FUTURE
OF WORK
FLEXIBLE • INNOVATIVE • RESILIENT

Inclusive Design Principles for Design of Workspace and Audio Visual Technologies

(including architectural recommendations and available AV technologies)

September, 2022 updated November 2023

Developed by the Institute for Human Centered Design (IHCD)
In conjunction with DCAMM, Perkins Eastman and the Future of Work Initiative

DIVISION OF CAPITAL ASSET MANAGEMENT & MAINTENANCE

World Health Organization

WHO / International Classification of Function, Disability and Health	Key Changes in Understanding Disability	Inclusive Design
Global Gold Standard	• **Functional limitation** is a *universal human experience* • **Mental and physical** reasons for limitations are equal • Defined disability as a *contextual* variable: functional limitation becomes disabling based upon the intersection of person and environments	**Environmental context defined *holistically*:** • Physical • Communication • Information • Policy • Attitude **Recommended Inclusive Design** as the most promising framework for identifying the "facilitators" that would: • Go beyond barrier removal • Minimize disability • Enhance participation and experience

World Health Organization   ICF

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Definition of Inclusive Design

Inclusive Design… **Universal** Design… **Design-for-All?**

> …a **framework** for the design of places, things, information, communication and policy that focuses on the user, on the widest range of people operating in the widest range of situations without special or separate design…
>
> **Human(ity)-centered design (of everything) with everyone in mind**

Why the Shift to Inclusive Design?

- In a world in which **Human Diversity** is not celebrated but **threatened**, *Inclusive Design* more directly states a **commitment** to **Diversity and Inclusion**.

- Inclusive Design resonates with a wide audience who can **intuitively** grasp the idea.

- Inclusive Design more accurately **communicates a continuous process of evolving** ever more responsive **solutions to changing human realities**.
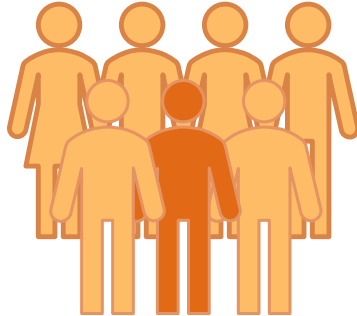
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Prevalence of Disability

Global

WORLD REPORT ON DISABILITY
World Health Organization   THE WORLD BANK
2021

- 1 Billion people
- **1** in **7** people on the planet have a disability
- *World's largest minority*

United States

- 61 Million US Adults
- **1** in **4** Adults
- *US Largest minority*
- **40%** of people **65+**
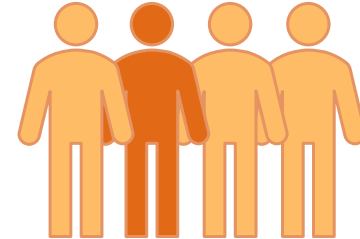
Why is the U.S. prevalence of disability so much higher?

- U.S. committed to gathering data on disability
- Counts adults from age 22 to the end of life
- Counts the spectrum of brain-based conditions, which many parts of the world don't
- Counts chronic health conditions, which many parts of the world don't

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Disability Impacts Massachusetts

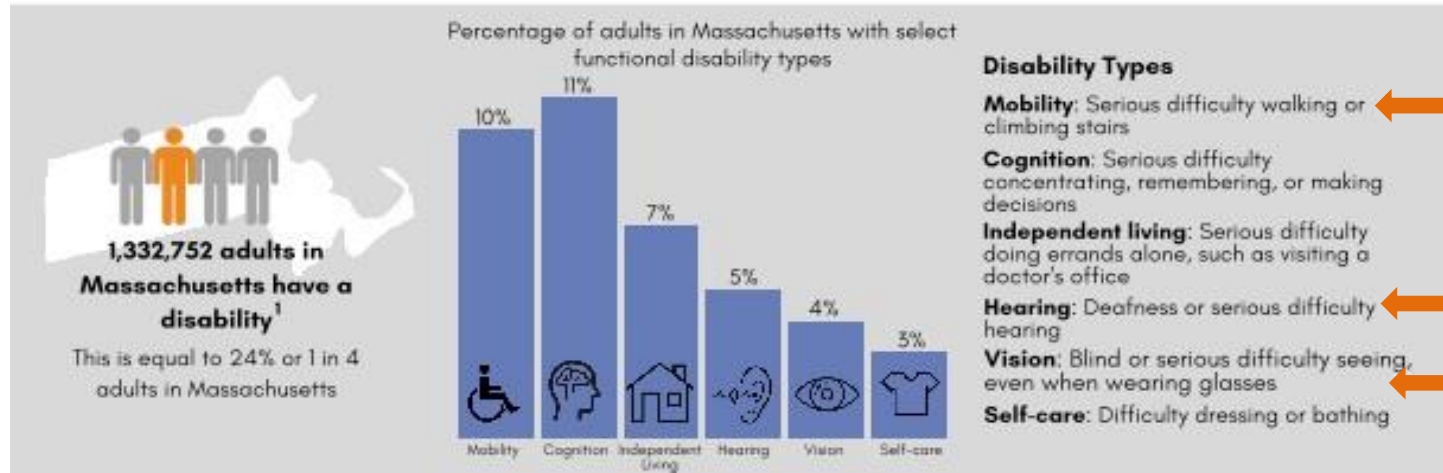CDC's National Center on Birth Defects and Developmental Disabilities
DISABILITY IMPACTS **MASSACHUSETTS**

Everyone can play a role in supporting more inclusive state programs, communities, and health care to help people with, or at risk for, disabilities be well and active in their communities. Join CDC and its partners as we work together to improve the health of people with disabilities.

