

# Ototoxicity Monitoring in a VA Business Model



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# Acknowledgements

## Conflict of Interest Statement

### Funding:

VA RR&D Merit Review #C3127R Awarded to DKM

The views expressed are those of the presenters, and do not necessarily reflect the position of the VA or the US government.

DKM is listed as co-inventor on two patents related to testing and technology designed for ototoxicity monitoring. She receives no remuneration for this intellectual property.



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## Introduction

- Pillars of healthcare
- Scope of the current problem
- We propose that ototoxicity monitoring (OM) requires proactive surveillance and rehabilitation embedded in the patients established care pathway

## Data Management

- Systematize methods to identify and track patients, and for inter-disciplinary communication
- Facilitate scheduling
- Apply patient choice for appropriate follow up

## Business Agreement

- Stakeholder buy in
- Determine the scope of OM; Understand priorities and patient care pathway tools of stakeholders

## Point of Care Testing

- Audiology outside of the booth
- Complements traditional audiology services

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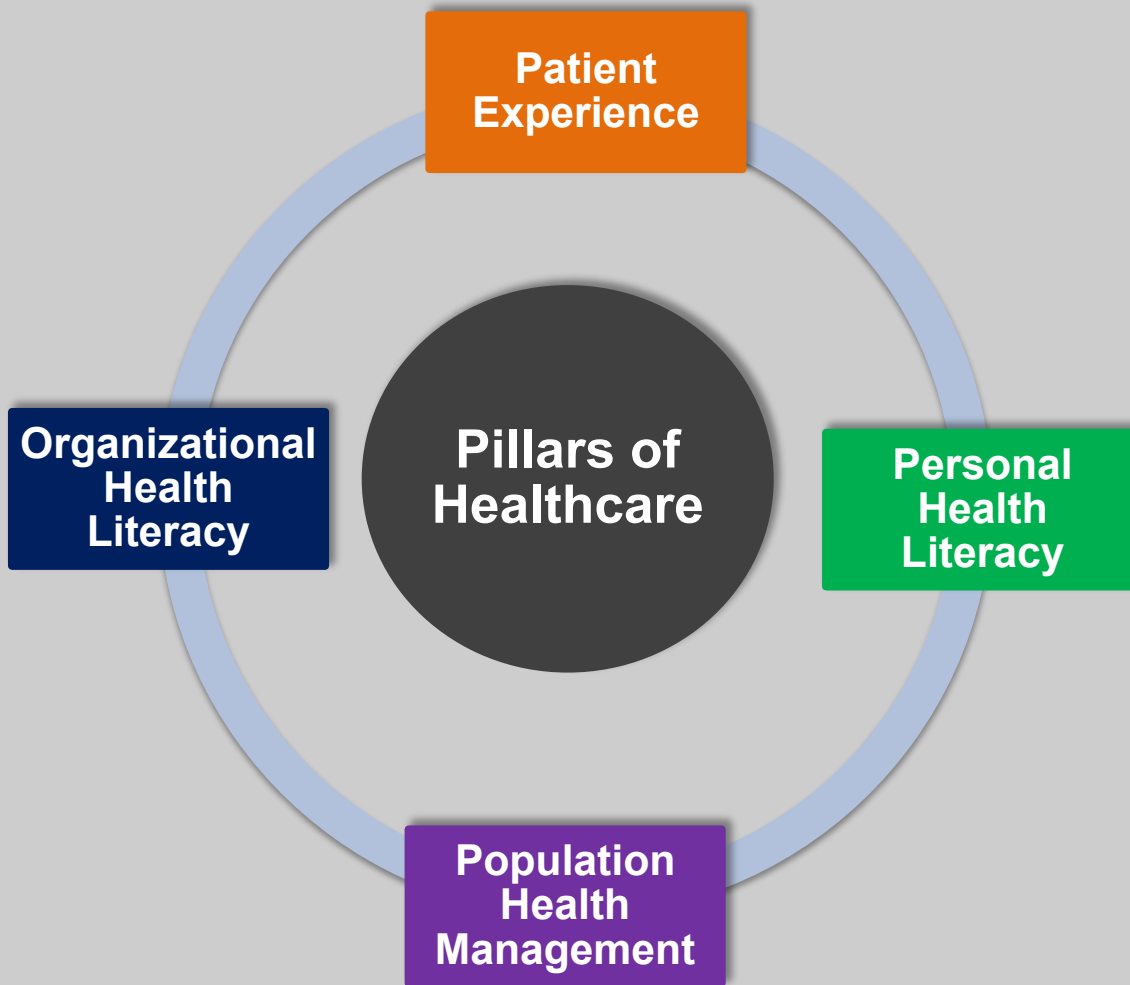
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Gaining the **Patient perspective** of interactions with organizational members (care team) as well as the **perspectives of other stakeholders** (other care team members, administration)

**is crucial for**

- **1) effective patient-provider communication** and
- **2) easy access to services and information** that is respectful of and responsive to individual patient preferences, needs, and values.

# Scope of Cancer and Platinum-related Ototoxicity

- **1.7 million** Americans will be diagnosed with cancer this year.
- 5-year survival rate for all cancers is 60-70% depending on race
- Platinum compounds are used in about 40% of all chemotherapy in adults: (solid tumors: colorectal, head & neck, lung, ovarian, testicular, bladder)
- Within VHA in 2018, **10.4K** patients received a platinum-based chemotherapy



VA Cancer Registry, 2018

<https://www.cancer.org/content/dam/cancer-org/research/cancer-facts-and-statistics/annual-cancer-facts-and-figures/2018/cancer-facts-and-figures-2018.pdf>

<http://theconversation.com/happy-50th-anniversary-to-cisplatin-the-drug-that-changed-cancer-treatment-38382>

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# Scope of Cancer and Platinum-related Ototoxicity

- Following **cisplatin** chemotherapy 40-80% of patients experience ototoxicity
- 20% of patients treated with **high-dose carboplatin** experience ototoxicity
- Ototoxicity with **oxaliplatin** is generally less common, but for some individuals is severe
- Survivors' quality of life is limited by morbidity from their disease, but also it's treatment

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

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# Scope of Infectious Disease related Ototoxicity

- IV-aminoglycosides (e.g., tobramycin, gentamicin, amikacin and high-cumulative levels of the glycopeptide vancomycin are cochlea and vestibulo-toxic)
  - Sepsis
  - MRSA
  - Pulmonary exacerbations
  - Some cardiac problems
- Wide variability in the reported incidence of AMG ototoxicity ranging from 7-90% across clinical populations
  - Rates of ototoxicity following treatment for COVID-19 and its complications are unknown

