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AI, Automation, and the Human Mind: Navigating Cognitive Risk and Mental Strain in the Modern Workplace

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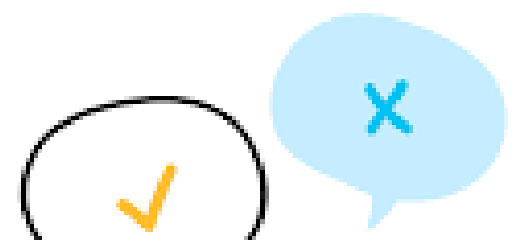
Objectives

1. Identify common forms of mental strain and cognitive fatigue related to AI-driven work environments.
2. Understand how automation-induced job changes can lead to reduced autonomy, deskilling, and loss of meaning at work.
3. Recognize early warning signs of AI-related mental health challenges in employees.
4. Apply a preventive, evidence-informed framework to assess and manage emerging psychosocial risks.

Two Truths and a Lie (AI Edition)



 **2 truths
& a lie**



Two Truths and a Lie (AI at Work Edition)

Statement 1

- AI reduces administrative burden in healthcare and occupational health settings.

Statement 2

- Automation improves safety and reduces human error.

Statement 3

- AI reduces employees' overall mental workload.



Dashboards
Alerts
Notifications
Escalations
False positives
Override justifications

“Well... the system
flagged it.”

“The algorithm scored
them high risk.”



- Irritability
- Brain fog
- Decision fatigue
- Reduced empathy
- Burnout



- What AI is actually doing to mental workload?
- Where cognitive risk is quietly increasing?
- And how you — as occupational health nurses — can identify and mitigate a hazard that doesn't look like a hazard?



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The Shift in Occupational Risk

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[https://youtube.com/shorts/LY6i5uEEkcA?
si=CNn419smYvnBLF8Z](https://youtube.com/shorts/LY6i5uEEkcA?si=CNn419smYvnBLF8Z)

or

[https://youtube.com/shorts/WvOuiR3iukg
?si=r_uu__bJ5xEEYUcL](https://youtube.com/shorts/WvOuiR3iukg?si=r_uu__bJ5xEEYUcL)

Types of Algorithmic Surveillance Tools

- Decision-Support Systems
 - Resume Screening
- Algorithmic Management Systems
 - Allocate tasks ie: Uber, Lyft, DoorDash
 - Warehouse Optimazation ie: Amazon
- Monitoring and Tracking
 - Computer Monitoring Software
 - GPS tracking
 - Biometric & Wearable Monitoring
 - Call center analysis



AI advancements.....

- AI powered video Analytics
- Predictive Safety Systems



<https://youtu.be/9xRi2LlikMU>

How does AI Reshape Job Demands and Work Design?

- Workload
- Autonomy
- Skill Use



Automation-Induced Job Changes

- Loss of Autonomy
- Deskilling
- Loss of Meaning



Ethical and Regulatory Concerns

- Bias & Discrimination
- Privacy Violations
- Lack of due Process
- Power Imbalance



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Occupational Risk of Cognitive Exposure

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- **Cognitive overload and technology-driven attention demands**
- **Worker perceptions of job insecurity and deskilling**
- **Mental health impacts such as stress, anxiety, and burnout**
- **Populations particularly vulnerable to AI-related strain**

Cognitive Overload in AI-Supported Work

AI-enabled work systems may increase cognitive demand by requiring workers to:

- Monitor multiple digital interfaces simultaneously
- Interpret AI-generated recommendations
- Override or verify automated decisions
- Rapidly process high volumes of information

Signs of Cognitive Overload

- Reduced concentration
- Decision fatigue
- Increased error rates
- Slower task completion

AI Stress Model



Sustained Attention Demands (“Technology Panic”)

Common contributors

- Alert fatigue
- Constant notifications
- Fear of missing system errors
- High expectations for rapid response

Consequences

- Mental exhaustion
- Decreased vigilance
- Reduced job satisfaction



Job Insecurity and Role Ambiguity

- Fear of job displacement
- Perceived deskilling due to automation
- Role ambiguity in human-AI collaboration
- Reduced autonomy in decision-making

These concerns may lead to:

- Workplace anxiety
- Reduced organizational trust
- Resistance to new technologies

AI-Related Stress and Anxiety

Workers may experience:

- Stress related to performance monitoring
- Anxiety about technological competence
- Pressure to continuously adapt to new systems
- Fear of algorithmic evaluation

Potential outcomes:

- Mental fatigue
- Reduced confidence
- Emotional strain

Burnout and Mental Fatigue

Prolonged Exposure Contributes to:

Cognitive fatigue
Reduced professional efficacy

Factors Contributing to:

Continuous digital interaction
High information load
Reduced human interaction
Limited recovery time

Vulnerable Worker Populations

Aging Workers

- Adjustment to rapidly evolving technologies
- Changes in cognitive processing speed

Workers with Lower Digital Literacy

- Difficulty interpreting AI outputs
- Increased training burden

Contingent and Contract Workers

- Limited access to training
- Reduced organizational support

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Measuring the Occupational Risk

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“If AI fatigue were a reportable occupational exposure, what would we measure?”



Possible metrics.....

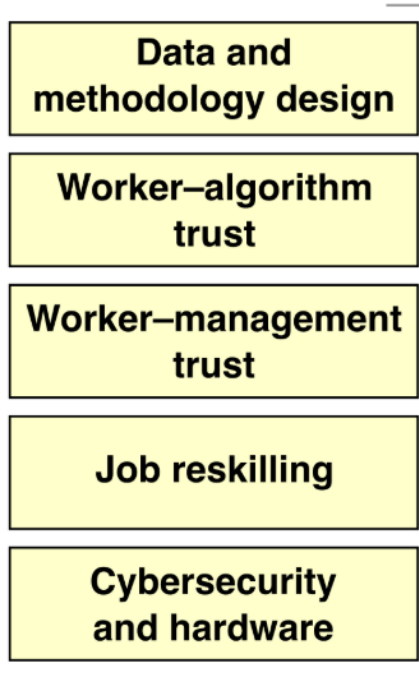
- Alert frequency
- Override frequency
- Dashboard time
- Notification density
- After-hours system engagement
- Self-reported digital rumination



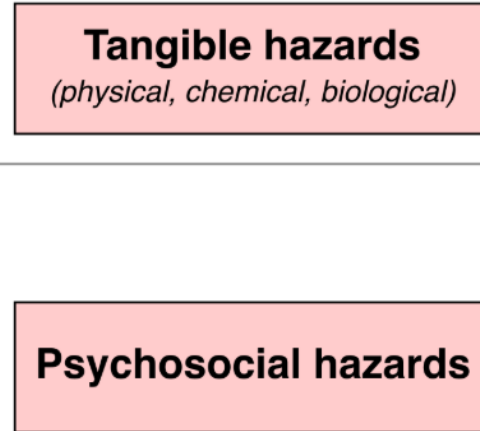
Algorithmic Hygiene.....