Percentage of adults in Massachusetts with select functional disability types

11% — Cognition
10% — Mobility
7% — Independent Living
5% — Hearing
4% — Vision
3% — Self-care

1,332,752 adults in Massachusetts have a disability[1]

This is equal to 24% or 1 in 4 adults in Massachusetts

Disability Types

Mobility: Serious difficulty walking or climbing stairs

Cognition: Serious difficulty concentrating, remembering, or making decisions

Independent living: Serious difficulty doing errands alone, such as visiting a doctor's office

Hearing: Deafness or serious difficulty hearing

Vision: Blind or serious difficulty seeing, even when wearing glasses

Self-care: Difficulty dressing or bathing

Just **1.4%** use wheelchairs

Just **0.22%** are culturally deaf

7.7% of the adults are legally blind

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Categories of Functional Limitation

Physical

MOBILITY

REACH

DEXTERITY

STRENGTH

STAMINA

Sensory

HEARING - Number of adults with hearing trouble: *37.5 Million*
- 15% of adults
- 0.22% are culturally deaf (ASL as primary language)

SIGHT - Number of adults with vision trouble: *24.8 Million*
- 7.7% of adults are legally blind
- 85% of adults with vision limitations have low vision
- Less than 10% of legally blind Americans read braille
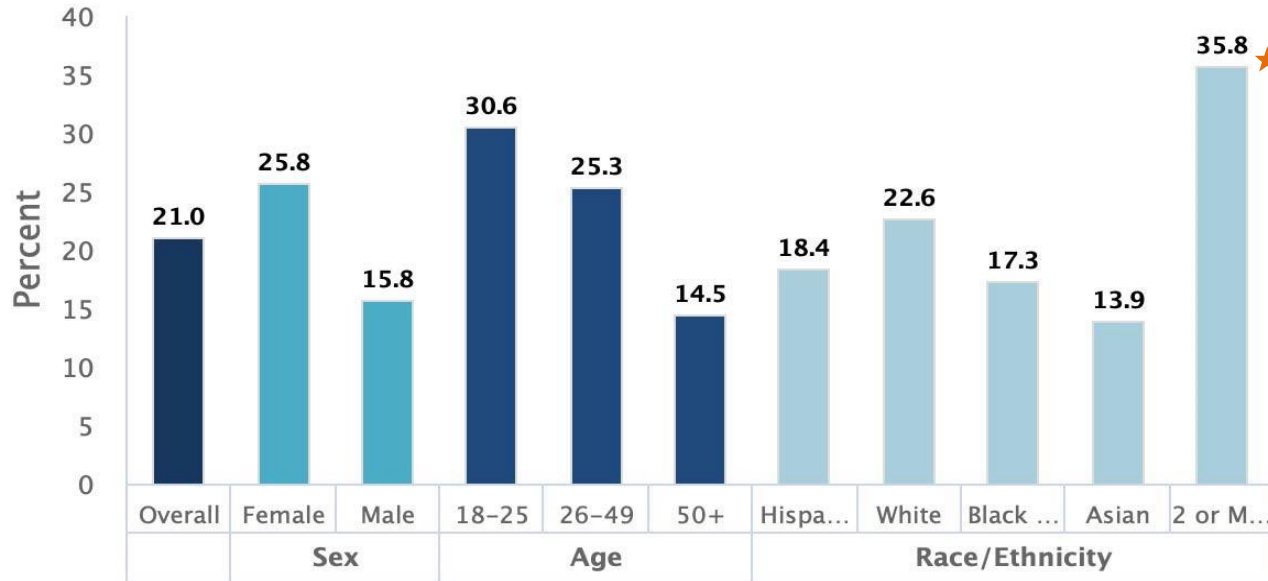
SPEECH
TOUCH

Brain-based

LEARNING

NEUROLOGICAL

DEVELOPMENTAL

MENTAL HEALTH

COGNITIVE

BRAIN INJURY

DEMENTIA

SUBSTANCE USE

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Prevalence of Mental Illness

## Past Year Prevalence of Any Mental Illness Among U.S. Adults (2020)

Data Courtesy of SAMHSA

★ People who identify as being or 2 or more races – now 10+% of population – Highest rate
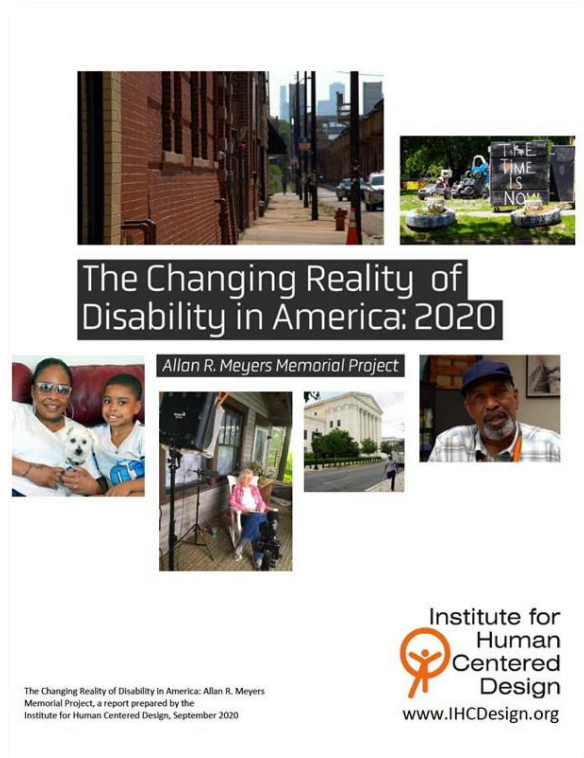
Proportion of Older Workers Highest in History