Al-Malky et al., *J Cystic Fibros* 2015;14(2):248-54; Fjalstad et al., *Eur J Pediatr* 2014, 173(4):489-495; Garinis et al., *J Cys Fib*, 2017, 16: 401-409

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# Scope of the Problem: Personal Health Literacy

- Approximately 80 million adults in the United States have limited health literacy (NAAL 2003; Berkman et al. 2011)
- Individuals with the skills and confidence to become actively engaged in their health care have better health outcomes (CDC, 2020)
- When given the option between an intervention and doing nothing, most patients will choose an intervention (Laplante-Levesque et al., 2012)
- In 2018, Dr. Dawn Konrad-Martin compared “Usual Care” to patient-driven automated hearing screening for OM
  - ~50% of all trial participants in the study pursued new HA’s or technology adjustments
  - Nearly all study participants (99.3%), conducted self-testing on the chemotherapy unit prior to each and every cisplatin treatment
  - Usual care generally tested one time, or not at all during treatment (<5% had guideline adherent OM)



# Scope of the problem: Unmet need

**American Academy of Audiology, AAA (2009). Position Statement and Clinical Practice Guidelines: Ototoxicity monitoring.**

## POSITION STATEMENT ON PROVISION OF OTOTOXIC MONITORING BY AUDIOLOGISTS

### **Audiological Interests in Ototoxicity Monitoring**

Audiologic monitoring for ototoxicity is primarily performed for two purposes: (1) early detection of changes to hearing status presumably attributed to a drug/treatment regime so that changes in the drug regimen may be considered, and (2) audiologic intervention when handicapping hearing impairment has occurred. These clinical goals are differentiated in the following.

The term “ototoxicity monitoring” is generally taken to express the principle of early identification, yet the concept also embraces the principle of early intervention. For example, when changes are detected early, the physician can be alerted so that alternative treatment protocols, possibly with less ototoxic medications, may be considered. Furthermore, when clinically significant changes occur, especially hearing deterioration that has migrated into the speech frequencies, the purpose of a monitoring program becomes to assist the patient and/or patient’s family to maintain effective communication, especially as hearing loss progresses. Unfortunately, this degree of hearing impairment may be unavoidable even with proactive ototoxicity monitoring, as the priority is effective treatment of the disease via the given drug therapy.

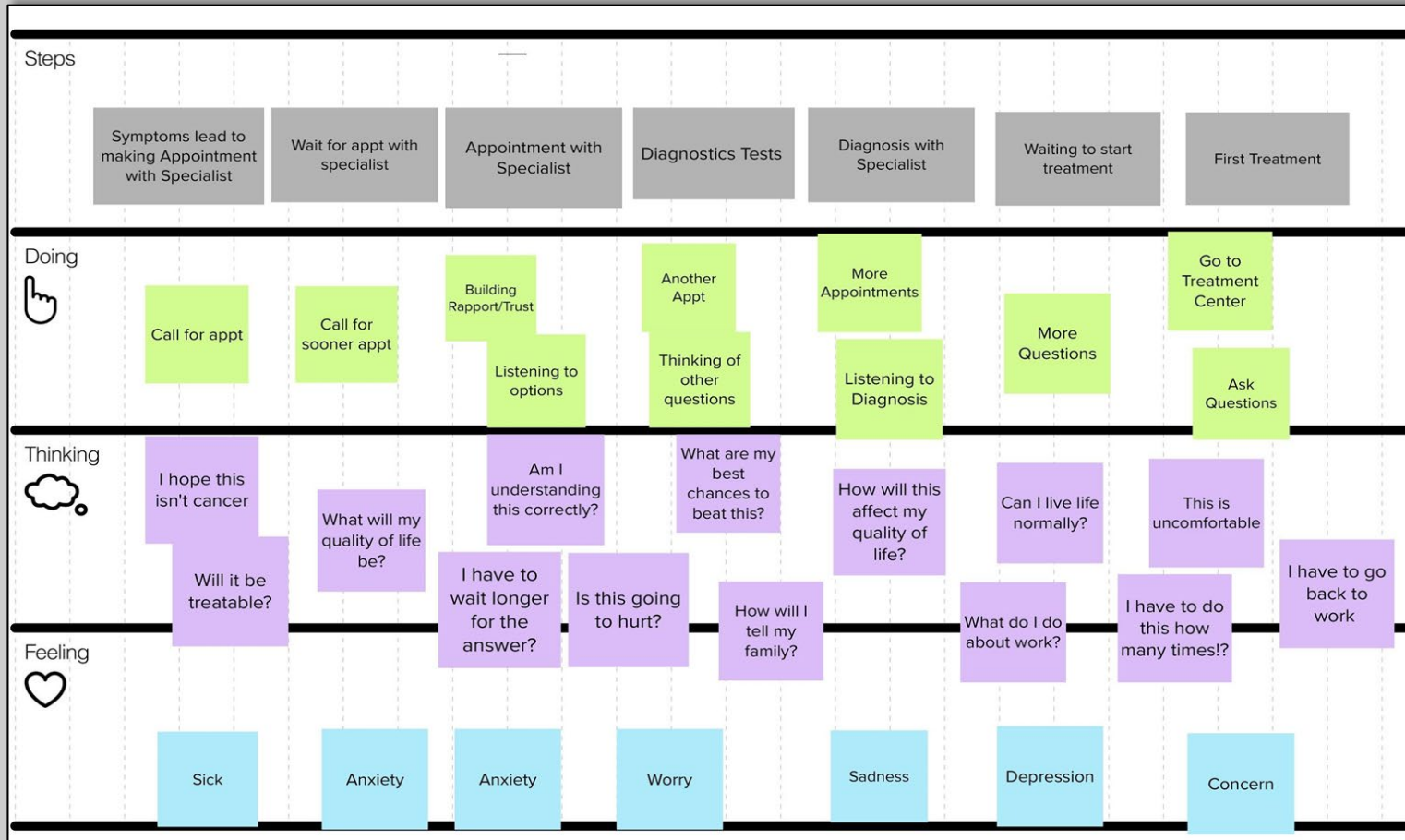


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# Current Journey Map of the Patient



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# Scope of the Problem: Patient Experience

- [Allyson's Experience](#)
- [Mike's Experience](#)

- Additional patient perspectives:

[Patient Voices - National Center for Rehabilitative Auditory Research \(NCRAR\) \(va.gov\)](#)

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# Individual patient reports are echoed in large cohort study of cancer survivors

