The Relationship between Health IT Usability and Patient Safety: Towards an EHR Usability Safety Framework

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Improving People's Lives
through innovations in personalized health care

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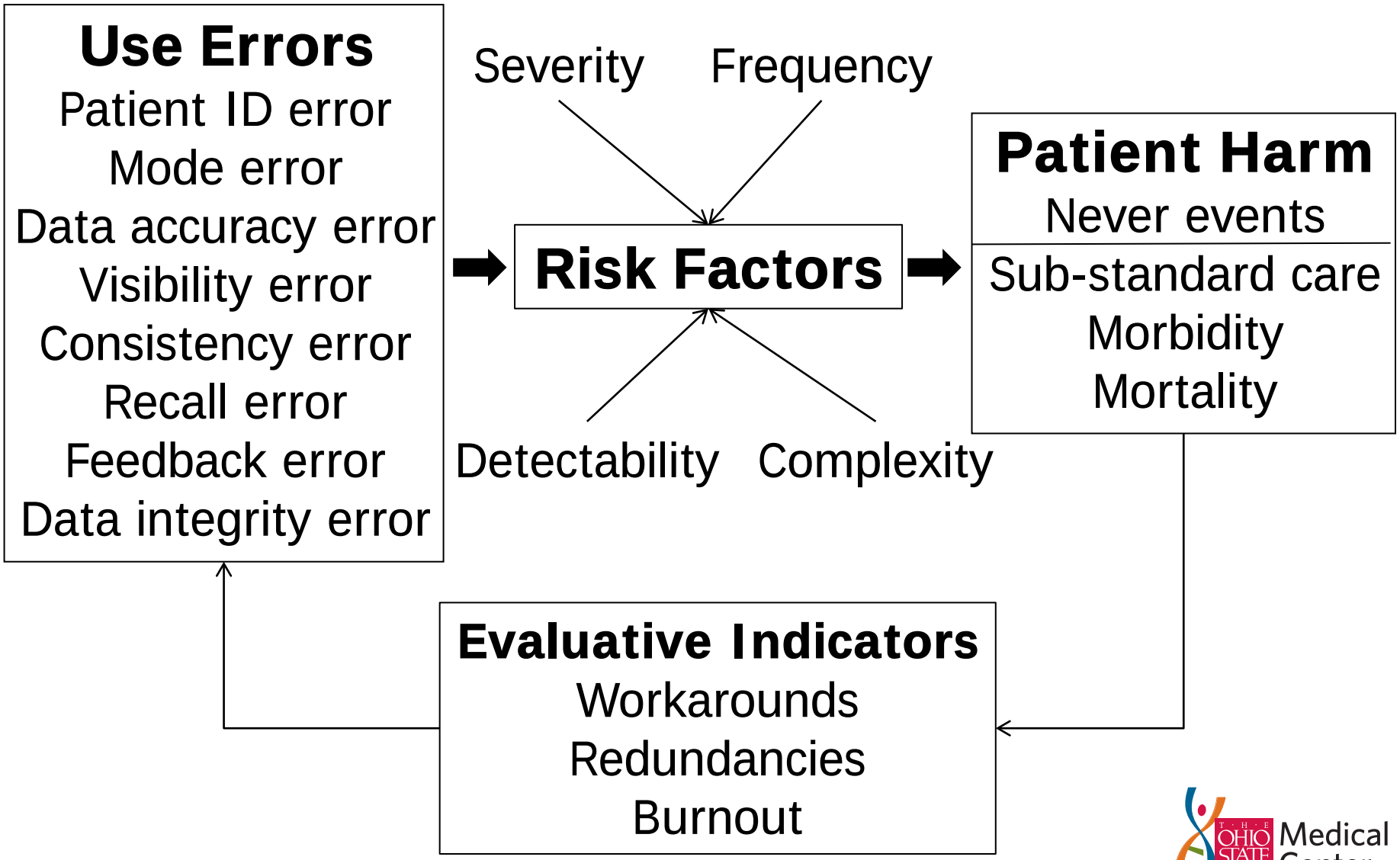
Working Definitions