Figure 1. Population share, by age group, 1996, 2006, 2016, and projected 2026

Percent

Legend:
- ● 16 to 24
- ● 25 to 54
- ● 55 and older

*40% of people over 65 have a disability
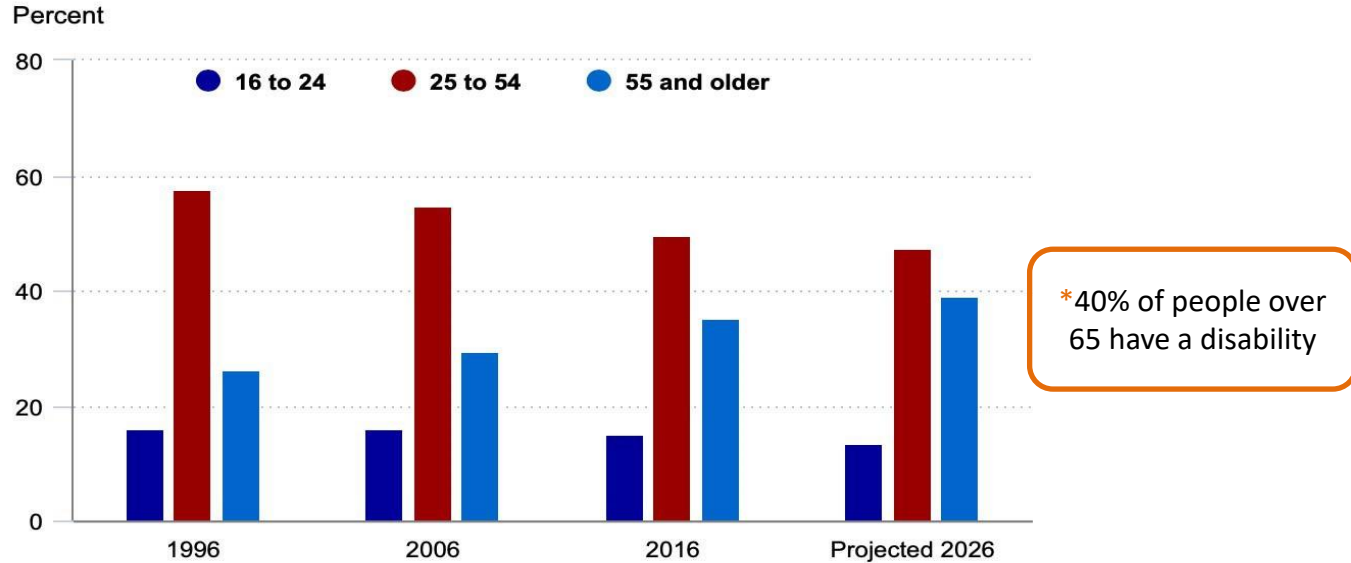
Click legend items to change data display. Hover over chart to view data.
Source: U.S. Bureau of Labor Statistics.

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Changing Reality of Disability-Resources

The Changing Reality of Disability in America: 2020

Allan R. Meyers Memorial Project

Institute for Human Centered Design
www.IHCDesign.org

The Changing Reality of Disability in America: Allan R. Meyers Memorial Project, a report prepared by the Institute for Human Centered Design, September 2020

The Changing Reality of Disability in America addresses the role of inequity and racism in relation to disability

Paper & Documentary film:
www.HumanCenteredDesign.org

The highest prevalence of disability is among Black, Indigenous and People of Color (BIPoC)

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General Facts	The Dilemma of Disclosure	Design as a Civil and Human Right
• Most physical and mental conditions are along a **continuum of severity** from mild to significant. • **Non-apparent conditions** are the norm. Beware of people who are confident that they can 'spot' disability. • Overwhelming majority of disabilities are **acquired** over the course of life.	• **76% of employees** with disabilities in a recent large survey report **not fully disclosing their disabilities** at work. **Make It Safe for Employees to Disclose Their Disabilities** Laurie Henneborn June 29, 2021	• Accessibility laws and codes affirm that **design is a civil and human right** for people with disabilities.

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Civil Rights Law: Regulations + Standards

Civil Rights Law	2008 ADA Amendment Act
Regulations defined: • A **Protected Class** of people with disabilities with rights to non-discrimination • The responsibilities of public + private entities	The 2008 Amendment Act clarifies the **Protected Class** to include **Bodily Functions**: • Prohibits consideration of mitigating measures such as medication, assistive technology, and reasonable accommodations or modifications when determining whether an impairment constitutes a disability • Limitations that are episodic or in remission will be considered as if active • Temporary impairments may meet the definition of disability • Chronic health conditions, so prevalent for many Americans, add many more people to the "ADA Covered Class"

ADA Regulations & Policy

Infrastructure for Accessibility	Requirements for Modification of Policy
• Administrative Requirements • Reasonable Modification of Policies, Practices, and Procedures to ensure program accessibility • Equal Employment Opportunity • Program Accessibility • Effective Communication • Facility Accessibility	Policies and practices must be in place to provide equal opportunity to programs for people with disabilities. If needed, modifications must be made to other policies, practices, and procedures if they result in discrimination against people with disabilities. It is important to understand the distinction between policies or practices that are themselves discriminatory, and policies which are neutral, but which may need to be modified on a case-by-case basis. A public entity is not required to provide an accommodation or modification if it would create a significant alteration in services or an "undue" financial or administrative burden. Where an accommodation would result in great difficulty or expense, the public entity must determine if another reasonable accommodation or modification is available. [ADA title II Regulations]

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ADA Regulations

Effective Communication

Integrated Setting

Application of Standards

Ensure communication is equally effective as everyone else

- Provide auxiliary aids + services
- The key: **Consider the nature, length, complexity, and context** of the communication in choosing a solution.

