department of Defense, or the United States government
- The authors have no financial conflicts of interest
- Dawn Konrad-Martin, PhD, is listed as co-inventor on two U.S. patents involving equipment and methods for screening hearing for ototoxicity

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# Introductions

**Rachel Polaski**

Rachel.Polaski@va.gov



**Trisha Milnes, AuD**

Trisha.Milnes@va.gov



**Jake Hulswit, BS**

Jacob.Hulswit@va.gov



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# Thank You

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# Outline

1. Background
2. Survey and interview plans
3. Clinician's perspective
  - Service gaps, barriers and solutions
4. Patient's perspective
  - Patient journey map
  - Patient voices
5. Takeaways + toolkit

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# Who is at Risk: Patient Populations

## Oncology

### Cancer

- Cisplatin
- Carboplatin at high doses
- Oxaliplatin when other ototoxic drugs given



## Pulmonology

### Cystic Fibrosis

- Congenital disease causing frequent lung infections
- IV-AGs tobramycin, gentamicin, amikacin

### COVID-19



## Infectious Disease

### Sepsis

- NICU infants
- Gram negative bacterial infections (MRSA)
- IV-AGs at high doses



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# Who is at Risk: Ototoxic Medications

## Antineoplastic Drugs

\*Cisplatin  
\*Carboplatin  
Oxaliplatin  
Nitrogen mustard  
Methotrexate  
Vincristine  
Dactinomycin  
Bleomycin

## Aminoglycosides

\*Gentamicin  
Neomycin  
\*Kanamycin  
\*Amikacin  
Streptomycin  
\*Tobramycin  
Netilmicin

## Loop Diuretics

Furosemide  
Ethacrynic Acid  
Bumetanide



## Other Antibiotics

Vancomycin  
Erythromycin

## Antimalarial Drugs

Quinine  
Chloroquine  
Cinchona alkaloids

## Salicylates

Aspirin/ Naproxen  
Etocolac/ Piroxicam

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*\*Commonly used highly ototoxic drugs*

# Incidence of Cancer and Platinum-related Ototoxicity

- 1 in 3 adults will get cancer within their lifetime
- Platinum compounds are used in about 40% of all chemotherapy in adults
  - Following cisplatin chemotherapy 40-80% of patients experience ototoxicity
  - 20% of those treated with high-dose carboplatin experience ototoxicity
  - Oxaliplatin is uncommon, but for some individuals it can cause severe ototoxicity

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Knight et al., *J Clin Oncol*, 2005; Qaddoumi et al., *J Clin Oncol*, 2012; Landier et al., *J Clin Oncol*, 2014; Frisina et al., *J Clin Oncol*, 2016; Miaskowki et al., *J Cancer Surviv*, 2018

# Incidence of Cancer and Platinum-related Ototoxicity

- Study of 609 cancer survivors treated with neurotoxic therapies (platinum or taxane compounds)
- Evaluated Chemotherapy Induced Neuropathy (CIN), hearing loss, tinnitus, and Quality of Life (QoL)

