# GUIDE TO DETECT AND MANAGE HEARING LOSS DURING THE MANAGEMENT OF DRUG-RESISTANT TUBERCULOSIS







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## Background

Quality of life in people with drug-resistant tuberculosis (DR-TB) can be badly affected by adverse reactions during treatment, and even after treatment due to sequelae from the disease itself or from medicines used to treat it. Anti-TB injectables used to be core drugs in the treatment of DR-TB. These drugs are known for causing adverse reactions that may have lasting effects, such as hearing loss.<sup>1,2</sup> In the 2018 update of the *World Health Organization (WHO) treatment guidelines for multidrug- and rifampicin-resistant TB (MDR-/RR-TB)*,<sup>3</sup> some medicines of the anti-TB injectable group (kanamycin and capreomycin) were deleted from the list of recommended DR-TB drugs, and only amikacin (Am) and streptomycin (S) were retained. These latter drugs have been placed lower in the hierarchy (to Group C from Group B previously) to be considered only if drug susceptibility test (DST) results confirm susceptibility and if high-quality audiology monitoring for hearing loss can be ensured. S is to be considered only if Am cannot be used (due to suspected or documented resistance or unavailability) and if phenotypic DST results confirm susceptibility.

As anti-TB injectables remain among the options for DR-TB treatment, it is important to have guidance on the detection and management of hearing loss during their use in DR-TB treatment. Hearing is a vital function for every individual and must be preserved. It is important to diagnose hearing loss as early as possible as it has a potential impact on children's learning and development, and, among adults, it has an impact on employment, education, general well-being and quality of life.<sup>4,5</sup>

This guide is intended to help health care providers use audiometry to make informed and patient-centered decisions to prevent and manage hearing loss resulting from the anti-TB injectables for DR-TB treatment.

### What part of the ear is relevant for hearing?

The inner ear contains the sensory organs for hearing and balance: the cochlea for hearing, and the semicircular canals for balance.



#### Figure 1: Hearing and balance functions of the inner ear

- 1. Torun, T., Gungor, G., Ozmen, Y., Bolukba, I., Maden, E., Bicakci, B., & Atac, G., et al. (2005). Side effects of associated with the treatment of multidrug-resistant tuberculosis. Int J TB and Lung Dis: 9 (12), 1317-1377.
- 2. Selimoglu, E. (2007). Aminoglycoside-induced Ototoxicity. current pharmaceutical design journal:13(1), 119-26.
- 3. World Health organization. WHO treatment guidelines for multidrug- and rifampicin-resistant TB (MDR-/RR-TB), 2018 update (Pre-final text), WHO/CDS/TB/2018.15
- Effects of hearing loss on development. American Speech-Language-Hearing Association (ASHA) https://www.asha.org/public/hearing/effects-of-hearing-loss-on-development/
   National Research Council (US) Committee on Disability Determination for Individuals with Hearing Impairments; Dobie RA, Van Hemel S, editors. Washington (DC): National
- Academies Press (US); 2004. Impact of hearing loss on daily life and the workplace.

### What is hearing loss?

A person is said to have hearing loss if they are unable able to hear as well as someone with normal hearing. Hearing loss may vary in severity. It can affect one ear or both ears and can lead to difficulty in hearing conversational speech or loud sounds.<sup>6</sup>

#### What are the causes and types of hearing loss?

**Sensorineural hearing loss** (SNHL) is a type of hearing loss in which the root cause lies in the inner ear or sensory organ (cochlea and associated structures) or the auditory or vestibulocochlear nerve (cranial nerve VIII). This cannot be medically or surgically corrected and is the most common type of permanent hearing loss. A common cause of SNHL is the use of medicines such as anti-TB injectables.

In contrast, **conductive hearing loss** is caused by a problem conducting sound waves anywhere along the route through the outer ear, tympanic membrane (eardrum), or middle ear (ossicles) which can lead to fluid accumulation, perforation, infection, etc.

Hearing loss can be pure SNHL or pure conductive hearing loss, and it can also be mixed.