Equal participation of individuals with disabilities

- Integrated to the maximum extend appropriate.
- Separate programs permitted where necessary.
- Cannot be excluded from regular program.

In new construction and major alterations, the most stringent accessibility requirements are to be applied regardless of whether they are contained in the ADA standards & regulations or in 521 CMR (MAAB).

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Summary of Findings from Survey of State Employees with Disabilities

Developed by the Institute for Human Centered Design (IHCD)
In collaboration with DCAMM, Perkins Eastman and
*the Future of Work Initiative*

September 2023

About the Survey

- In 2022, we surveyed a sampling of state employees with disclosed disabilities about preferences/necessities to succeed in their work environment to inform design of hybrid work spaces —the Future of Work
- Accessible survey administered via Survey Monkey
- Survey respondents: 57 state employees with self-identified disabilities
- Questions in the survey asked about:
  - Type of functional limitation/disability
  - Technology needs for remote/hybrid work
  - Ergonomic needs (chair, desk, other furniture)
  - Protocols and practices to function and succeed in the workplace

Do you have a functional limitation or a disability? The state's goal is to provide as equitable as possible a workplace by anticipating the diversity of needs and preferences of state employees. Please check all that apply. If none, leave blank.
Answered: 52 Skipped: 5
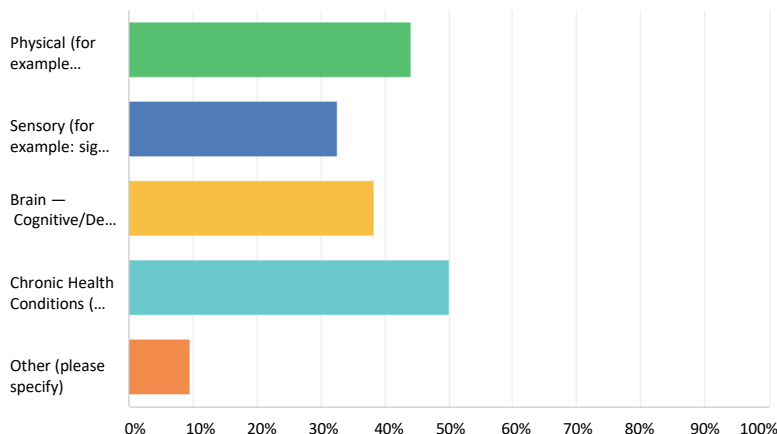
Note: The survey was sent to a limited number of state employees who have disclosed a disability. Given low rates of disclosure for non-apparent conditions, the findings are an undercount of conditions that are among the most common reasons for disability including brain-based disabilities (including mental health conditions, learning disabilities, and neurodiversity) and people with hearing loss.

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Summary of Self-Identified Disabilities

Q5: Physical:
What kind of functional limitation or disability do you have? Please check all that apply. If none, leave blank.

Mobility — 41.94%
Dexterity (Difficulty... — 38.71%
Upper body limitations... — 32.26%
Limb difference — 3.23%
Strength — 29.03%
Stamina — 32.26%
Other (please specify) — 41.94%
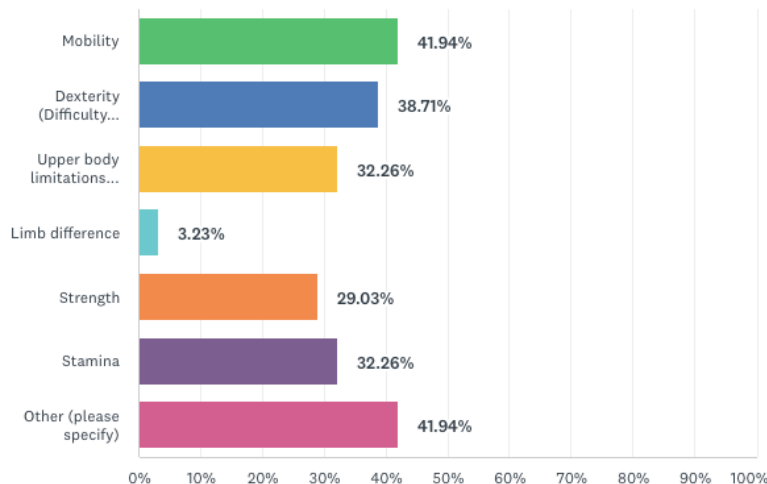
Q6: Sensory:
What kind of functional limitation or disability do you have? Please check all that apply. If none, leave blank.

Sight — 81.25%
Hearing — 43.75%
Touch —

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Summary of Self-Identified Disabilities

Q7: Brain:
Cognitive/Developmental/Mental health: What kind of functional limitation or disability do you have? Please check all that apply. If none, leave blank.