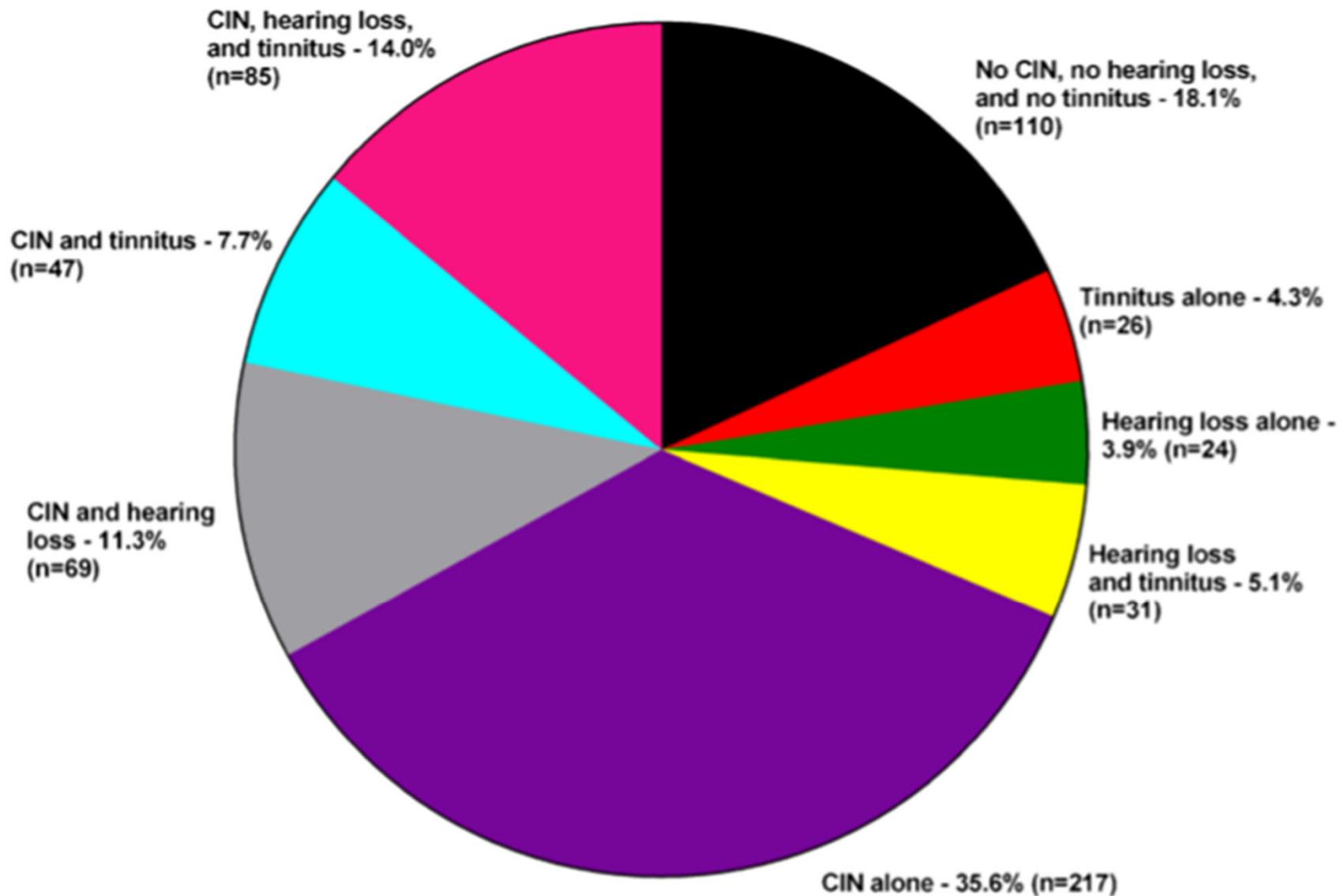
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Miaskowski C, Mastick J, Paul SM, et al. Impact of chemotherapy-induced neurotoxicities on adult cancer survivors' symptom burden and quality of life. *J Cancer Surviv.* 2018;12(2):234-245. doi:10.1007/s11764-017-0662-8



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# Quality of life effects

- Higher symptom burden associated with **decreased QOL**
  - Physical\*, social\*, physiological\*, and spiritual well being were evaluated
- Cancer survivors experience **higher levels** of both generic and disease/ treatment-related stress

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# Incidence of Infectious Disease related Ototoxicity

- Wide variability in the reported incidence of AMG ototoxicity ranging from 7-90% across clinical populations
- Rates of ototoxicity are lower in pediatric population (2-20%) compared to adults for cystic fibrosis
  - Shorter duration of treatment
  - Research is also limited
- Incidence of ototoxicity in adult CF patients ranges from 0-57% and 0-6% for CF children

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2. Fjalstad et al., *Eur J Pediatr* 2014, 173(4):489-495
3. Garinis et al., *J Cys Fib*, 2017, 16: 401-409

# Incidence of Tinnitus Onset

Survey of adults without pre-exposure tinnitus (N=260)

- **Cisplatin**
  - 39%
- **Carboplatin**
  - 26.3%
- **AMGs & Vancomycin**
  - 19.4%



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Dille et al, *J Amer Acad Audiol*, 2010; 21:  
409-417, 2010.

# Objectives of Survey and Interviews

- Quantify and characterize the **prevalence** of current ototoxicity monitoring (OM) protocols (or lack thereof)
- Assess **care provider knowledge** of ototoxic risk factors and symptoms and current ototoxicity management protocols
  - Oncologists, Audiologists, Nurse Practitioners
- Identify important **barriers** and **facilitators** to programmatic change

Results will inform the development and implementation of refined OM guidelines.