Usability:
Extent to which a product can be used by specified users to achieve specified goals with effectiveness, efficiency, and satisfaction in a specified context of use

Patient safety:
System attribute that influences the risk of patient harm due to errors

The EHR-USF Framework



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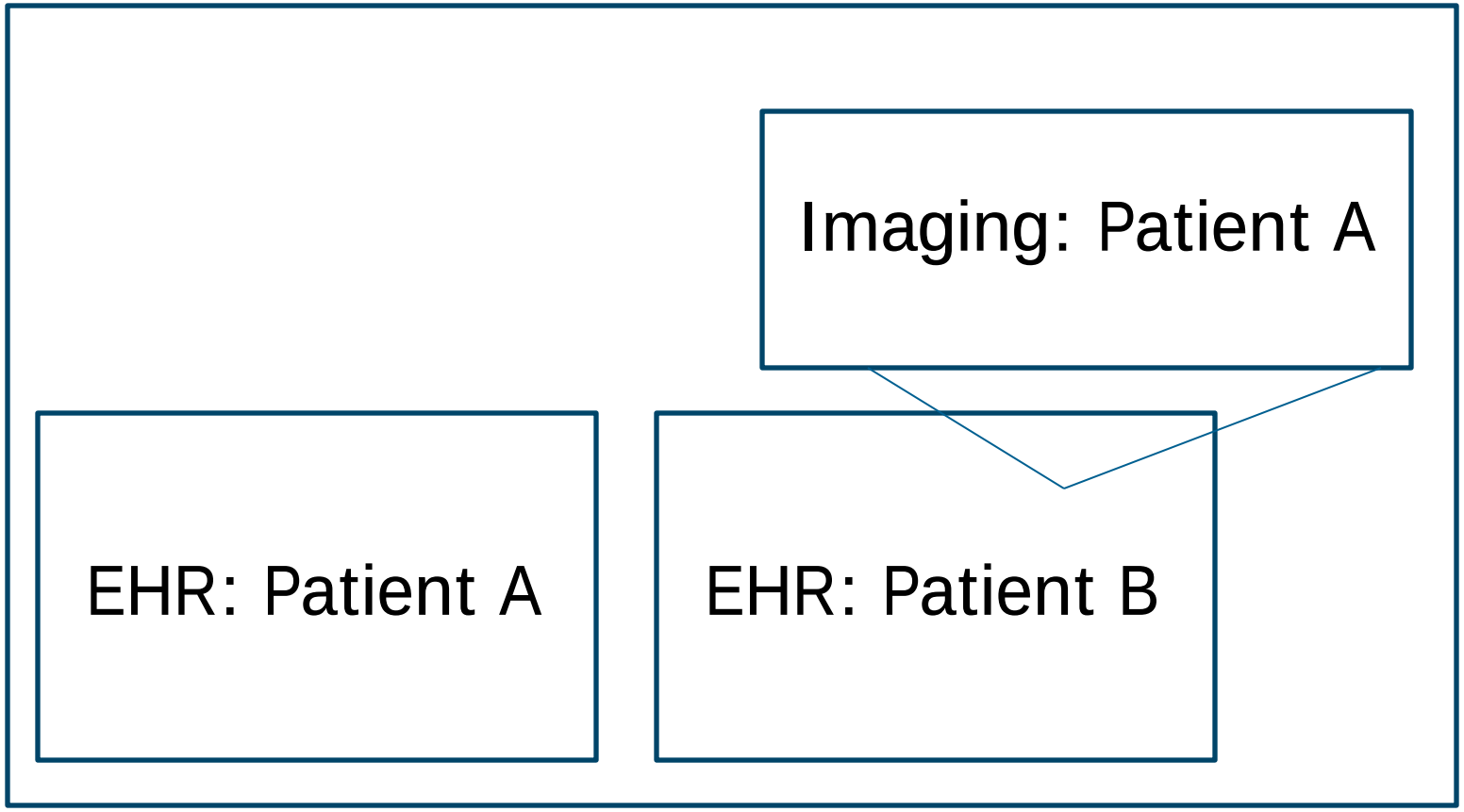
Use Error: Patient ID Error