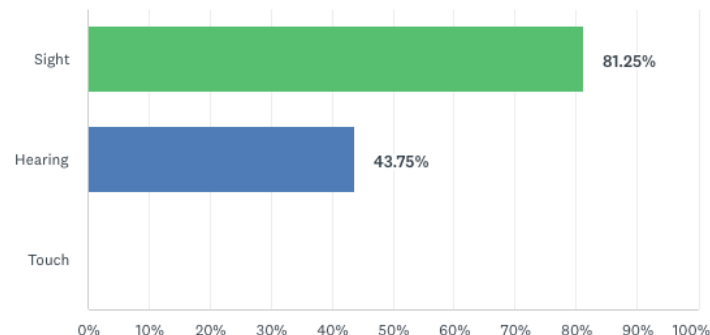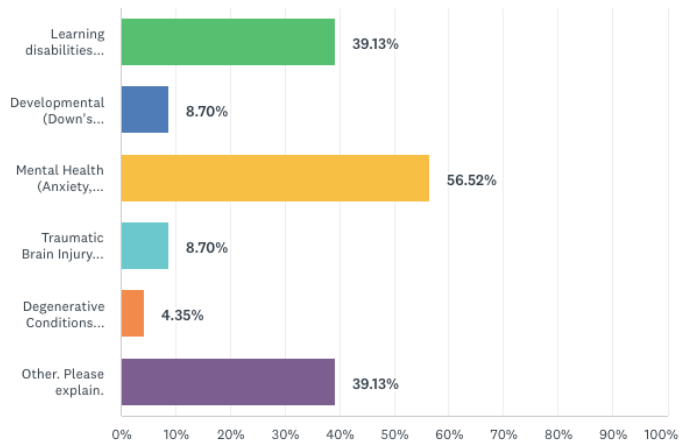|	
Learning disabilities...	39.13%
Developmental (Down's...	8.70%
Mental Health (Anxiety,...	56.52%
Traumatic Brain Injury...	8.70%
Degenerative Conditions...	4.35%
Other. Please explain.	39.13%

Q7: Brain-Based

Q8: Chronic Health Conditions:
What kind of functional limitation or disability do you have? Please check all that apply. If none, leave blank.

Arthritis	31.25%
Autoimmune diseases (fo...	25.00%
Diabetes	25.00%
High blood pressure	21.88%
Asthma	46.88%
Allergies	46.88%
Multiple Chemical...	6.25%
Heart disease	3.13%
Multiple sclerosis (MS)	3.13%
Parkinson's disease	
Other. Please explain.	34.38%

Q8: Chronic Health Conditions

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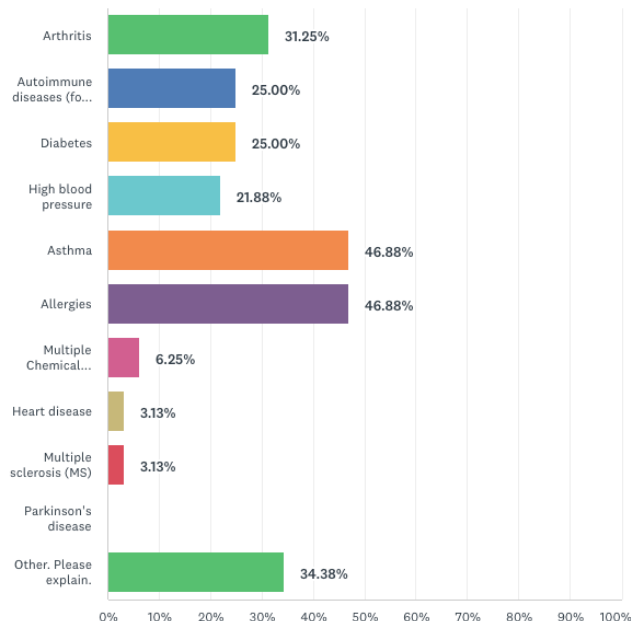
Assistive Technology (AT) + Ergonomics

62.96% of respondents said they use assistive technology.

Q10: If yes to the previous question [about AT use], please tell us specifically what works for you with the following:

- Physical (consider furniture and other ergonomic accessories)

ergonomic chair work chair table office door desk need
height adjustable Visual adjustable

- Technological Hardware (e.g., specific laptop/monitor type or size, specific keyboard or mouse obtained for better dexterity, etc.)

Large printer laptop ergonomic mouse keyboard
ergonomic keyboard monitor Bluetooth
Large Monitor screen mouse

- Technological Software (including apps, browser extensions)

JAWS software Dragon Zoom dragon naturally speaking

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Physical + Technological Conditions

Q11:

Through working away from the office during the pandemic, have you developed insights about the physical and technological environmental conditions you need?

- "One general concern is around **hybrid meetings – and the ability for those working remotely to feel equally part of the meeting** – will be difficult to tell who is speaking within a conference room if multiple people are there and you are attending remotely and they only show up as one participant on the meeting platform. And more broadly – how those working remotely will not miss out on more informal aspects of work/career development."

- "**Accommodations requests concerning eyesight and computer equipment** are not respected by the agency."

- "**I have felt so much more confident and competent in large group meetings because I have been able to see and hear content as well as everyone else.** Additionally, not always having the loudest voice (literally not figuratively) in the room no longer matters because virtual meetings have sort of democratized the participation experience. I am actually low-key dreading going back to the office and struggling to hear again."

- "**Carrying all my daily needs in and out of the office is putting a strain on my neck and back.** Working out of a space that is shared is fine for a couple of hours but staying for a full days work is difficult as we don't have as much as a box of Kleenex. Shared meeting rooms are not sanitary (no wipes) not ergonomic so hard for me to type."