#### What factors cause and exacerbate hearing loss?

Anti-TB injectables are ototoxic agents which cause hearing loss starting at high frequencies, similar to hearing loss seen with advancing age. A genetic predisposition adds to the possibility of developing such hearing loss. The risk is also greater in patients with HIV infection,<sup>7,8</sup> compared to non-HIV patients. The ototoxic effects of anti-retroviral therapy are well-documented.<sup>9</sup> Other ototoxic medicines are loop diuretics, large doses of non-steroidal anti-inflammatory agents and aspirin.<sup>10,11,12</sup>

#### How do we test hearing?

**Audiometry** is the procedure that tests a person's ability to hear various sound frequencies, and is used to identify and diagnose hearing loss. The test is performed using an electronic equipment called an **audiometer**. Audiometry may be done using air conduction and bone conduction tests. Both report hearing thresholds in a similar way; the difference is on how the stimulus is delivered, i.e., through the ear canal (air conduction) or through the bone behind the ear (bone conduction), as shown in the pictures below. Not all audiometers come with bone conduction testing capacity. Fortunately, screening audiometry only requires air conduction.

<sup>6.</sup> http://www.who.int/mediacentre/factsheets/fs300/en/

Harris, T., Bardien, S., Schaaf, HS., Petersen, L., De Jong, G., & Fagan, J.J. (2012). Aminoglycoside-induced hearing loss in HIV-positive and HIV-negative multidrug-resistant tuberculosis patients. South African Medical Journal: 102(6 pt 2), 363-6.

A Trebucq, V Schwoebel, Z Kashongwe et al. Treatment outcome with a short multidrug-resistant tuberculosis regimen in nine African countries. Int J Tuberc Lung Dis 22 (1): 17-25, 2018

Khoza-Shangase, K., Mupawose, A., & Mlangeni, N.P. (2009). Ototoxic effects of tuberculosis treatments: How aware are patients. African journal of pharmacy and pharmacology: 3(8), 391-399. (e-published ahead of print 17 Nov 2017)

<sup>10.</sup> Rybak LP. Ototoxicity of loop diuretics. Otolaryngol Clin North Am. 1993.

<sup>11.</sup> Curhan S, Eavey R and Curhan GC. Analgesic use and the risk of hearing loss in men. Am J Med Mar 2010. 123 (3): 231-237

<sup>12.</sup> Sheppard A, Hayes S, Chen G, Ralli M and Salvi R. Review of salicylate-induced hearing loss, neurotoxicity, tinnitus, and neuropathophysiology. Acta Otorhinolaryngol Ital v.34(2); 2014 Apr

#### Air Conduction



The **audiogram (Figure 2)** is a graph showing the result of a pure tone audiometry or the hearing test which determines the faintest tones a person can hear at selected pitches or frequencies from low to high. It illustrates the type, degree, and configuration of hearing loss, where patients' responses are recorded. A sound can be characterized by the following three main parameters:

- a. Frequency is the rate of sound pressure waves that determines the **pitch** of the sound. It is measured in Hertz (Hz). "Speech frequencies" refer to pitches of sound commonly attributed to human speech ranging from 250 to 6000 Hz. High frequency ranges from 2000-8000 Hz.
  - Example of low-pitch sound: thunder heard from far away (100 Hz)
  - Example of high-pitch sound: bird singing (2000-8000 Hz but can also be 1000 Hz)
- b.Intensity is the amplitude of the sound waves that determines the **loudness (volume)** of the sound. It is measured in decibels (dB).
  - Examples of different sound intensities measured in dB: rock band (120 dB), loud radio (80 dB), ordinary conversation (60 dB)
- c. Complexity is the interaction of the various frequencies and intensities that make up a sound.

The first two parameters can be recorded in an audiogram, with the frequency shown at the horizontal axis and the intensity down the vertical axis (**Figure 2**).

#### Figure 2: Sample of an audiogram



### What is considered normal hearing?

A number of authorities classify hearing as a) normal when the patient hears sounds presented at an amplitude of  $\geq$ 25 dB, b) mild hearing loss at 26-40 dB, c) moderate hearing loss at 41-55 dB, d) moderately severe hearing loss at 56-70 dB, e) severe hearing loss at 71-90 dB, and f) profound hearing loss at >90 dB.<sup>13</sup>

#### Table 1. Grades of hearing

Grade of hearing	Loudness (dB)	
Normal	≤25	
Mild	26-40	
Moderate	41-55	
Moderately severe	56-70	
Severe	71-90	
Profound	>90	

There are other scales that grade hearing, such as that from the WHO (*Annex 1*), the Bureau International D'Audiophonologie (BIAP) (*Annex 2*), and the Division of Microbiology and Infectious Diseases (DMID) (*Annex 3*). Countries may choose what grading scale best fits their setting in DR-TB treatment. The WHO Classification provides a simple representation of severity applicable to both adults and children. It allows determination of hearing thresholds per frequency per ear in case of ototoxicity, or the average hearing threshold across frequencies per ear. The BIAP Classification grading uses sub-grades of 1<sup>st</sup>, 2<sup>nd</sup>, 3<sup>rd</sup> degrees, allowing more detailed monitoring of hearing loss over time. It also allows one to get the average hearing threshold across frequencies per ear. The body across frequencies per ear in the streshold across frequencies per ear. The grade across frequencies per ear to get the average hearing threshold across frequencies per ear. The body across frequencies per ear in case of stresholds across are being used to grade severity. It also applies to both adults and children and has management suggestions.