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# Survey and Interview Development

- Consolidate Framework for Implementation Research (CFIR)
- Guide for systemically assessing potential barriers and facilitators to implementing an innovation
  - Inner setting
    - Current methods
    - Implementation climate
  - Outer setting
    - Patient needs/ resources
  - Characteristics of Individual
    - Evaluation of knowledge and priorities of the providers and patients

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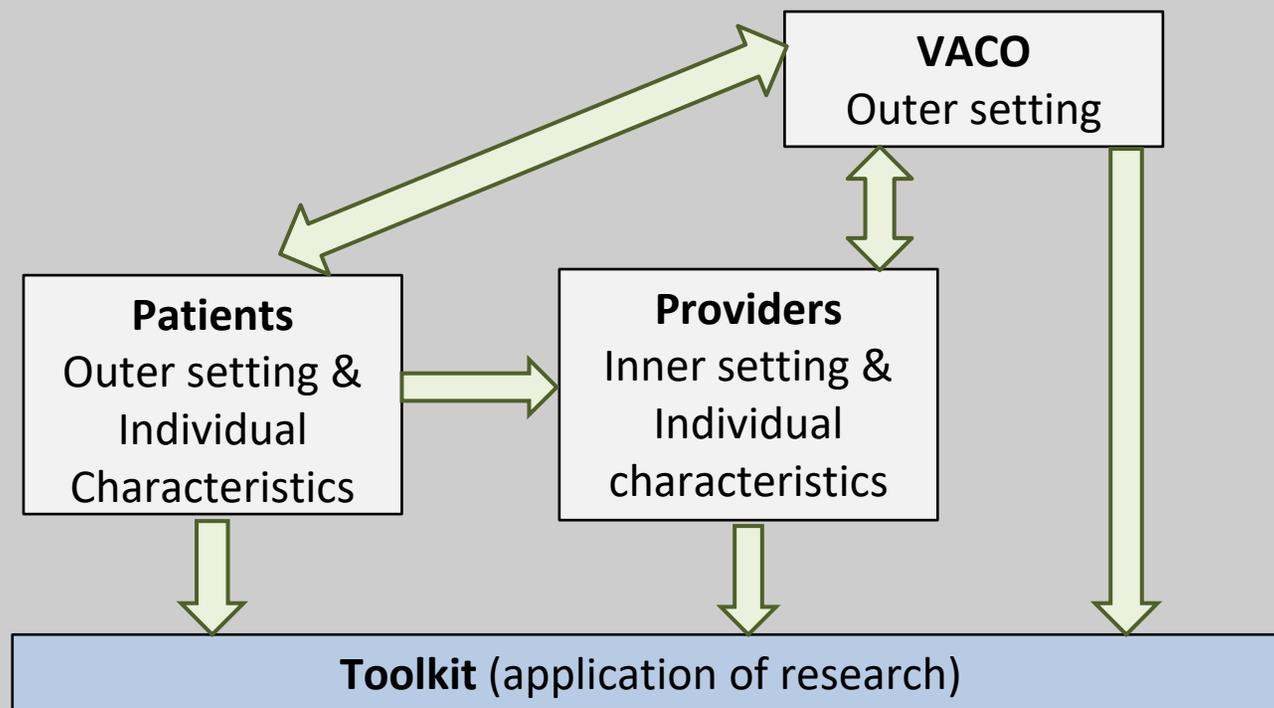


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# Survey and Interview Development



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# Survey Methods

- Each question was mapped to a CFIR construct, objective, and assessment format

Construct	Question	Objective	Assessment Approach
Inner setting - Demographics (structural characteristics)	What is your primary medical specialty?	a	Multiple choice selection
Demographics	What is your terminal degree?	a	Multiple choice selection
Outer setting – patient needs and resources (Prevalence)	How often do you prescribe the following medications? - platinum-based <u>antineoplastics</u> - chelating agents	b	Multiple choice selection (matrix)
Inner setting - Current methods/practice	If ___ is prescribed, do your patients routinely receive audiological monitoring for ototoxicity? - platinum-based <u>antineoplastics</u> - chelating agents	i	Multiple choice selection (matrix)

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Original survey developed by Konrad-Martin and others affiliated with the DoD Hearing Center of Excellence ototoxicity working group

# Interview Methods

- Semi-structured interviews of audiologist and oncologist to gather more information on individual characteristics
- Interview patients on their perspective of OM practices and their priorities
  - Based on systematic analysis of survey results
  - Ensure the OM protocols are useful and relevant for patients