- "Meetings should have a clear function. Virtual meetings should be moderated to ensure that people get the opportunity to talk if needed. Hand raises are helpful, so that everyone can access the discussion and over lapping or fast turn-taking does not leave staff with disabilities out of the conversation. **There should be emphasis on ensuring that anyone hosting virtual meetings are aware of accessibility issues and that they moderate their meetings accordingly.**"

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Q11:

Through working away from the office during the pandemic, have you developed insights about the physical and technological environmental conditions you need?

- "A **flexible schedule** that would allow me to work from home temporarily when there are Covid related health risks in my office space."

- "Before working from home I'd been hospitalized [with] double pneumonia and [with] 'moderate asthma' and was on 3 different kinds of inhalers, 2 different tablets and still frequently on steroids. Since working from home, recent PFT shows only 'mild asthma' and I'm now off of 2 of the meds. **Although air quality testing in the building allegedly showed 'acceptable' air quality, studies demonstrate that acceptable is not the same for those of us [with] compromised lungs.**"

- "Please understand that work from home has made work easier and more efficient for some individuals with disabilities. Please remain flexible with work preferences moving forward; the burden of traveling and working in an office 5 days a week is exhausting for some individuals with disabilities. **If we can perform our work effectively at home, please let that be an option."**

- "**Allow people to work from home** if they prefer and if they cannot physically report to the office, allow them to telework. **As of now, this is not allowed and it is negatively affecting employees**."

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Video Conferencing

Q16: Can you tell us about your experience with video conferencing soft wares given that it will continue to be a common tool in a hybrid work environment? Which of the following platforms are you familiar with? Select all that apply.
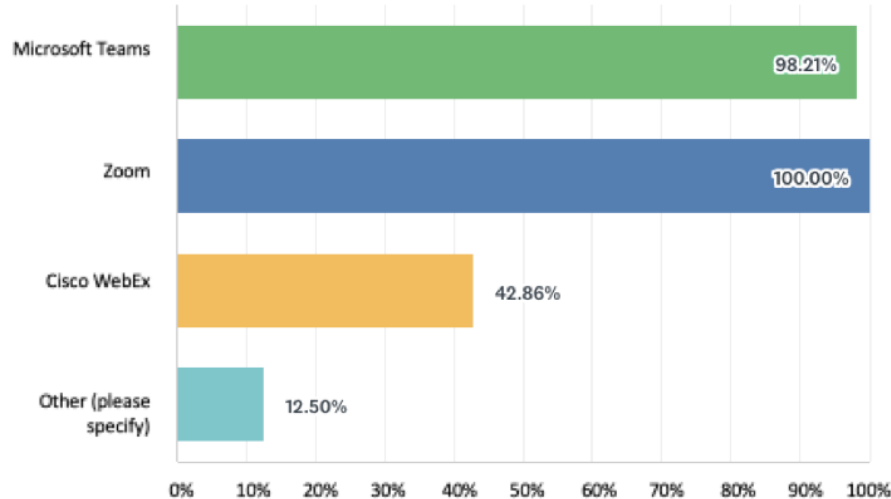
- Many respondents stated (in comments accompanying responses) a preference for Zoom to be the State's primary video conferencing software as it currently incorporates the most accessibility features. Teams follows closely behind, with easier integration into Outlook.

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Inclusive Design
Recommendations

In collaboration with DCAMM and the Future of Work Initiative with recommendations from the Institute of Human Centered Design (IHCD)

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Synopsis: Principles of Inclusive Design

Based on the information provided on statistics, codes and types of disabilities, we are committed to Inclusive Design as an integral part of the design, process and conversation. In collaboration with IHCD the following principles are to be integrated into the design process.

1. Equitable Use
2. Flexibility in Use
3. Simple, Intuitive Use
4. Perceptible Information
5. Tolerance for Error
6. Low Physical Effort
7. Size and Space for Approach & Use

The **Principles** are **measures through which to evaluate user experience** of the widest audience in your design decisions.

[Developed by a group of US designers and design educators from five organizations in 1997. Principles are copyrighted to the Center for Universal Design, School of Design, State University of North Carolina at Raleigh. The Principles are in use internationally.]

*Reference: **inclusive-design***

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Architectural Recommendations

Acoustics	Lighting
Sensitivity to office acoustics is a commonplace problem for people with a diverse set of functional limitations. They include many people with vision limitations who depend upon audible cues, people with a wide range of mental health conditions, people who are neuro-diverse, people with hearing loss, and people with chronic migraines. • Use ceiling clouds and/or acoustical wall panels to manage reverberations and noise. • Carefully analyze the use of white or pink noise machines since they can irritate listeners over time. Retrofit solutions include: • Permit employees to use noise canceling headsets and headphones designed for listening tasks. • Use a combination of passive soundproofing and Active Noise control (ANC) technology to reduce exposure to unwanted background noise and improve the signal to noise ratio when listening to another sound source.	Sensitivity to office lighting is a commonplace problem for people with a diverse set of functional limitations. They may include people with visual limitations, people who are neuro-diverse, and people with chronic migraines. • Provide controls for people to adjust ambient lighting when possible and/or use task lighting. • Provide Full spectrum natural lighting and lighting controls when possible • Provide anti-glare LED filters

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Architectural Recommendations (Continued)