13. Seddon JA, Godfrey-Faussett P, Jacobs K, Schaaf HS, et. al. Hearing loss in patients on treatment for drug-resistant tuberculosis. Eur Respir J 2012; 40: 1277–1286. DOI: 10.1183/09031936.00044812

#### How do we categorize hearing loss?

Hearing loss can be categorized according to frequency, amplitude, whether unilateral or bilateral and whether it is sensorineural, conductive or a combination of the two. *Figure 3* shows examples of audiograms demonstrating the hearing status of a patient on DR-TB treatment with progressive hearing loss.<sup>13</sup>



#### Figure 3. Audiograms demonstrating hearing assessment

Audiogram descriptions of **Figure 3**: *Circles* demonstrate responses to sounds presented in the right ear, while *crosses* to those presented in the left ear. *Graph a*) normal hearing; *Graph b*) moderate unilateral high-frequency hearing loss; *Graph c*) moderately severe bilateral high-frequency hearing loss, and *Graph d*) severe bilateral hearing loss including high and mid frequencies.

High-frequency hearing loss in DR-TB patients is often the first sign of ototoxicity due to anti-TB injectables. However, often, patients do not notice hearing loss above 4000 Hz. Frequencies around 2000 Hz are the most important for understanding conversations. In *Graph c)* in **Figure 3**, where at 2000 frequency, hearing is recorded at 10 dB, the patient could still hear normal conversations; however, in *Graph d*, where at 2000 frequency, hearing is recorded at 80 dB (severe hearing loss), the patient already has difficulty hearing normal conversations.

## How do we monitor a person's hearing whilst on an anti-TB injectable?

Audiometry is the recommended test for all patients on anti-TB injectables.

- A **baseline** screening audiometry determining at least air conduction thresholds should be performed on all patients proposed to be treated with an anti-TB injectable.
- Regular audiological follow-ups must be undertaken for patients on anti-TB injectables. Detecting changes in the pure tone threshold directly, and using serial audiograms are the most effective means of detecting ototoxic hearing loss. Ideally, since the nature of the damage done by the ototoxic medicine leads first to high frequency hearing loss, a high frequency audiometry is recommended to determine air conduction thresholds with testing at 125 Hz to 20,000 Hz undertaken at weekly intervals.<sup>7,14</sup> However, in consideration of the fact that not all settings have access to technical resources that can test beyond 8000 Hz weekly, an alternate management is to do **monthly** screening audiometry including speech frequencies and higher frequencies of up to 8000 Hz while on the injectable.<sup>15</sup> More frequent monitoring may be necessary for patients who are at high risk of drug-induced hearing loss.
- As the ototoxic effect of anti-TB injectables may continue to progress up to 6 months after completion of therapy,<sup>16,17</sup> patients who were discontinued from the anti-TB injectable either because of adverse effects or because the treatment course has finished, are advised repeat audiometry **3 and 6 months** after completion of DR-TB treatment, if feasible.

#### Figure 4. Audiometry monitoring schedule for DR-TB patients on injectable



## How can health care providers help in preventing hearing loss?

The following points will help health care providers in preventing hearing loss among patients or detecting it early applying clinical awareness and doing audiometry to aid in decision-making regarding the use of injectables in DR-TB management.

 Health care providers responsible for initiating, dispensing and managing DR-TB treatment should be aware of the risk of ototoxicity, its early symptoms and signs, diagnosis, and management. This must be part of all training programs for clinical staff in DR-TB management. TB programs must have a management protocol based on the resources of the health system, with clear roles and responsibilities to ensure early detection and proper management of hearing loss.

<sup>14.</sup> American Speech-Language Hearing Association. (1993). Audiological Management of Individual Cochleotoxic Drug Therapy: Ad Hoc Committee on Audiologic management of Individuals Receiving Ototoxic and/or Vestibulotoxic Drug Therapy. http://www.asha.org/policy/GL1994-00003.htm (accessed 07 May 2013).