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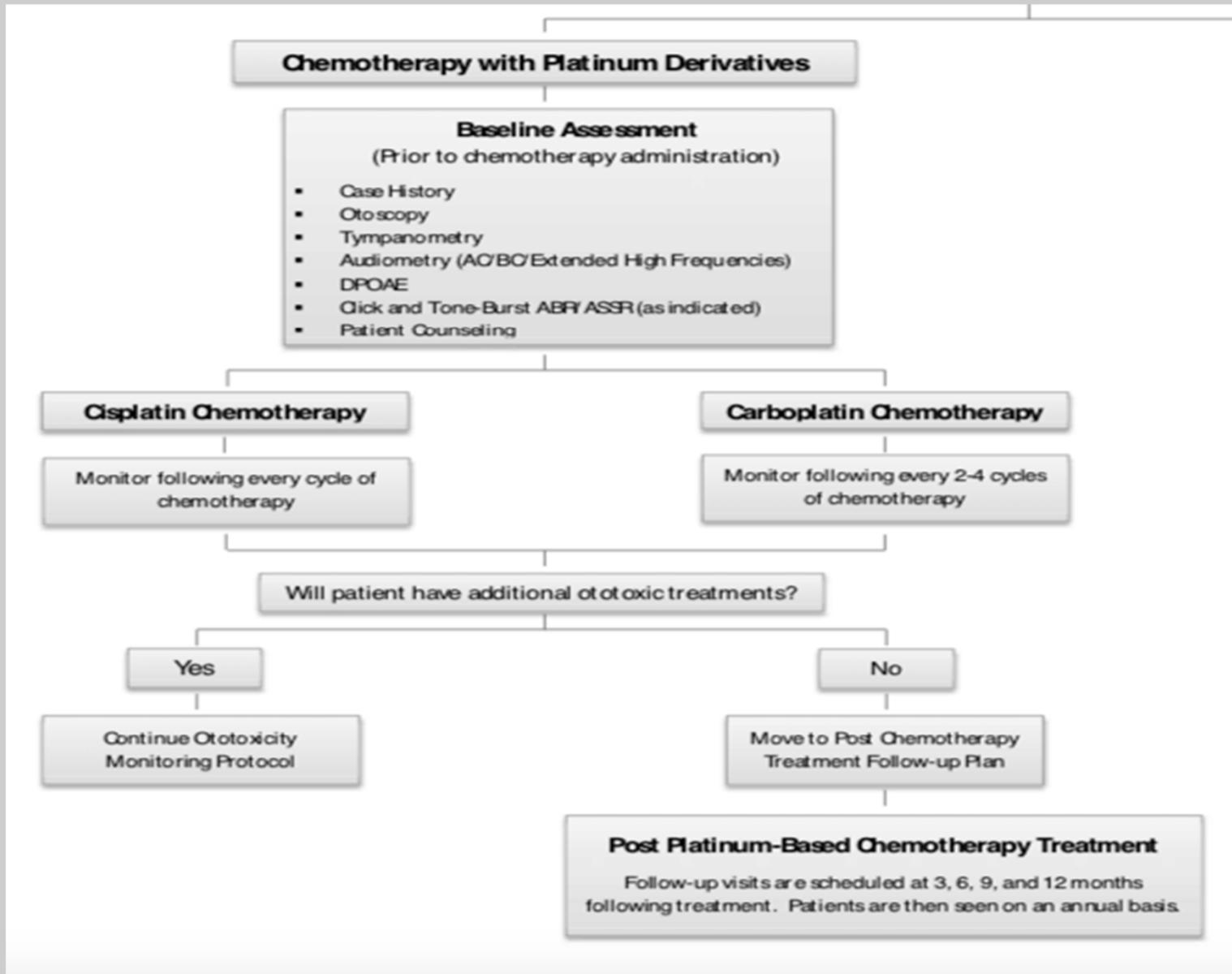


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# ASHA OM Protocol Flow



# Audiologist Perspective: Barriers of current OM practices

- Time intensive
- Requires patient to self advocate for treatment
- Requires collaboration and communication between all members of the care team
- Lack of referrals
- Patients not disclosing treatments when scheduling
- Lack of available appointments devoted to protocols in a timely manner, consistent with protocol and patient experience