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

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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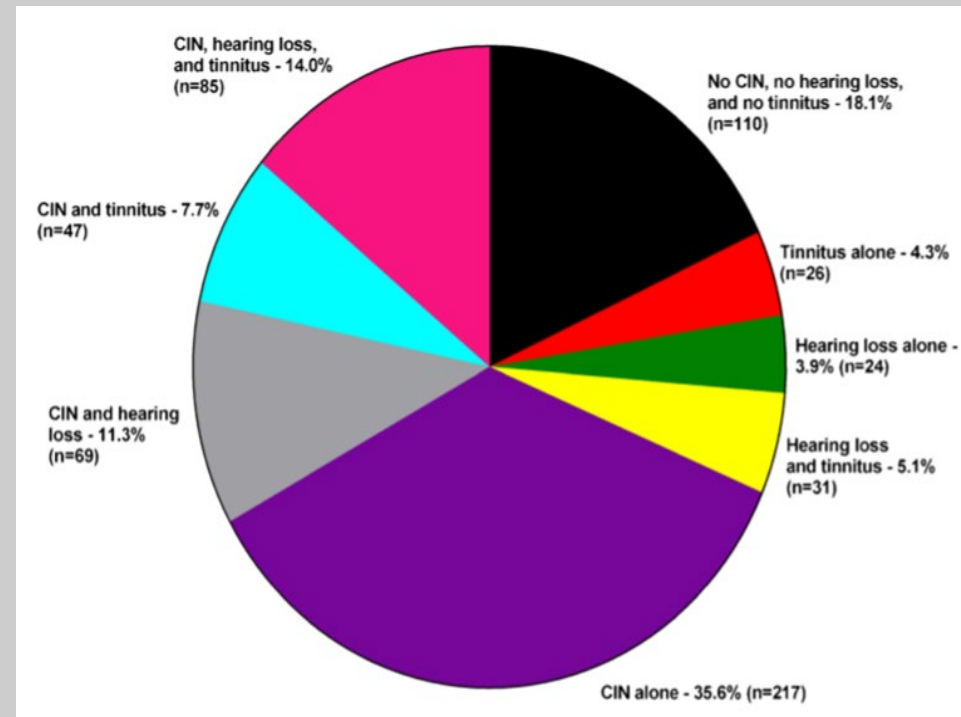
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# Individual patient reports are echoed in large cohort study of cancer survivors

- 18% had no symptoms;  
37% had CIN only;  
**45% had some combination of hearing loss and tinnitus** either with or without CIN
- Patients with these symptoms reported **decreased QOL**
  - Physical\*, social\*, physiological\*, and spiritual well being were evaluated
- Cancer survivors experience **higher levels** of both generic and disease-treatment-related stress compared with controls



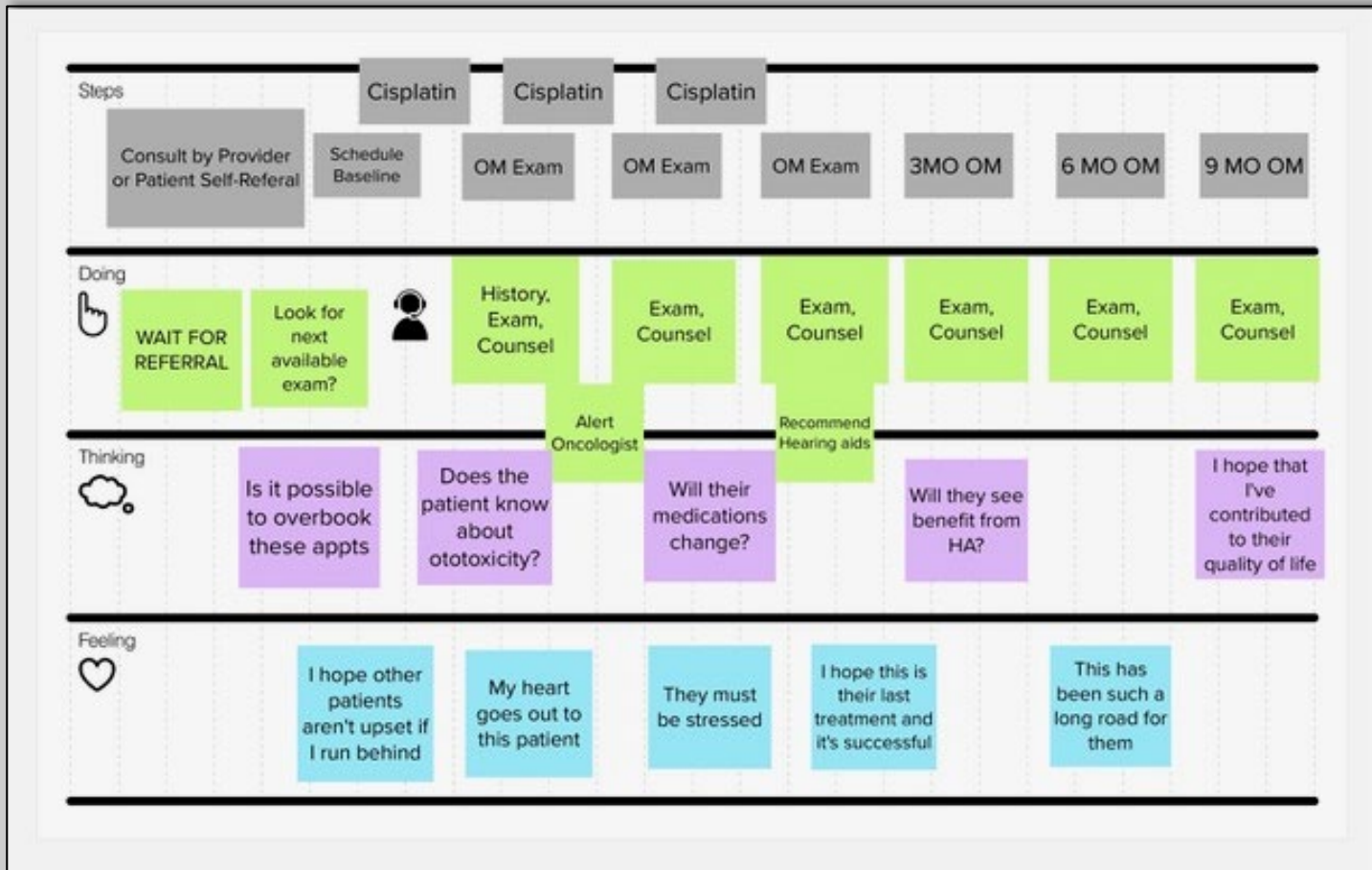
Miaskowski C, Mastick J, Paul SM, et al. Impact of chemotherapy-induced neurotoxicities on adult cancer survivors' symptom burden and quality of life. *J Cancer Surviv.* 2018;12(2):234-245.