<sup>15.</sup> Department of health, Republic of South Africa. (2013). Management of drug-resistant tuberculosis: policy guidelines. https://www.health-e.org.za/wp-content/uploads/2014/06/ MDR-TB-Clinical-Guidelines-Updated-Jan-2013.pdf (accessed 18 March 2019)

Prahlad, D., & Malay, S. (2007). Audiologic monitoring of multi-drug resistant tuberculosis patients on aminoglycoside treatment with long term follow-up. BMC ear, nose & Throat disorder: 7:5. Doi: 10.1186/1472-6815-7-5. http://bmcearnosethroatdisord.biomedcentral.com/articles/10.1186/1472-6815-7-5

<sup>17.</sup> American Speech-Language Hearing Association. (1993). Audiological management of individual cochleotoxic drug therapy: Ad hoc committee on audiologic management of individuals receiving ototoxic and/or vestibulotoxic drug therapy. http://www.asha.org/policy/GL1994-00003.html

 Health care providers are responsible for making patients aware of the possible adverse effects of therapy by providing them information about the early symptoms of ototoxicity, such as tinnitus and dizziness, and the irreversible effects, such as hearing loss and vertigo. Patients must be taught to assess themselves everyday while on treatment with an injectable. Hearing loss will only be recognized by patients when it has already extended to speech frequencies; thus, a change in hearing or a complaint of hearing loss is already a late indicator, underscoring the need to stay alert for early symptoms.

### When is starting the anti-TB injectable contraindicated?

Abnormal hearing shown by a baseline audiogram reading of >25dB at frequencies up to 8000 Hz is a contraindication for starting any anti-TB injectable.

#### How is hearing loss managed?

The algorithm in **Figure 5** is a guide on what actions to take in response to audiometry results at baseline and during follow-up.

- <u>At baseline</u>: for audiometry that shows normal hearing (≤25dB) at frequencies between 125 8000 Hz, one may proceed with the use of an anti-TB injectable. Otherwise, if hearing is abnormal (>25dB), it is recommended to avoid the injectable.\*
- <u>During follow-up</u>: While on an injectable, monthly monitoring is needed at a minimum.
  - Monthly audiometry: proceed with the anti-TB injectable if hearing remains normal (≤25dB); however, permanently stop the injectable and replace with a non-ototoxic agent such as bedaquiline (Bdq), linezolid (Lzd) or delamanid (Dlm),\* if hearing is abnormal (>25dB), or if any of the following ototoxic changes occur at any frequency up to 20,000 Hz:
    - Decrease in hearing threshold by ≥20 dB at any one test frequency;
    - Decrease in hearing threshold by ≥10 dB at any two adjacent test frequencies;
    - Loss of response at three frequencies where response was previously obtained.

**Figure 5** is followed by sample audiograms to demonstrate these ototoxic changes in a patient on an injectable.

- Monthly symptom monitoring (or more frequently by the patient or health worker): for symptoms of vertigo, tinnitus or beginning hearing loss, temporarily stop the injectable and refer to an ENT specialist to rule out other causes by otoscopy, tympanometry and/or audiometry:
  - If audiogram results show no hearing loss, or SNHL is ruled out, continue with the injectable and do weekly audiometry. However, if vertigo persists despite normal tests, permanently discontinue the injectable as it can be intolerable and irreversible.
  - If audiogram results confirm SNLH either alone or mixed with conductive hearing loss, permanently stop the injectable and replace with a non-ototoxic agent, such as Bdq, Lzd, Dlm.\*

\* When stopping the anti-TB injectable, care should be taken to keep the patient on an effective regimen in consultation with the DR-TB case management committee. Reference may be made to the WHO new treatment guidelines for MDR-/RR-TB to guide the replacement of the injectable with other drug(s).<sup>3</sup> Knowing that there are alternatives to the anti-TB injectables, such as new and repurposed anti-TB agents, will empower DR-TB health providers to make patient-centered decisions.

### What can we do for patients who have developed hearing loss?

Advise and guide patients regarding suitable options for rehabilitation, including the following:

- Use of hearing devices, such as hearing aids and cochlear implants
- Sign language education
- Social and psychological support

Suitable referral protocols must be put in place for effective management of persons developing ototoxic effects of DR-TB treatment.