**Survey and interviews are designed to elicit additional examples of barriers**

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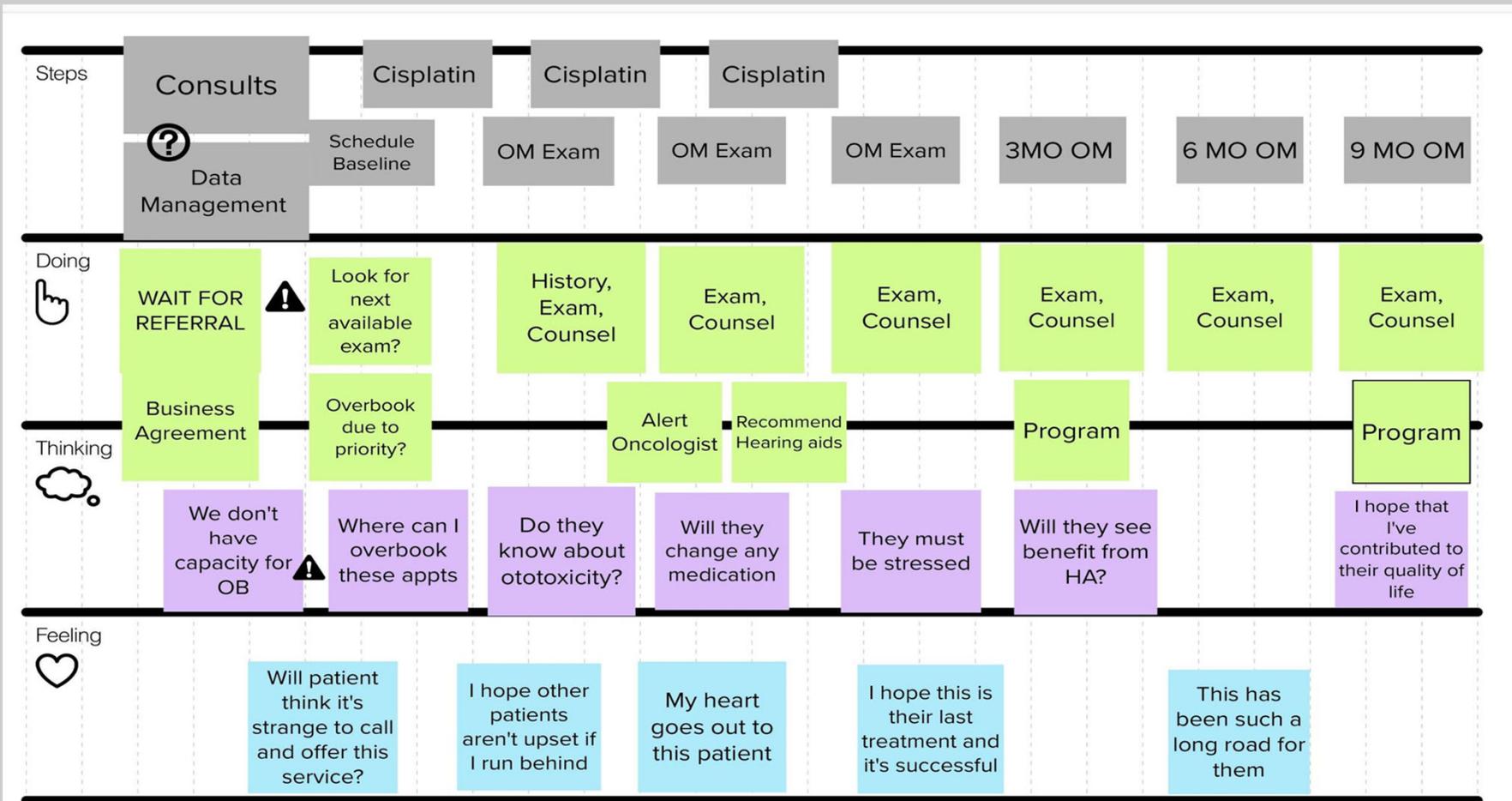


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# Audiologist Perspective: Journey Map of OM



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# Audiologist Perspective: Example Lesson Learned from Journey Map

- From the audiologist and patient perspectives: Flexibility in scheduling is important
- Imperative to arrange same day access to accommodate patients whether contact is based on consults or data management
- Need ability to schedule between treatments or to coincide with other appointments given the stress and number of appointments patients attend

**Bottom line: Need to integrate audiology into the patient's already established care pathway**

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# Audiologist Perspective: Solutions for current OM practices