doi:10.1007/s11764-017-0662-8

# Scope of the Problem: Organizational Health Literacy

- What is the scope of the problem at your own VA?
- Data from one VA (May 6, 2020, July 20, 2020)
  - Cisplatin: 48 prescriptions were present in a 90-day-period prior to a data pull on 5/6/2020
    - Number of cisplatin patients seen by audiology: **Zero**
  - Gentamicin: 44 prescriptions were present in a 90-day-period prior to a data pull on 7/30/2020
    - Number of gentamicin patients seen by audiology: **Zero**
- Service delivery varies in part due to system and program-level priorities and resources
  - Within an OM program, services do not always support even the most basic monitoring practices. (Konrad-Martin et al. 2018)

# Current Journey Map of the VA Audiologist



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# Scope of the Problem: Population Health Management

- Providers want to provide best care, patients want to receive best care, and facilities want to support ideal healthcare that fits within their framework.
- How does the clinic implement and sustain best care practices when resources may already be stretched?
  - Identify gaps and barriers in the current “usual care” service delivery protocol and implement a plan of change that has support from all stakeholders



# Ototoxicity Monitoring in a VA Business Model

- Objective: Improve patient care of the largest integrated health system in the US by considering audiology services from health literacy and management perspectives.
  - Look beyond the traditional healthcare delivery model to determine who needs what, when, and how (Medicaid and Public Health Partnership Learning Series)
- Plan:
  - Utilize **data management** to identify the ototoxic monitoring caseload while removing barriers from the current healthcare delivery model
  - Utilize **business plan** to structure duties among clinics and within the audiology clinic

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# Data Management and Business Plan should address gaps in the current model

- Insufficient patient education
- Inconsistent referrals
- Scheduling limitations
- Location and space limitations
- Staffing limitations

**But how?**

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# Ototoxicity Monitoring in a VA Business Model

- Improvement can be made by utilizing qualitative data from organizational and patient health literacy efforts
  - Keep patients at the center of care for best patient experience
  - Minimize burden on all stakeholders through systemizing patient referral process, stakeholder communication
  - Minimize burden on patients through point-of-care OM screening and rehabilitation services as appropriate

# Ototoxicity Monitoring in a VA Business Model

- Targeted gaps in the current model:
  - Patient referrals from other care team providers are low
  - Difficulty scheduling patients
    - Typically the audiology schedule is booked several weeks in advance
  - Self-referrals may not report ototoxic medication use to their providers

# Business Agreement

- (Link to website from business agreement, still not on NCRAR site)
- Necessary to facilitate desired change
  - Stakeholder buy in
- Key components:

Determine  
stakeholders

Identify scope of  
audiology

Determine data  
management  
strategies

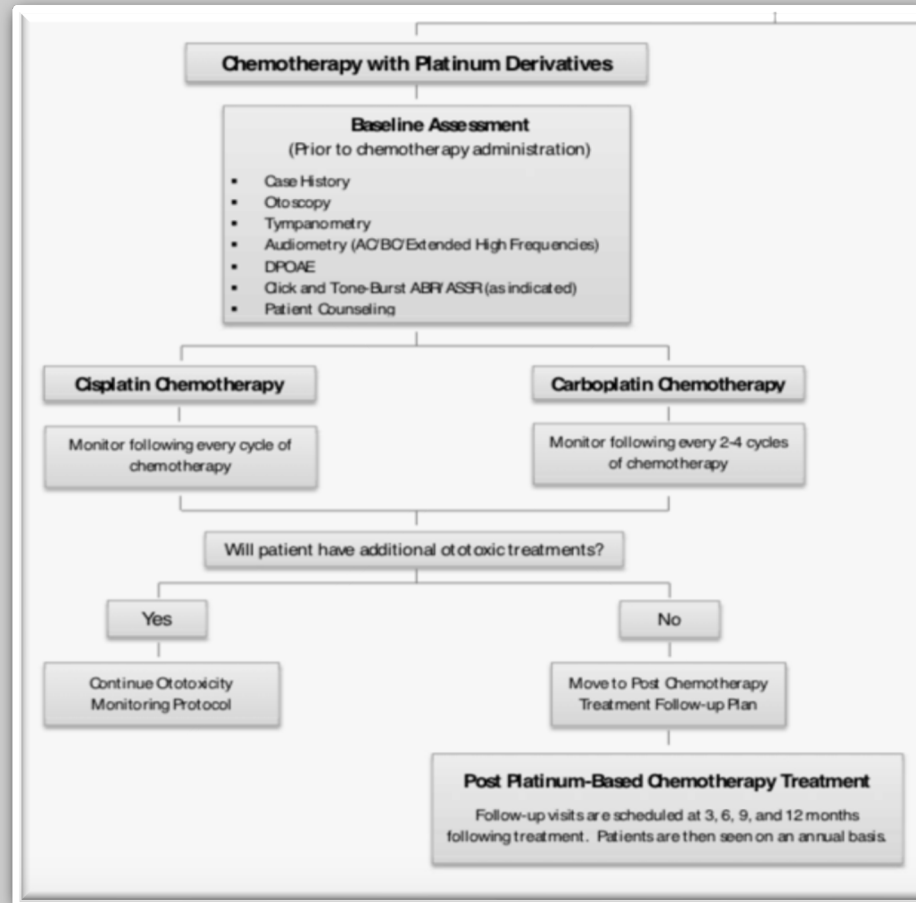
# Key Component: Determine the Stakeholders

- Potential stakeholders
  - Chief of staff
  - Oncology
  - Hematology
  - Critical care
  - Pharmacy
  - Infectious disease
- Once determined, this group will review and agree to the business agreement