Flooring	Ventilation and Air Purification
Flooring choices are significant for people with functional limitations relative to mobility, as well as those with sight limitations, and those with brain-based limitations relative to perceptual differences.	For employees with significant respiratory conditions who request improved ventilation and/or air quality in properties that have not been updated for this, consider taking steps to improve ventilation and employees' comfort and safety in the building which could include:

Flooring:

- Provide stable, firm & slip resistant flooring (both wet & dry)
- Carpet w/ pile height of ½" or less
- Provide flush transition between flooring types and eliminate thresholds to greatest extent possible.
- If a threshold is necessary the max. height at a doorway shall be ½ inch. Over this dimension shall have a beveled slope equaling 1:2. Exterior sliding doors to have a max. height of ¾ inches.
- Recess walk-off mats or provide a beveled transition edge.
- Use matte finishes to avoid glare
- Provide contrast between flooring and wall finishes
- Avoid strong color contrasts in flooring materials as this can be misperceived as changes in level, gaps, or obstructions.

Ventilation and Air Purification:

- Increase total airflow supply to occupied spaces
- Disable demand-control ventilation (DCV)
- Improve central air filtration

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Hybrid Meetings- Best Practices

Hybrid meetings via videoconferencing are here to stay.   Standard protocols for videoconferencing will ensure equitable experience by everyone whether present or remote.

The following protocols are appropriate to Teams or to Zoom:

- Someone should **moderate hybrid meetings** of three or more people.
- Confirm at the start if the meeting will be recorded and solicit requests for a recording
- The moderator should request that **each person identify themselves each time they speak.**
- The moderator should **review protocols for "raising hand" through the software** rather than on screen so that blind participants are not left out.
- The moderator should **use AI-powered live transcription** when setting up a meeting.   The moderator/host should enable the feature in their account settings so attendees can activate it in theirs.
- The moderator should **be familiar with how to pin/spotlight a sign language interpreter** so their location on the screen does not change as other members leave/join the meeting.
- In large meetings, the moderator should **review keyboard shortcuts to access the basic functions** within the platform if participants are using a screen reader such as JAWS or NVDA. Moderators should **have a readily accessible digital 'cheat sheet'** to share if participants using screen readers may be unfamiliar.
- In large meetings, moderator should **establish conventions for using the chat and Q&A functions** so that all employees can participate equally.

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Emergency Management Recommendations

- Create Floor Plans showing accessible routes with a 'You-Are-Here star' also noting location of manual fire alarms and extinguishers in all elevator lobbies but also replicate map at entries to agency floors.
- Provide 2-way communication (messages in either direction are confirmed on receipt) at elevator lobbies
- Designate staff daily as an Emergency Management monitor on each floor and for each agency to ensure that evacuation is ensured for people with disabilities who need assistance.
- Consider scrolling emergency reader boards in central locations to provide information about type of emergency or situation for people with hearing loss and/or brain-based conditions.
- Consider "directional sound" technology to guide people especially those with sight limitations or brain-based disabilities to find the way out.
- Recommended to have wall phones at conference rooms and support spaces in case of emergencies.
- Card readers recommended at IDF/IT closets and tenant entry doors to provide a secured reception as required – specific to each agency.
- Keyed locks to be provided at private offices if required by agency.
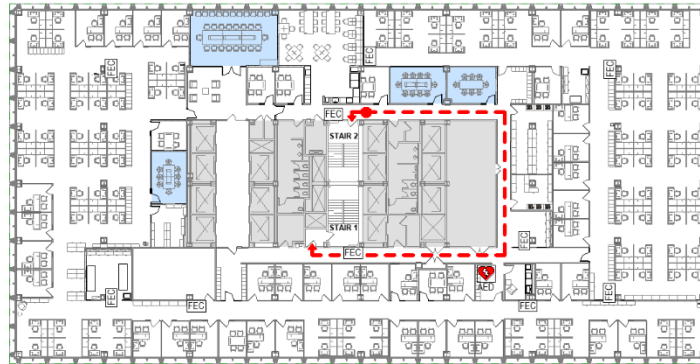
Typical sample Evacuation plan

LEGEND

●	YOU ARE HERE		CONFERENCE ROOM
▪▪▶	EVACUATION ROUTE	FEC	FIRE EXTINGUISHER CABINET
		AED	AUTOMATED EXTERNAL DEFIBRILLATOR

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Audio Visual Technology Inclusive Design Recommendations

Developed by the Institute for Human Centered Design (IHCD)
In collaboration with DCAMM, Perkins Eastman, AVH Technologies and
the Future of Work Initiative

September 2022

Audio Visual Technology to Support Inclusive Design

Accessible technology refers to the technology necessary to ensure equitable experience for employees who have disclosed a specific disability and to meet the State's responsibility to ensure "Effective Communication" as required in the Regulations of the Americans with Disabilities Act (ADA) of 1990.