\* Individuals tested by audiometers beyond 8000 Hz and found to have hearing threshold of >25 dB at baseline are recommended to undergo more frequent audiometric monitoring, e.g., weekly or every 2 weeks. Any ototoxic change from baseline as defined above \*\* warrants discontinuation of the injectable.

\*\* Sample audiograms are presented in the following pages as **Patients 1, 2 and 3** showing the three ototoxic changes referred to above.

## Audiogram Right Ear



250	5	5	0
500	10	10	0
1000	5	10	5
2000	10	15	5
5000	15	20	5
8000	15	40	(25)



## Audiogram Left Ear







#### Patient 3: Loss of response at three frequencies where response was previously obtained

## Audiogram Right Ear

8000

25



NR



### Annexes

## Annex 1: Hearing Loss Severity Grading (WHO Classification)

http://www.who.int/pbd/deafness/hearing\_impairment\_grades/en/

Disabling hearing loss: refers to hearing loss greater than 40 dB in the better hearing ear in adults and greater than 30 dB in the better hearing ear in children.

Note: While audiometric descriptors may provide a useful summary of an individual's hearing thresholds, they should not be used as the sole determinant for the provision of hearing aids. The ability to detect pure tones using earphones in a quiet environment is not in itself a reliable indicator of hearing disability. Audiometric descriptors alone should not be used as the measure of difficulty experienced with communication in background noise, the primary complaint of individuals with hearing loss.

#### Figure 6: Hearing Loss Grades

26-40 dB	41-60 dB	61-80 dB	Over 81 dB
Slight/Mild	Moderate*	Severe	Profound
A person with this level of hearing loss will have trouble hearing and understanding soft speech, speech from a distance or speech against a background of noise.	A person with this level of hearing loss will have trouble hearing regular speech, even at close distances.	A person with this level of hearing loss may only hear very loud speech or loud sounds in the environment, such as a fire truck siren or a door slamming. Most conversational speech is not heard.	A person with this level of hearing loss may perceive loud sounds as vibrations

\*In the case of moderate hearing loss, the range for children is 31-60 dB.



## Annex 2: Hearing Loss Severity Grading (BIAP - Bureau International D'Audiophonologie)

## **BIAP Recommendation n° 02/1 bis, AUDIOMETRIC CLASSIFICATION OF HEARING LOSS**

Speech is made up of both acute and low-pitched sounds of highly-varied acoustic power. It cannot be measured by means of a single average acoustic level.

After a clinical examination, an audiometric measuring can be done in satisfactory acoustic conditions. It shows a loss in dB, compared with normal hearing level (dB H.L.), with reference to ISO standards. An average tone loss is calculated, taking as a starting point the loss in dB at various frequencies: 500 Hz, 1000 Hz, 2000 Hz and 4000 Hz. A frequency which is not perceived is considered as a loss of 120 dB. The total amount is calculated, divided by 4 and rounded up to the nearest unit. In the event of an asymmetric hearing loss, the average loss level, expressed in dB, is multiplied by 7 for the "good" ear and by 3 for the "bad" ear. The total is then divided by 10.

I. Normal or subnormal hearing	II. Mild hearing loss	III. Moderate hearing loss	IV. Severe hearing loss	V. Very severe hearing loss	VI. Total hearing loss - Cophosis
1. Average to	ne loss				
< 20 dB.	Between 21 and 40 dB.	<u>1st degree</u> : Between 41 and 55 dB. <u>2nd degree</u> : Between 56 and 70 dB. Some daily life noises are still perceived.	<u>1st degree</u> : Between 71 and 80 dB. <u>2nd degree</u> : Between 81 and 90 dB.	<u>1st degree</u> : Between 91 and 100 dB. <u>2nd degree</u> : Between 101 and 110 dB. <u>3rd degree</u> : Between 111 and 119 dB.	> 120 dB.
2. Sound and	speech percep	otion			
Mild tone disorder with no social consequences	Speech perceived if voice is <u>normal</u> , difficulties arise if voice is low-pitched or distant from the subject. Most of the daily life noises are perceived.	Speech is perceived if the voice is <u>loud</u> . The subject understands better what is being said if he can see his/her interlocutor.	Speech is perceived if the voice is <u>loud</u> and <u>close to the</u> <u>ear</u> . Loud noises are perceived.	Speech is not perceived. Only very <u>loud noises</u> are perceived.	<u>Nothing</u> is perceived