# Key Components: Identify the Scope of Audiology

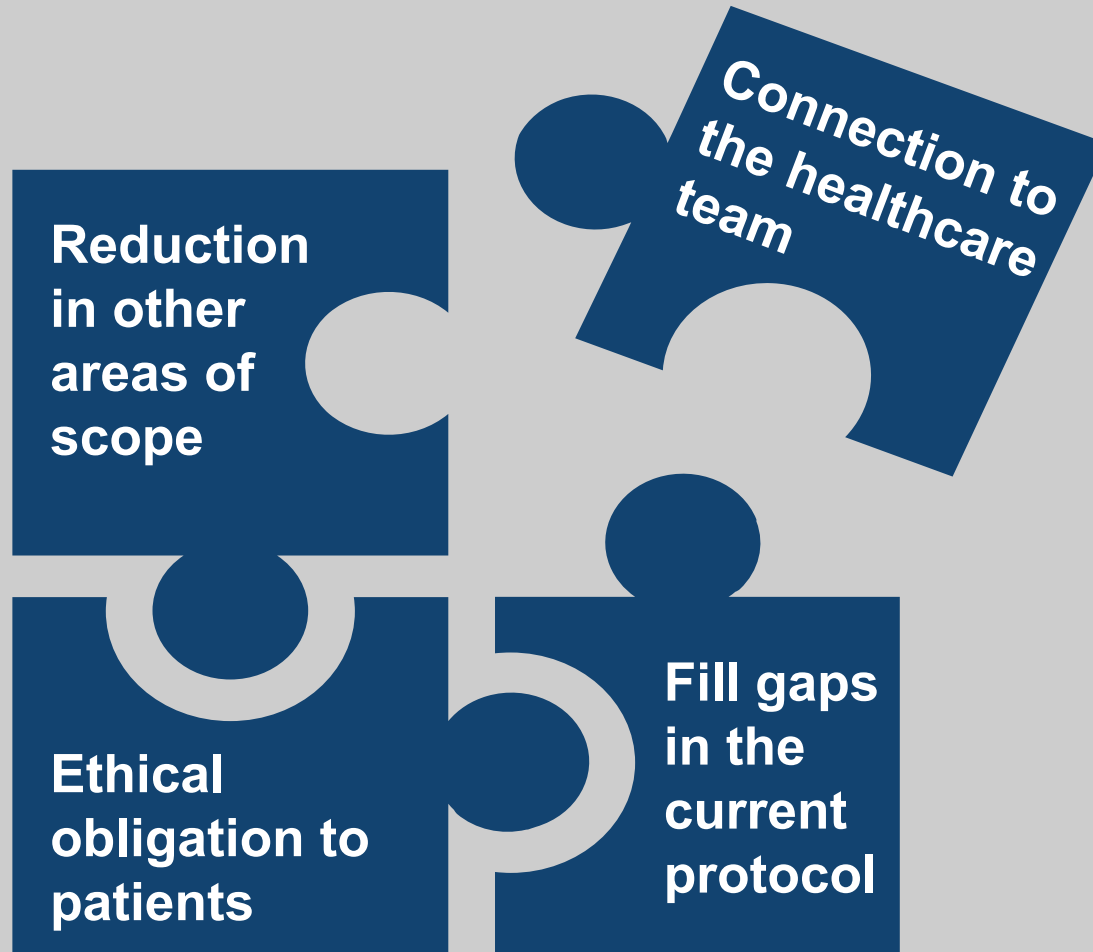
- Audiologists have an ethical requirement to offer current recommended practice (ASHA and AAA guidelines)
- Patient care protocol is needed for:
  - Education
  - Contact
  - Monitoring
  - Alerting medical staff
    - Physicians and pharmacists

# ASHA Guidelines for Ototoxic Monitoring





# How Does This Benefit Audiology?



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# Automated Hearing Testing Increases the Clinical Provision, and Patient Uptake of OM

Total N=47 Study Arm	Total (N) Doses of Chemo	Avg (N) Doses per Patient	Total (N) Monitors	Avg (N) Monitors Per Patient	Avg (%) Got Best Practice Protocol
Usual Care (N=23)	119	5.1	14	0.6	11.8%
Oto-ID (N=24)	137	5.7	136	5.7	99.3%

Preferred Practice would have meant a lot of testing

UC fails to provide audiology case management for most patients

Konrad-Martin et al. *Int J Audiol*, 2018

# Key Components: Data Management Strategies

- Determine mechanisms within the audiology scope of practice to:
  - **Identify** patients in need of services based on treatment medications
  - **Track** patient contact
  - **Facilitate** scheduling
  - **Apply** patient choice for appropriate follow up

Template: AUDIOLOGY OTO-TOXICITY MONITORING INPT

Audiology will use Data Management to identify patients receiving Cisp  
Amikacin, and Gentamicin.

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

1. Chemotherapeutic Drugs:

- Carboplatin
- Vincristine
- Methotrexate
- Nitrogen Mustard

2. Aminoglycoside Antibiotics:

- Neomycin
- Streptomycin
- Tobramycin

3. Other Medications Associated with Ototoxicity:

4. Intravenous Loop Diuretics:

- Furosemide
- Bumetanide

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

# Identify Patients

- An updated consult screen allows audiologists to identify patients receiving ototoxic drugs

# Identify Patients

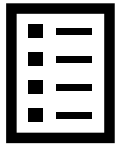
- Data management\* generates a patient list through medication prescriptions sent to pharmacy
  - Amikacin
  - Gentamicin
  - Cisplatin

# Identify Patients

- Mechanisms to improve self-referral
  - Brochures/written materials
    - Provide education and visibility regarding ototoxicity
    - For dispersion at infusion centers/specialty care clinics
  - Provider-to-patient contact
    - Phone script for contacting at-risk patients
    - Letter to send patients who cannot be reached by phone

(Link to website when embedded)

# Track Patient Contact



Administrative Notes



Self Alerts



Return to Clinic Orders

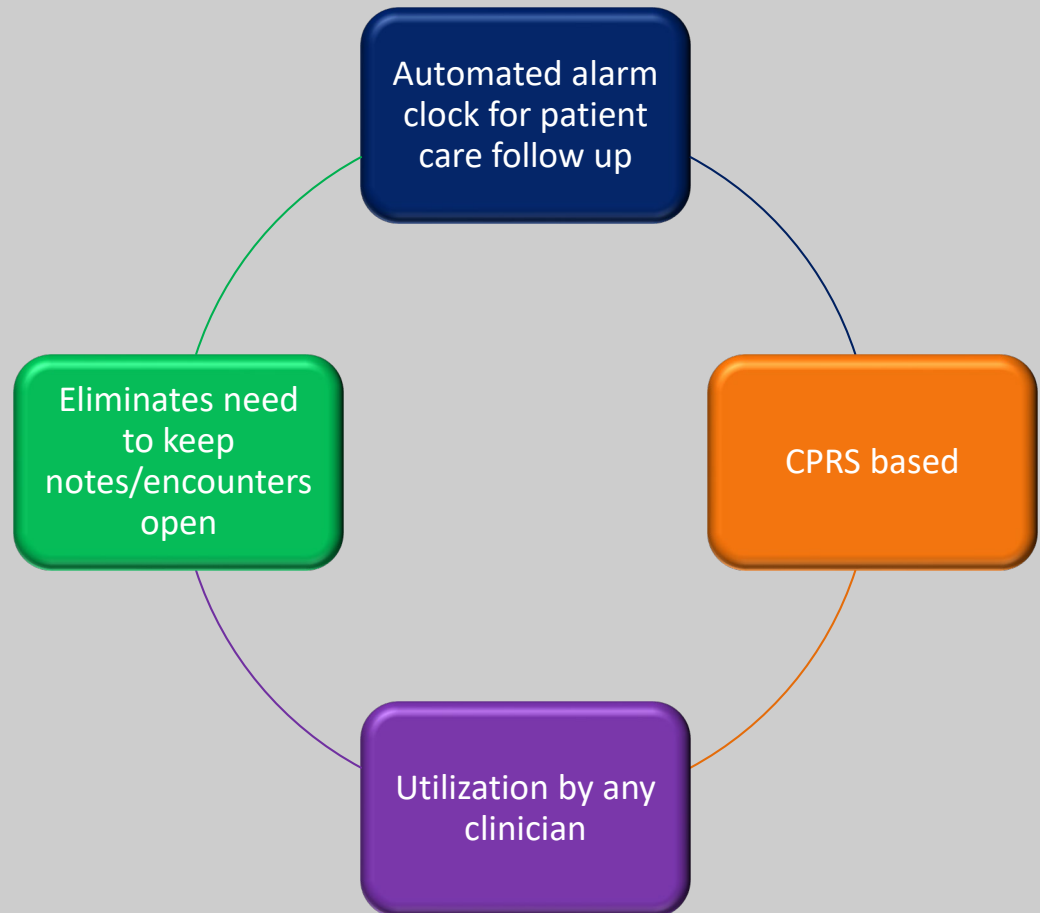
# Track Patient Contact: Administrative Notes