System characteristics



Hazard types



Hazard controls

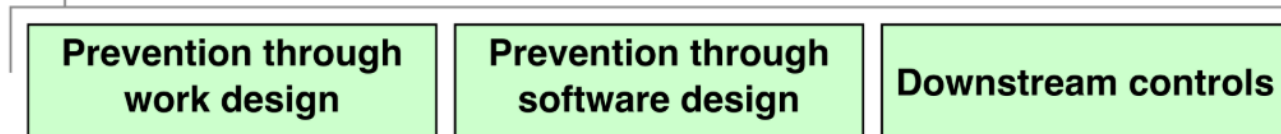
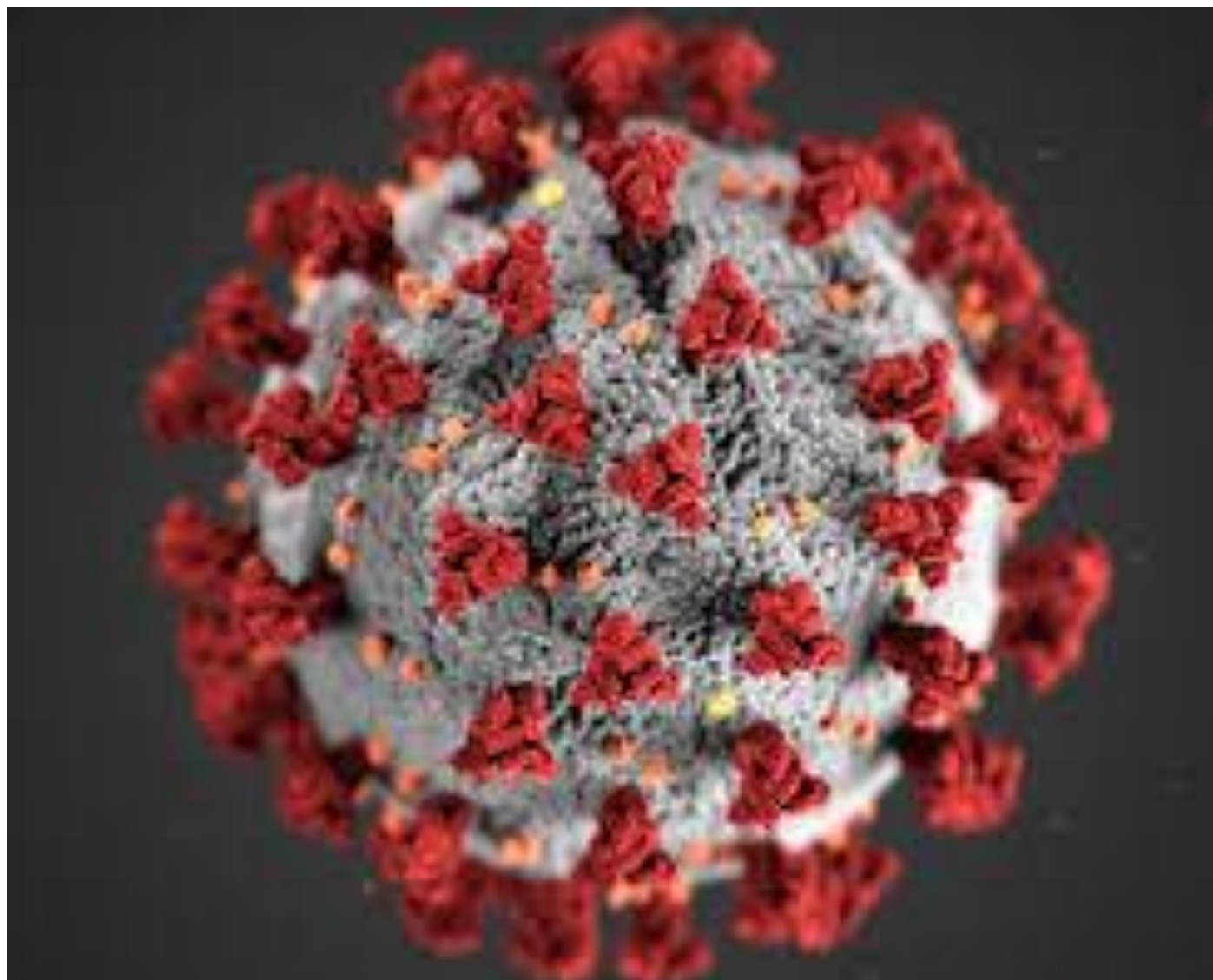


Figure 1. A framework for algorithmic hygiene. Several categories of AI system characteristics can each cause any of the standard occupational hazard types; they can mediate but not directly create any tangible hazards but can directly create psy...

- The term "trained algorithm," vs "artificial intelligence"
- Algorithms must be distinguished from the physical platforms
- Algorithms are software with no physical substance. While they cannot directly create any new "tangible" (physical, chemical, or biological) hazards, they do alter the risk profile of physical platforms or substances they control or interact with. **Algorithms can, however, directly cause psychosocial hazards by changing work organization and skills.**
- OEHS professionals can still use familiar exposure assessment tools ...while taking the algorithmic system's characteristics into account to enhance the assessment.
- There is a distinction between "prevention through work design" vs "prevention through software design"

Measuring
Digital
Transformation
Stress



Sample Questions (Likert Scale)

Perceived Control

- “I can override AI decisions when necessary.”

Workload Impact

- “AI systems have increased my work pace.”

Skill Adequacy

- “I feel sufficiently trained to use AI tools.”

Transparency

- “I understand how AI evaluates my performance.”

Job Security

- “AI threatens my long-term role.”

Identifying Worker Techno-Stress (Technostress Creators Scale)

Measures Five Core Dimensions:

- **Techno-overload** – Technology increases work pace
 - “Technology forces me to work faster.”
- **Techno-invasion** – Work intrudes into personal life
 - “I feel I must be available at all times.”
- **Techno-complexity** – Feeling inadequate using technology
 - “I lack the skills to use new systems effectively.”
- **Techno-insecurity** – Fear of job loss due to tech
 - “I worry others with better tech skills may replace me.”
- **Techno-uncertainty** – Constant changes in systems
 - “There are frequent changes in the technologies I use.”