Use Error: Mode Error

Direct Dose Mode (mcg/min)
Weight Dose Mode (mcg/kg/min)

Test Mode
Production Mode

Use Error: Data Accuracy Error

Lidocaine Hydrochlor

Use Error: Visibility Error

80 mg

Use Error: Consistency

Kilograms or pounds?

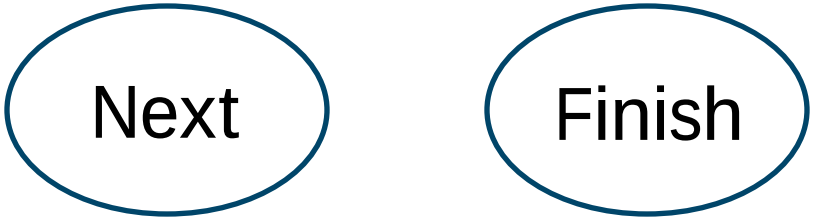
Use Error: Recall Error

One Time Dose

Use Error: Feedback Error

1 tablet

Use Error: Data Integrity Error



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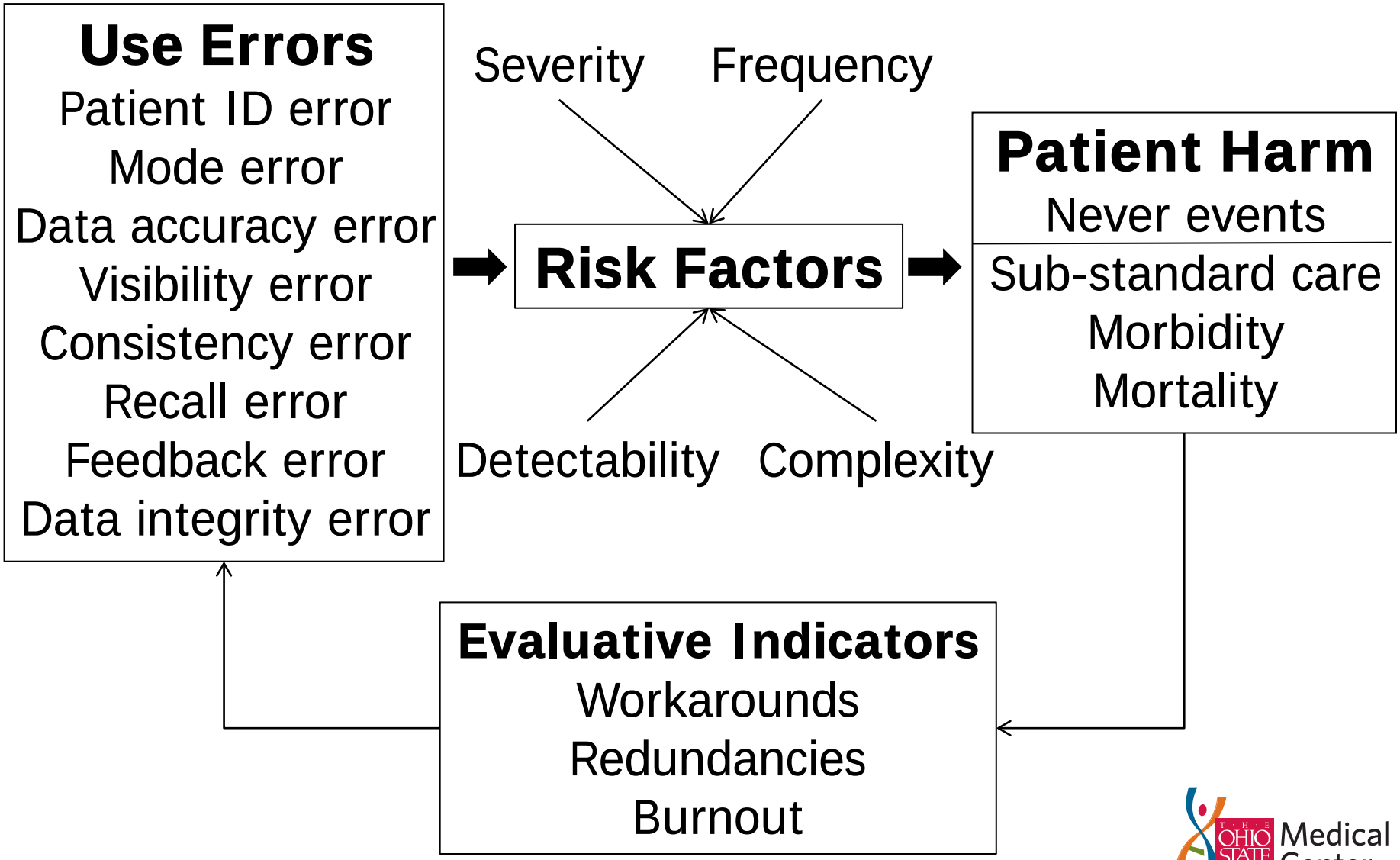