## Annex 3: Ear disorder severity grading scale (Division of Microbiology and Infectious Diseases)

Principally based on DMID Nov 2007 and CTCAE v.4.03 14-Jun-2010

Grade 1	Grade 2	Grade 3	Grade 4
<ul> <li>A. Hearing loss</li> <li>Definition: characterized by partial or complete loss of the ability to detect or understand sounds resulting from damage to ear structures</li> </ul>			
<b>ADULTS</b> enrolled on	monitoring program	on a 1,2,3,4,6 and 8k	Hz audiogram
Threshold shift of <b>15-25 dB</b> averaged at <b>2</b> contiguous test frequencies in at least <b>one</b> ear or subjective change in the absence of a Grade 1 threshold shift.	Threshold shift of >25 dB averaged at 2 contiguous test frequencies in at least one ear.	Threshold shift of >25 dB averaged at 3 contiguous test frequencies in at least one ear. Therapeutic intervention indicated.	Profound bilateral hearing loss: Threshold <b>&gt;80 dB</b> <b>HL at ≥2 kHz</b> Non-serviceable hearing
ADULTS not enrolled	l on monitoring progr	am	
N/A	Hearing loss but hearing aid or intervention not indicated; limiting instrumental activities of daily living (IADL)**	Hearing loss with hearing aid/ or intervention indicated; limiting self-care ADL.*	N/A
CHILDREN enrolled	on a monitoring prog	ram on a 1, 2, 3, 4, 6,	& 8 kHz audiogram
Threshold shift <b>&gt;20</b> <b>dB</b> at <b>8 kHz</b> in at least <b>one</b> ear	Threshold shift <b>&gt;20</b> <b>dB</b> at <b>4 kHz</b> and above in at least <b>one</b> ear.	Threshold shift >20 dB at 3 kHz and above in at least one ear; Hearing loss sufficient to indicate therapeutic intervention, including hearing aids. Additional speech-language related services indicated.	Pediatrics not enrolled: Audiologic indication for cochlear implant and additional speech- language related services indicated.
B. Tinnitus <b>Definition</b> : characterized by noise in the ears, such as ringing, buzzing, roaring, or clicking			
Mild symptoms Intervention not indicated	Moderate symptoms Limiting instrumental ADL**	Severe symptoms Limiting self-care ADL*	N/A
<b>Definition:</b> characterized by dizziness, imbalance, nausea, and vision problems			
N/A	Symptomatic Limiting instrumental ADL**	Severe symptoms Limiting self-care ADL*	N/A



#### \*Activities of daily living (ADL):- Self-care

ADL (Self-care) are a series of basic activities performed by individuals on a daily basis necessary for independent living at home or in the community. There are many variations on the definition of the activities of daily living but most organizations agree there are 5 basic categories.

- 1. Personal hygiene bathing, grooming and oral care
- 2. Dressing the ability to make appropriate clothing decisions and physically dress oneself
- 3. Eating the ability to feed oneself though not necessarily to prepare food
- 4. Maintaining continence both the mental and physical ability to use a restroom
- 5. Transferring moving oneself from seated to standing and get in and out of bed

Whether or not an individual is capable of performing these activities on their own or if they rely on a family caregiver to perform the ADLs serves a comparative measure of their independence.

#### \*\*Instrumental ADL (IADL)

IADLs are actions that are important to being able to live independently but are not necessarily required activities on a daily basis. The instrumental activities are more subtle than the Activities of Daily Living (Self-care). They can help determine with greater detail the level of assistance required by an elderly or disabled person. The IADLs include:

- 1. Basic communication skills such as using a regular phone, mobile phone, email or the Internet
- 2. Transportation either by driving oneself, arranging rides or the ability to use public transportation
- 3. Meal preparation meal planning, preparation, storage and the ability to safely use kitchen equipment
- 4. Shopping the ability to make appropriate food and clothing purchase decisions
- 5. Housework doing laundry, cleaning dishes and maintaining a hygienic place of residence
- 6. Managing medications taking accurate dosages at the appropriate times, managing re-fills and avoiding conflicts
- 7. Managing personal finances operating within a budget, writing checks, paying bills and avoiding scams.

https://www.payingforseniorcare.com/longtermcare/activities-of-daily-living.html#title2

Other ADL checklists (Katz index of Independence in Activities of Daily Living and Lawton-Brody Instrumental Activities of Daily Living Scale, are available at:

https://clas.uiowa.edu/socialwork/sites/clas.uiowa.edu.socialwork/files/NursingHomeResource/documents/Katz%20ADL\_LawtonIADL.pdf



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