Psychological Safety: AI in the Workplace

- Can employees safely question AI recommendations?
- Are mistakes treated as learning opportunities or punished?
- Are AI decisions understandable to staff?
- Can employees override AI without fear of retaliation?
- Are employees trained and supported in using AI tools?



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Preventing Psychosocial Risks in AI-Enabled Workplaces

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- Worker education and digital literacy
- Adaptive coping and workforce resilience
- Human-centered AI implementation
- Ethical AI governance and workplace policy



Preventive Framework for AI-Related Psychosocial Risk



Individual Level

- Education and digital literacy
- Coping and resilience skills



Organizational Level

- Human-centered AI design
- Worker involvement in technology adoption



Policy Level

- Ethical AI governance
- Transparent workplace technology policies



Worker Education and Digital Literacy

Workplace training includes:

- Understanding AI system capabilities and limitations
- Interpreting AI-generated recommendations
- Knowing when to question or override automated decisions
- Recognizing algorithmic bias and system errors

Benefits of digital literacy:

- Reduced technology anxiety
- Increased confidence and competence
- Improved decision-making

Digital Literacy Support Resources Internal

- Structured AI training programs
- Simulation-based learning environments
- Just-in-time learning modules
- Peer mentoring or technology champions
- Continuing education for digital competencies

Digital Literacy Support Resources

External Organizations

- NIOSH Future of Work initiatives
- National Library of Medicine (NLM)
- World Health Organization (WHO)
- Healthcare Information and Management Systems Society (HIMSS)
- American Association of Occupational Health Nurses (AAOHN)
 - AAOHN Academy Online Education Center (CNE courses)
 - Continuing education webinars
 - Professional development roadmap
 - Occupational health practice competencies

Digital Literacy Support Resources

Certificate & Continuing Education Programs

- AI Foundations for Nursing Professionals – Walden University
- AI Fundamentals for Healthcare – Chamberlain University
- AI for Health & Nursing – Coursera

Professional Education Initiatives

- AACN Artificial Intelligence Integration in Nursing Education
- N.U.R.S.E.S. AI Literacy Framework

Goal:

Prepare clinicians and occupational health professionals to use AI tools safely, ethically, and effectively.

Promoting Adaptive Coping and Workforce Resilience

- Organizations can promote adaptive coping by supporting:
 - Psychological safety in technology adoption
 - Open communication about workplace change
 - Stress management programs
 - Employee assistance programs (EAP)
- Protective factors include:
 - Social support
 - Clear expectations
 - Opportunities for feedback

Human-Centered AI Implementation

Human-centered
AI focuses on:

- Supporting human decision-making
- Maintaining worker autonomy
- Designing intuitive interfaces
- Reducing cognitive workload

Key principle:

- **AI should augment human capability — not replace human judgment.**

Worker Involvement in AI Implementation: Best Practices

Including
workers in
technology
evaluation

Pilot testing
AI systems
before full
deployment

Collecting
worker
feedback on
usability

Adjusting
systems
based on
workforce
input

AI Policy Development and Ethical Technology Use

Organizational
policies should
address:

Transparency in
AI decision-
making

Limits on
algorithmic
surveillance

Worker data
privacy
protections

Accountability
for automated
decisions

Ethical AI
principles:

Fairness

Transparency

Accountability

Human
oversight

Protecting Worker Well-Being in AI-Enabled Workplaces

- Effective prevention strategies include:
 - Workforce digital literacy education
 - Coping and resilience support
 - Human-centered AI implementation
 - Ethical and transparent AI policies

Six Principles for Healthy AI-Enabled Workplaces

1. Prioritize Worker Well-Being



- Focus on mental health and cognitive load

2. Promote Digital Literacy

- Provide AI training and ongoing education

3. Ensure Transparency

- Explain how AI makes decisions
- Build trust and fairness

4. Maintain Human Oversight

- Keep humans involved in critical decision-making
- Monitor AI systems for bias and errors

5. Mitigate Job Insecurity

- Communicate technology impacts on roles
- Offer reskilling opportunities



6. Foster an Ethical AI Culture

- Develop clear AI policies
- Uphold fairness and worker rights



The future of work must remain human-centered



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