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Never Events

Wrong patient action of commission

Wrong patient action of omission

Wrong treatment action of commission

Wrong treatment action of omission

Wrong medication

Delay in care

Unintended care

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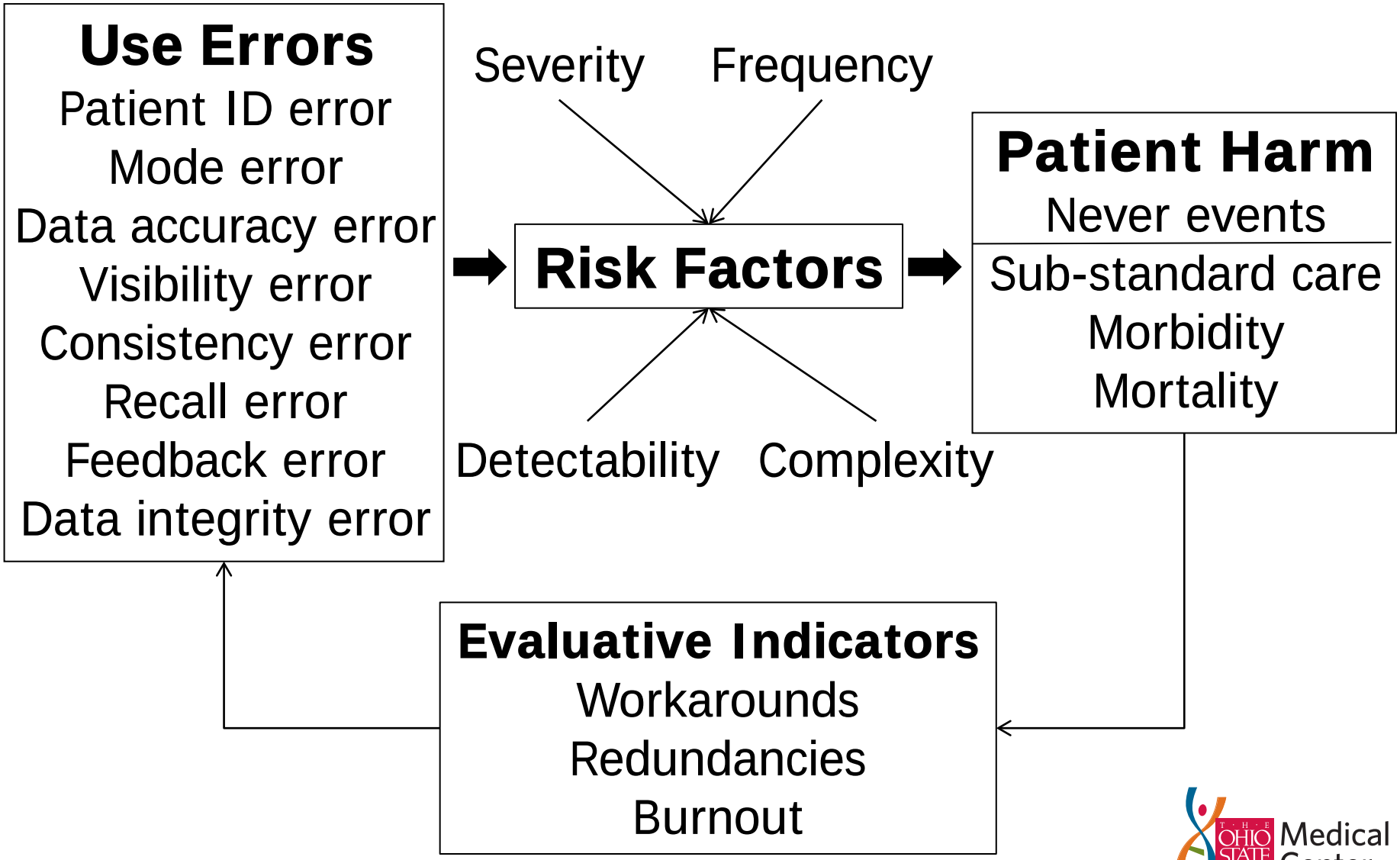