**Service Gap:** Identifying and scheduling patients

- Traditionally, audiology referral for OM was based on consults

**Barrier:** 2016: Direct Scheduling Initiative for audiology made Consults unnecessary

- Some audiology clinics removed consults entirely, and thus removed the ability for “normal” referral

**Solution:** Reach out to form relationships with other departments: oncology, hematology, infectious diseases, pulmonary medicine, pharmacy

-formalize through **Care Coordination Agreement**

(more on this later)

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# Audiologist Perspective: Solutions for current OM practices

## “Walk-in” Clinics

- Benefit: Easy access and no appointment needed
- Drawbacks: Patients may or may not be counseled to have a baseline or followed for ototoxicity
- If they are told to have a test, there is no record, and it is up to them to “walk in” for baseline and follow ups; lack of reminders (letters, text messages)
- Patient may or may not disclose that they are undergoing treatment with an ototoxic drug

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# Audiologist Perspective: Solutions for current OM practices

## Initiate a “Hybrid Walk-in Clinic”

- A dedicated audiologist for walk in patients (while others are scheduled) and allotted booth time for same day access hearing exams
- In a fully scheduled clinic, having alternating open appointments options for same day access can provide time for OM patients as well as other “walk in” patients
- Use data to determine how many patients would need this service if you are using consults or data management for OM
- Over time, can determine the most commonly requested time frame if you overbook per patient request into a specific OM clinic

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# Openings for “Floats” in Full Schedule

7:00	Admin	Admin	Admin	Admin			
7:15							
7:30	HE	HE	Individual Fit	Float		Admin	Admin
7:45							
8:00				C&P	Admin	Individual fit	HE
8:15	F/u	HE	F/u				
8:30					Float		
8:45						HE	
9:00	Fit, orient	Float	Fit, orient				HE
9:15					HE		
9:30	Fit, orient		Fit, orient	C&P		HE	
9:45		HE					Float
10:00					HE		
10:15	Individual fit		Individual Fit			HE	
10:30		HE					HE
10:45					Individual fit		
11:00	Individual fit		Individual Fit	C&P		Float	
11:15		F/u					Individual Fit
11:30					F/u		
11:45							
12:00	Lunch	Lunch	Lunch	Lunch	Lunch	lunch	Lunch
12:15							
12:30	Admin	Admin	Admin	Admin	Admin	Admin	Admin
12:45							

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# Audiologist Perspective: Solutions for current OM practices

## Create a VA Consult for OM

- Benefit: Provides opportunities for physicians to alert Audiology of treatment; the physician in turn will receive an alert with results
- Drawbacks: Consults are not always placed even in an established program (12% according to Konrad Martin, 2018), so we continue to have a gap in the opportunity to serve patients if we are not alerted

**VA consult is helpful**

**but insufficient without other supports**

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# VA Consult Example for OM

Reason for Request: AUDIOLOGY OTO-TOXICITY MONITORING OUTPT



Consult to be placed for prescriptions including, but not limited to:

1. Chemotherapeutic Drugs:

- Cisplatin
- Carboplatin
- Vincristine
- Methotrexate
- Nitrogen Mustard

2. Aminoglycoside Antibiotics (patients anticipated to receive aminoglycosides for greater than or equal to 2 weeks):

- Amikacin
- Streptomycin
- Tobramycin
- Neomycin
- Gentamicin

3. Other Medications Associated with Ototoxicity:

Please see patient prior to initial treatment \*  ... .

Please see patient \*  Weekly  Monthly  
during treatment between \*  ... and \*  ... .

Please see patient post treatment after indicated date \*  ...

Videonystamography (VNG) should be included at

- Initial Exam
- Final Exam

# Audiologist Perspective: Solutions for current OM practices

## Enter the role of **VA Data Management Resources**

- How: Work with Data groups at your facility to obtain lists of patients prescribed common Ototoxic medications
- Benefit:
  - Can review previous time periods to determine OM program needs
  - Can obtain weekly lists to ID new patients

**Our Data Pilot:** Generated lists of patients who received Cisplatin (48) or Gentamicin (27) over 3 months:

- None reported to our “walk in” clinic; all were missed!