The ADA Act requires effective communication be provided for people with sight, hearing or speech limitations. The effective communication regulation intends that a person with sight, hearing, or speech limitations can communicate with, receive information from, and convey information to, the State like anyone else. **Agencies must provide *auxiliary aids and services* when requested or required by law.**

Some examples are:

- qualified interpreters
- notetakers
- screen readers
- Computer Aided Real-Time Transcription (CART)
- written materials
- telephone handset amplifiers

- assistive listening devices
- hearing aid compatible telephones
- text telephones

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Inclusive Design & Accessibility

In addition to **removing physical barriers**, sensory limitations (hearing and sight), chronic health conditions and brain-based conditions need to be considered. **Hardware and devices that can be used include:**

- High-definition microphones
- High-definition camera
- Large monitor (if needed, high contrast keyboards)
- Very good speaker(s)

Hardware Devices

- Automated Speech Recognition (i.e., Individual tablets for a customer which can instantaneously interpret voice to text; in multiple languages
- Assistive Listening Devices (enhancing or increasing sound)
- Devices which support Optical Character Recognition (to scan and read printed forms)

Software

- Speech recognition supports
- Computer screen readers and/or Zoom Text Magnification (i.e., Fusion Professional, JAWS licenses through state partners)
- American Sign Language (ALS) provided by certified interpreters either in person or remotely

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Resources for Special Requests

Communication Access Realtime Translation (CART)
CART interpretation is captioning for live or virtual meetings. It can include interpretation by an onsite or remote human provider who is a professional CART writer. A CART Interpreter may be requested by attendees needing the service. Typically this request must be made two weeks in advance of the meeting. A notice on how to request interpreter services should be provided in public meeting notices. This is an ADA requirement. Agencies should consider having a policy and practice related to providing interpreter services when working with contracted vendors who may need the service.

American Sign Language (ASL)
ASL Interpretation typically requires a minimum of 2–3 weeks' notice to contract an interpreter through the Massachusetts Commission for the Deaf and Hard-of-Hearing (MCDHH)*: mass.gov/statewide-interpreter-and-cart-referral-service

NOTE for Video Conferencing with an ASL Interpreter: Make sure that meeting moderators know how to pin/spotlight interpreters so that their location on the screen does not change as other members leave/join the meeting. This is crucial for people who are Deaf and need ASL interpretation to stay connected and not have to continually relocate the interpreter during the course of the meeting.

*Note that securing an interpreter is not guaranteed but subject to availability.

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Recording Meetings

Recording Meetings in a Hybrid Environment

Ensure privacy and security while balancing the assets of recording where appropriate:

- Consider the AI-powered live transcription now built-into Zoom for a transcript of the meeting that each attendee can save at the end of the meeting. The transcript is searchable and can be referenced for notes. Be mindful that it records the name of the speaker (sometimes inaccurately) but it requires general caution and awareness about being recorded.
- See Massachusetts instructions for compliance with Open Meeting Laws when using video-conferencing here: mass.gov/info-details/updated-guidance-on-holding-meetings

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Assistive Listening

Hearing loss is one of the most common reasons for disability and critically important to accommodate in hybrid meetings.

In a large conference room, a Loop system might be used. It's a convenient system when a number of people with hearing loss can be expected to be present. Each speaker speaks into a microphone. The signal is boosted via the amplifier and the signal goes into a Loop of wire that covers the perimeter of the room (or at least a portion of it). The Loop puts out an electro-magnetic field that can be picked up by either

    a)   a hearing aid's T-coil switch or

    b)   a device with magnetic field pick-up capabilities that can then be used to send the sound into headphones to
        amplify sound for a person who does not have T-coils or may not be using hearing aids.

Alternatives to the Loop system are FM systems and Infrared systems. A sign on the wall should indicate the presence of an assistive listening system when the system is required by code based on the occupancy of the room.

 It is important that the agency with control over the room has knowledge of the system and how to use it.

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Assistive Technology

For some people, inclusively designed technology solutions will still need a bridge of assistive technology to create maximum usability for an individual. A strategy that works for one professional may not work for another. Remain flexible to an individual's technology needs within a particular context.

Note Taking Apps	Screen Readers	Screen Magnification	Text-to-Speech Apps	Voice/Speech Recognition
Note-taking apps assist individuals who have difficulty simultaneously listening and taking notes by providing methods to record, highlight topics from images, audio recordings/dictation, categorizing and documentation annotation: Sonocent, Notability, Evernote OneNote, Otter.ai etc. *These products benefit a wide range of people including people with a spectrum of brain-based conditions (e.g., learning disabilities, ADHD, mental health conditions, neurodiversity). Rather than considering these products as available only as accommodations, they are recommended to be made available to anyone whose performance could be enhanced by use of them.*	Screen Readers provide voice (text-to-speech) and braille output for computer displays, including Microsoft Office, browsers, email, cloud storage, shared documents, etc. for individuals who are blind or have low vision. Screen readers differ in detailed functions, the number of supported apps, and the degree to which those apps are supported: JAWS, NVDA, Microsoft Narrator, VoiceOver, TalkBack	Screen Magnification enlarges the visual output of a computer or mobile device for easier and more detailed viewing for individuals who have low vision: ZoomText, Windows Magnifier Zoom, (macOS)	Speech-to-Text Apps and Reading Tools read digital text aloud and can be helpful for people with difficulty reading, understanding or following written text, and for people with low vision. Features vary within different apps and may include reading highlighted text, reading entire documents, converting documents into audio files, and assisting with typing text: Read & Write, Kurzweil 1000 & 3000, ClaroRead, TextAloud (Windows PC), Balabolka (Windows), NaturalReader	Voice/Speech Recognition allows individuals to use their voice to control their computers. Dragon NaturallySpeaking, MS Windows 10 speech recognition and speech commands, macOS voice control and dictation, Google Docs voice typing *MassRelay is a free and confidential relay service. It enables those who are disabled to communicate over regular telephone lines through the use of a relay operator.* *Voice Carry-Over – 866-887-6619* *Speech to Speech – 866 645- 9870* *Hearing Carry-Over – 800-439-2370*

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