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Scenario #1: Ambulatory Care (Diabetic)

Includes NIST Test Procedures (V1.1)

§170.302.a Drug-drug, drug allergy, formulary checks
§170.302.c Maintain up-to-date problem list *
§170.302.d Maintain Active Medication List *
§170.302.h Incorporate Lab Test Results *
§170.304.h Clinical Summaries *
§170.306.a Computerized Provider Order Entry
§170.306.g Reportable Lab Results *
§170.302.g Smoking Status

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Scenario #1: Ambulatory Care (Diabetic)

Task 1: Review active patient medications and medication history to identify if prescription refills are needed and ensure that discontinued medications do not need to be renewed

Task 2: Review patient labs to determine if changes are needed for care plan

Task 3: Modify active medications

Task 4: Order new medications

Task 5: Update problem list

Task 6: Order a consult

Task 7: Document progress note

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Scenario #2: Inpatient Care (Chest Pain)

Includes NIST Test Procedures (V1.1)

§170.304.h Clinical Summaries *
§170.306.a Computerized Provider Order Entry
§170.302.q Automatic Log-off
§170.304.b Electronic Prescribing *
§170.304.j Calculate & Submit Quality Measures
§170.306.e Electronic Copy of Discharge Information
§170.306.h Advance Directives

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Scenario #2: Inpatient Care (Chest Pain)

Task 1: Document STAT administration
Task 2: Enter vital signs
Task 3: Order cardiac labs
Task 4: Modify active medications
Task 5: Review labs
Task 6: Document DNR status
Task 7: Determine status of STAT medication ordered 2 hours prior
Task 8: Finish handoff documentation
Task 9: Day 2. Review morning labs, vital signs
Task 10: Transfer to outpatient medications
Task 11: Print discharge summary
Task 12: Print a quality measure report

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Factors to Approach Real-World Complexity

- Increase dose of existing medication
- Drug interaction warnings: false alarms
- Taper dose for steroids
- First dose now and subsequent doses tomorrow
- Verbal order
- Change form of medication (PO to IV)
- Handoff
- Interruptions
- Follow-up documentation of prior work
- Batch transfer of medications

Thank you for your attention

Questions?

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