- Progress Note titles: Telephone Note, Administrative Note, Ototoxicity Monitoring Note
- Administrative Note: Used to document declined testing and screening questions, as well as any other unsuccessful scheduling.
  - Can also be used to attach Provider Self Alerts in CPRS



# Track Patient Contact: Self Alerts

- Allows providers to track patients and follow up with alerts in CPRS
- Eliminates need for “lists” of patients that need follow up



File Edit View Action Options Tools Help

**ZZTEST,EIGHT MIKE (OUTPATIENT)** HAS Oct 23,15 08:00 Primary Care Team Unassigned  
 000-00-1358 Sep 13,1958 (47) Provider: WALTON,STEPHEN JOSHUA MH Treatment Coordinator: Gowda,Sidhar

View Orders Active Orders (includes Pending & Recent Activity) - ALL SERVICES

Service	Order	Start / Stop	Provider	N...	Q...	C...	St...	Lo...
A/D/T	>> Diagnosis Syncope	Start: 08/13/15 11:44	Searcy, Lydia				active	5d-Dc
	>> Condition	Start: 08/13/15 11:44	Searcy, Lydia				active	5d-Dc

Writes Delayed Orders

Writes Orders

- Emergency Department Quick Orders...
- Hem/Onc Lab Orders
- Hem/Onc Oral/SQ Medz (Outpt)
- Primary Care Orders
- Surgery Clinic Orders...
- Surgery Orders...
- Women's Health Labs
- Add New Orders
- Acute Care Inpt Orders
- Allergy/ADR Documentation
- Clinical Procedures
- Comfort Care Orders
- Consults
- Critical Care Orders...
- Dialysis Orders
- Diet Orders
- Diet Additional Orders INPT
- DNR Orders
- Imaging Orders
- Lab & Path Orders (inc. Blood Bank & Autopsy)...
- Pharmacy & Medication Orders...
- Read Back Menu
- Respiratory Care
- Restraints
- Return to Clinic Orders
- Self Alert Tracking Menu...
- Text Only Orders
- Vitals
- Tele ICU Orders

Active Orders

Out. h

Non-A

Consu

Proce

Self Alert Tracking Menu...

**SELF ALERT SYSTEM**

Instructions for use

1. If used as a stand alone order please use clinic 'TESTENTRY X'.
2. Alerts must be set at a minimum for the next calendar day.
3. Time MUST be included. We recommend 0200 (T+X@0200).  
 Example: T+2@0200 will alert 2 days from today.

**The system looks forward 48Hrs. for 'expiring orders'.**  
**You may need to add 1 day to the alert date under normal conditions**

- FAJ ADMISSION\*
- FAJ CONDITION\*
- FAJ EDUCATION\*
- FAJ IMAGING\*
- FAJ LABS\*
- FAJ MEDICATION\*
- FAJ PROCEDURE\*
- FAJ REFERRAL\*

Note: Custom alerts will NOT contain a subject  
 FAJ CUSTOM\*



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**Patient Selection**

**Patient List**

- Default: CPRS
- Providers
- Team/Personal
- Specialties
- Clinics
- Wards
- All

**Patients (CPRS)**

- Zztest\_Eight Mike
- Zztest\_Remote M
- Zztest\_Vadod One
- Zztestcase\_Baby Boy
- Zztestcase\_Collateral
- Zztestcase\_Dumpty
- Zztestcase\_Employee Veteran
- Zztestcase\_Jt
- Zztestcase\_Lab
- Zztestcase\_Nhcu
- Zztestcase\_Shad
- Zztestcase\_Template
- Zztestcase\_Test Error
- Zztestcase\_Testing
- Zztesting\_Augusta Suicide G
- Zztesting\_Augusta Suicideh
- Zztesting\_Catastrophic Disabil

OK  
Cancel

Save Patient List Settings

**Notifications**

Info	Patient	Location	Urgency	Alert Date/Time	Message
	ZZTEST.RE (20232)	OUTPT	HIGH	10/21/2015@00:00	Order expiring: F/U REFERRAL* 10/19/15 8:45
	ZZTEST.RE (20232)	OUTPT	HIGH	10/20/2015@00:00	Order expiring: F/U LABS* 10/19/15 8:45 am
	ZZTEST.RE (20232)	OUTPT	HIGH	10/20/2015@00:00	Order expiring: F/U CUSTOM* 10/19/15 8:45 a

