

# ***Do you hear what I hear?***

## ***Reflecting on Auditory Display in Medicine***

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## What is auditory display?

- Displays that use sound to enhance the meaning of the display.
- Readily identifiable 🗣️



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## What is auditory display?

- Displays that use sound to enhance the meaning of the display.
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## What is auditory display?

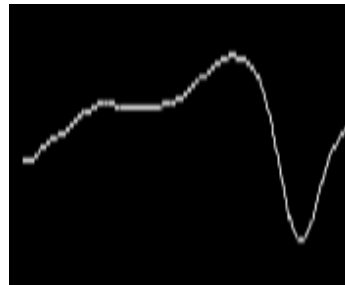
- Displays that use sound to enhance the meaning of the display.
- Readily identifiable  Windows Start Up  
 New Mail



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## Why use auditory display?

- Omnidirectional
- Identify transient events
- Reduction in required display space
- Reduce stress




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## Language of Auditory Display

- Auditory Icons – sound “image” 🗣️
- Earcons – abstract musical hierarchy 🗣️
- Audification – translation of physical sound 🗣️
- Sonification – mapping of data streams 

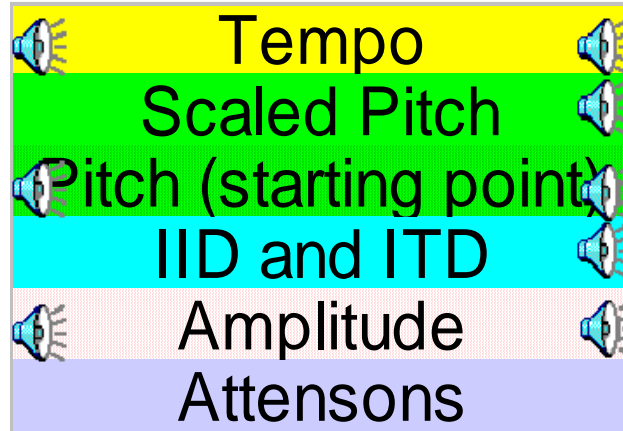


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[http://www.csulb.edu/colleges/coe/org/bme/respiratory\\_sounds/breath1.htm](http://www.csulb.edu/colleges/coe/org/bme/respiratory_sounds/breath1.htm)

## Auditory Elements of Context



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## Designing Auditory Displays

- Cognitive work analysis
  - Ecological Interface Design
  - Strategy Analysis
  - Social Organisation Analysis
  - Attentional Mapping
  - Worker Competencies Analysis



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## Ineffective use of auditory display

- Alarm signals 📢



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## Effective use of auditory display Anaesthesiology

- Sonification to provide information to anesthetists (Watson and Sanderson)
- Breathing sounds providing additional information
  - Normal 📢
  - Fluid in lungs 📢
  - Bronchial 📢
  - Asthmatic 📢



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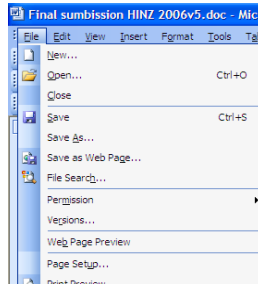


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## Effective use of auditory display Medical Records

- Menu selection 



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<http://www.dcs.napier.ac.uk/~gregory/>



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## Conclusions

- Enhance display without reducing visual attention
- Can reduce cognitive load on user
- Applied to medicine, can enable better communication and reduction of errors



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## Acknowledgements

- Catherine Burns for supervisory support
- Dominic Covvey for review and suggestions
- Canadian Institutes for Health Research for funding



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