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# Audiologist Perspective: Solutions for current OM practices

## Drawbacks of Data Management Approach:

- To use data management to contact these patients, will need to set up a **Care Coordination Agreement**, similar to a memorandum of understanding, with all parties involved at your facility (currently writing at Augusta VA)
- Clinicians have expressed feelings of “cold-calling”
- A data Management **service gap** is Community Care
  - if patients are seen/prescribed cisplatin at another facility, we were not able to see those patients

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# Audiologist Perspective: Solutions for current OM practices

## Optimize equipment for flexibility

- Looking at equipment that can be used to test in offices (GSI AMTAS or Madsen Astera Ambient Noise Assessor [ANA] options)
- Additional options include portable, automated testing during treatments or an option to test at home

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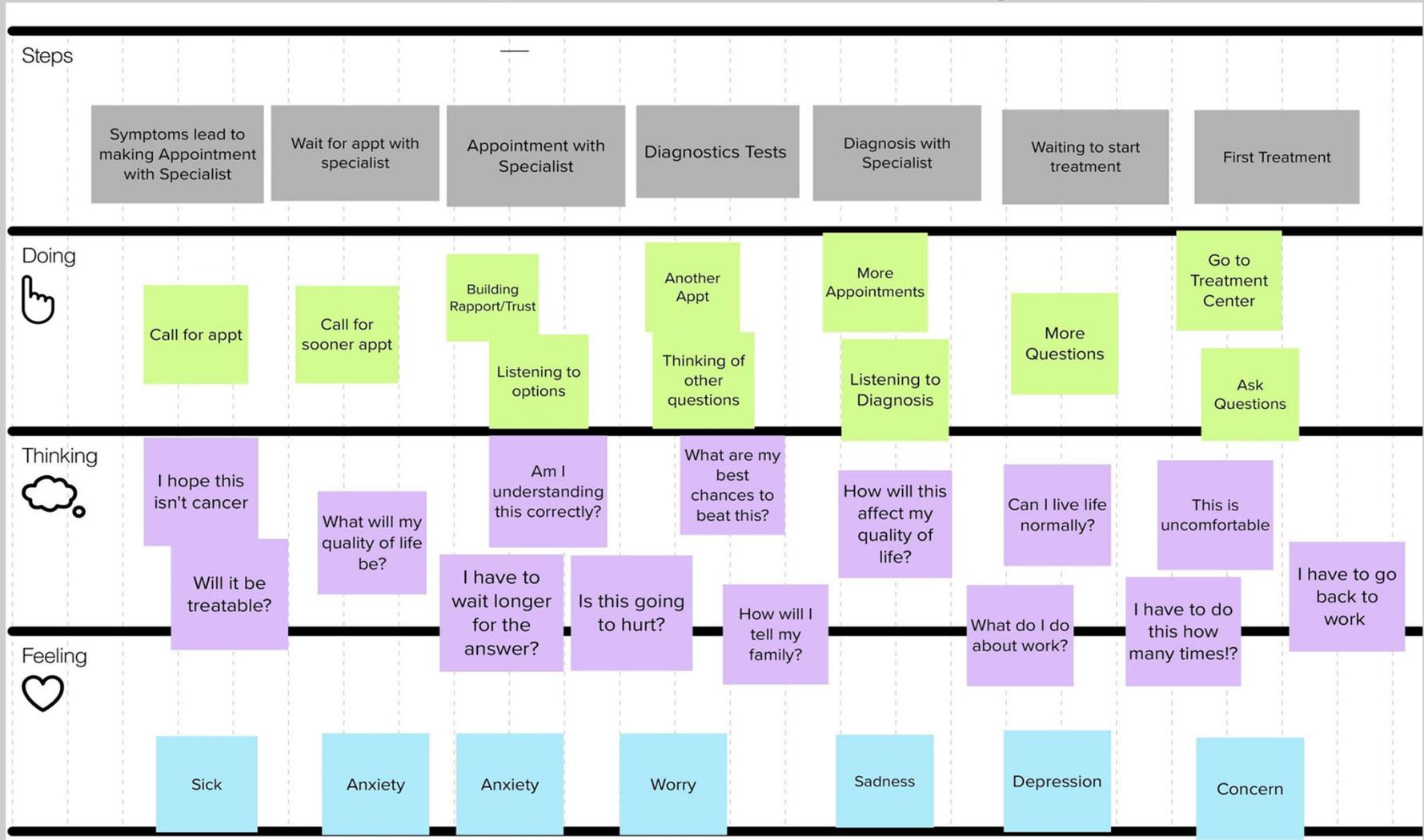