Process Info    Process All    Process    Forward    Show Comments    Remove



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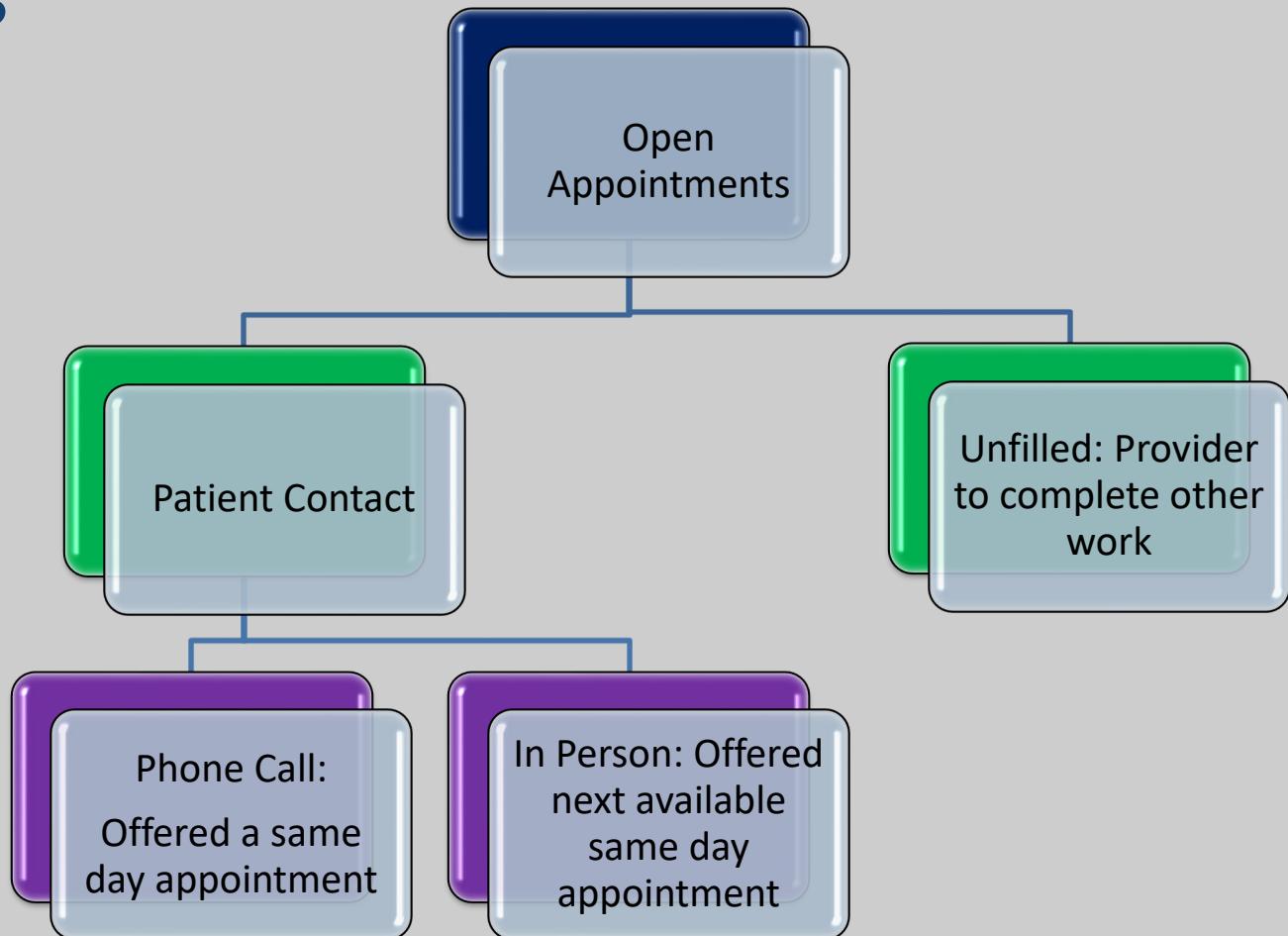
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# Facilitate Changes in Scheduling

- How do we accommodate patients so that they are willing and interested in following through on the protocol?
  - Remember current model shortcomings: Typically the audiology schedule is booked several weeks in advance
- Creation of flexibility in a structured schedule
  - Same day or walk in access
    - Flexibility in testing space (booths) and clinician time need to be considered
  - Point of care testing
  - Telehealth

# Changes in Scheduling: Same Day Access



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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# Changes in Scheduling: Hybrid Walk In

- Audiologist Walk In:
  - Technicians to field appointments
  - Adjustments to hearing aids post-repair
- Ototoxicity Walk In:
  - Dedicated booth time for one audiologist to field appointments

6:30		Audio 1	Audio 2	Audio 3	Tech
7:00					
7:30			Disp*		
8:00		Tele		G/B	
8:30			HE*		
9:00		Tele		G/B	Walk in
9:30			Walk In		Repairs
10:00		HE*	Adjust	G/B	
10:30			Ototox		
11:00			ENT	G/B	
11:30					
12:00		Lunch	Lunch	Lunch	Lunch
12:30					
1:00		HE		G/B	
1:30					
2:00		Disp*		G/B	
2:30					
3:00			Disp*	G/B	
3:30					
4:00				G/B	
4:30					
5:00					

# Changes in Scheduling: Ototoxicity Monitoring Grid

- Set for one appointment per day and used to overbook per patient request
- Unscheduled visit: A patient does not have a previously scheduled appointment
- Overbook: Scheduled beyond the normal capacity or timeframe of the clinic's grid



# Changes in Scheduling: Point of Care Testing

- Consider change to clinical model in testing occurs in department
- Options for consideration:
  - Testing at infusion centers or other doctor appointments
  - Portable equipment utilized by an audiologist
  - Screeners that are patient or health technician driven
  - Testing at home



**Tele-health** allows results to be uploaded to the Audiology department

# Telehealth: Legal Considerations

- ASHA resources
  - [State-by-State \(asha.org\)](https://www.asha.org)
  - [ASHA Facilitator Checklist for Telepractice Services in Audiology and Speech-Language Pathology](#)
- VA Interim Final Rule (11/11/2020)
  - Allows VA health-care professionals to practice across state lines as long as it is in accordance with the scope and requirements of their VA employment, regardless of state licensing requirements.
  - Note that storing patient information to the cloud is not permissible

American Speech-Language-Hearing Association (n.d.). *Telepractice*. (Practice Portal).