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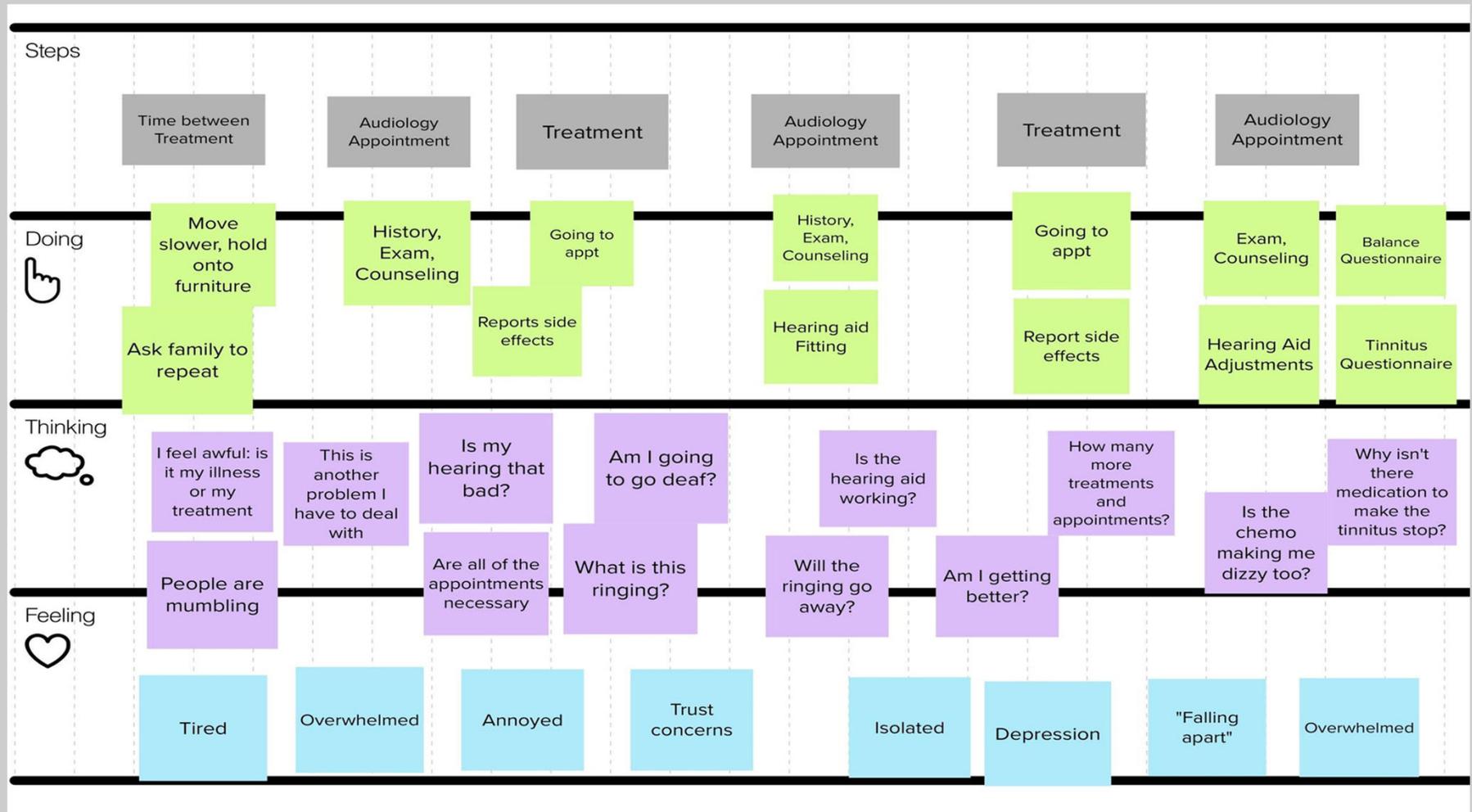
# Patient's Perspective: Journey Map



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# Patient's Perspective: Journey Map



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# Patient Voices

   #CHILDHOODCANCER



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# Patient Voices

# Patient Voices



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# Patient Voices



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# Takeaways

- Focus on new/different service delivery approaches to OM
  - Rehabilitation medicine group
  - Patient-centered care
  - Tech driven/automated care
- Consider quality of life effects in addition to life saving therapies

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# Toolkit

- Educational materials for clinicians and patients about ototoxicity monitoring
- Updated NCRAR OM Webpage Coming Soon!
- IOMG

[https://en.wikiversity.org/wiki/International\\_Ototoxicity\\_Management\\_Group\\_\(IOMG\)](https://en.wikiversity.org/wiki/International_Ototoxicity_Management_Group_(IOMG))

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