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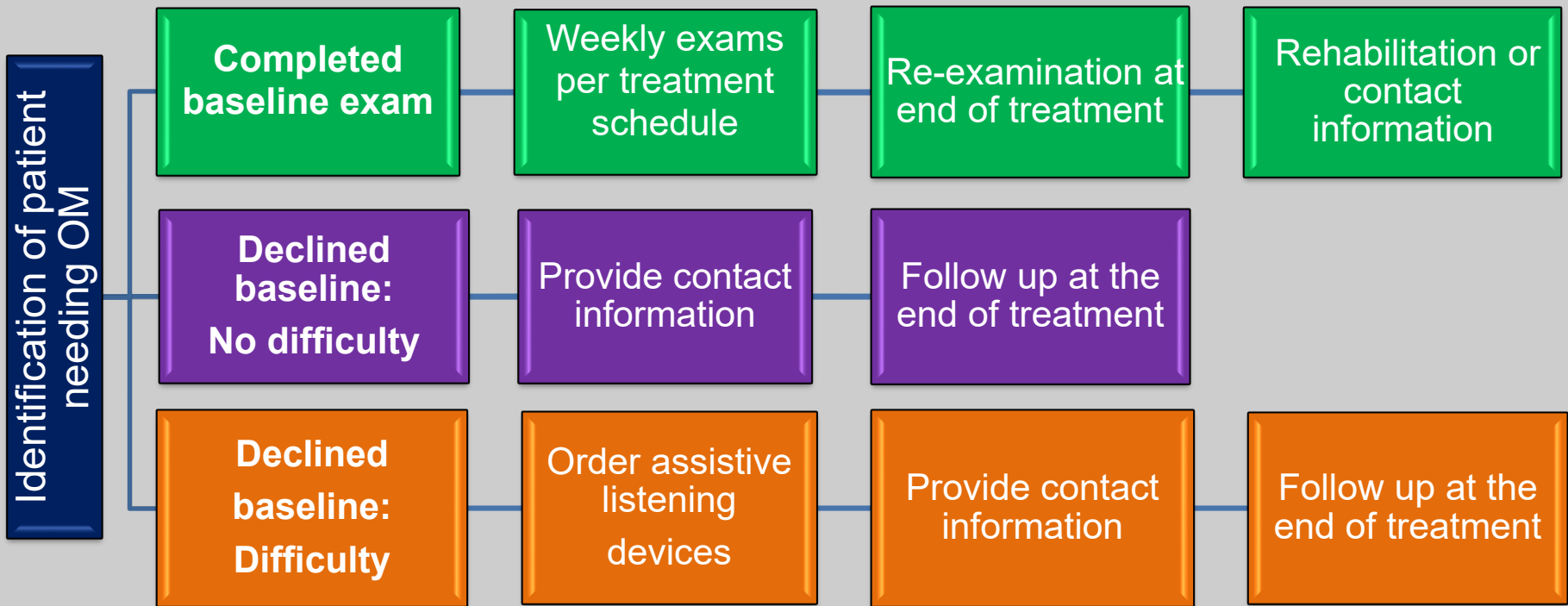


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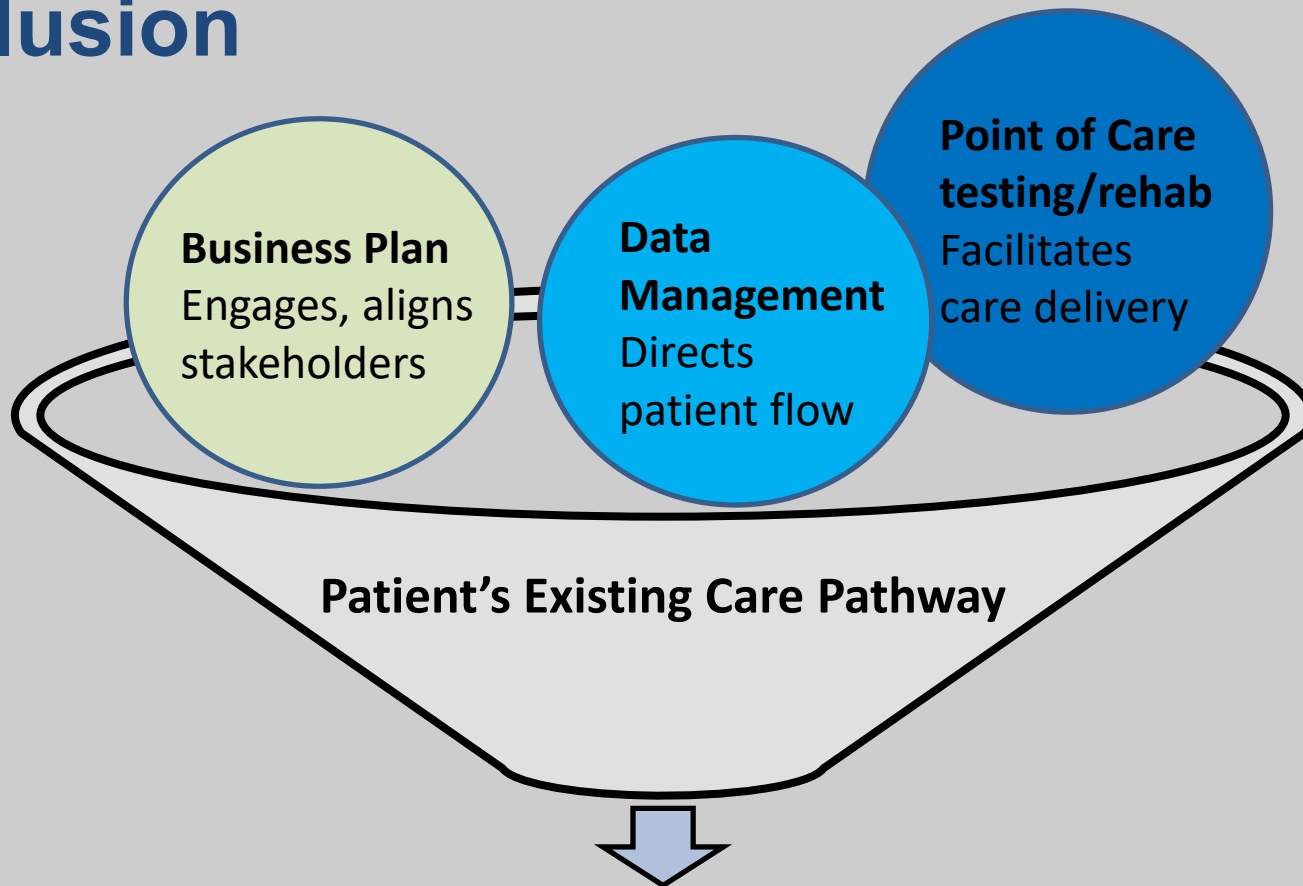
# Apply Patient Choice in Follow Up Care



# Conclusion

- OM is an underutilized piece of the Audiology scope of practice that has multiple benefits
- Improvements in healthcare pillars facilitate optimal healthcare practices for all stakeholders
- Audiologists can utilize data management to identify the ototoxic monitoring caseload while removing barriers from the current healthcare delivery model to:
  - **Identify** patients in need of services based on treatment medications
  - **Track** patient contact
  - **Facilitate** scheduling
  - **Apply** patient choice for appropriate follow up
  - **Utilize point-of-care** OM management as needed to streamline testing and referrals for follow up

# Conclusion



**Flexible & Patient-Centered OM**

# Contact Information

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- [dawn.martin@va.gov](mailto:dawn.martin@va.gov)
- <http://www.ncrar.research.va.gov/>

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