Leveraging Clinical Lab Results in Administrative Data

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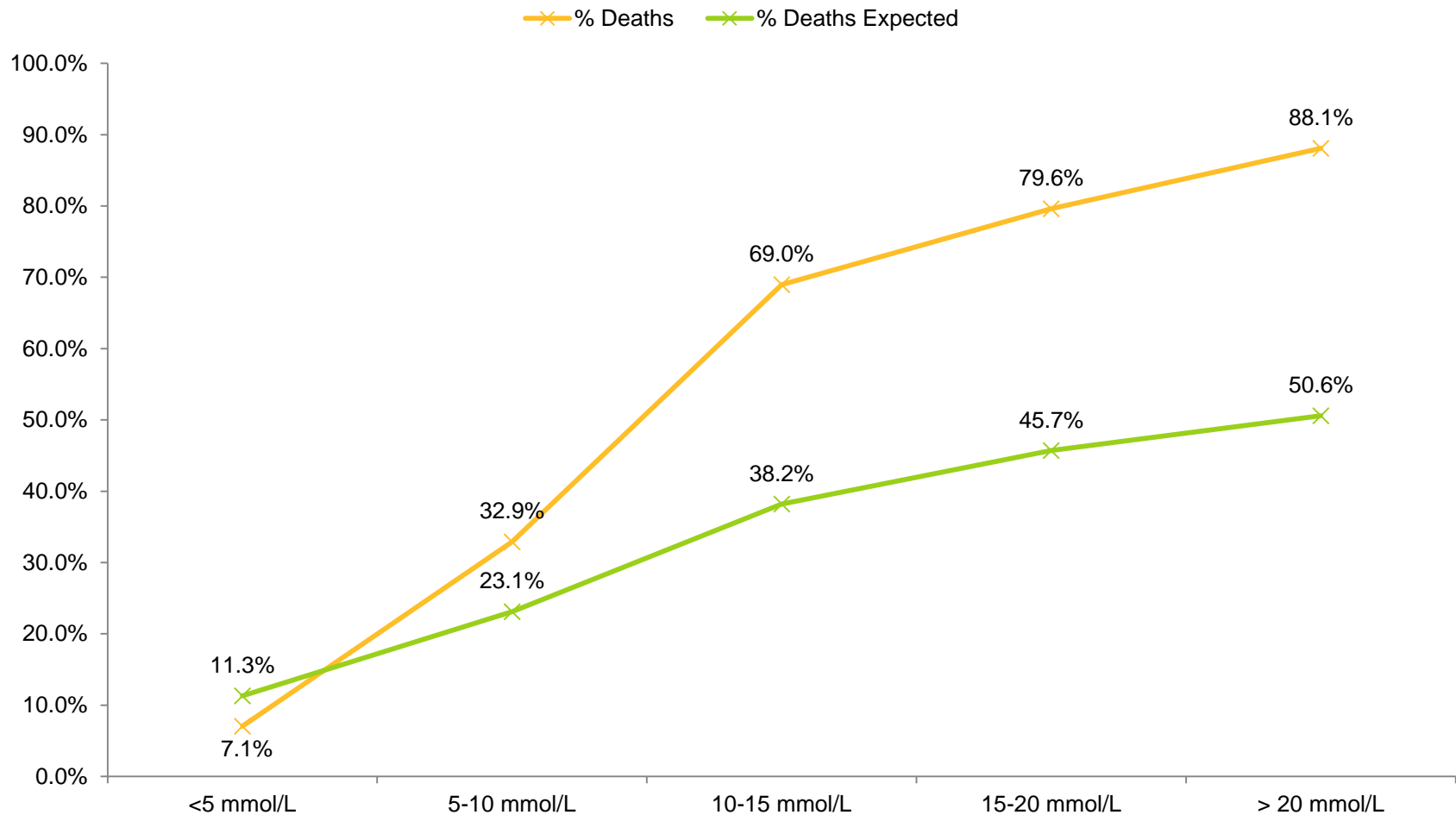
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Applications of Clinical Lab Values in Administrative Data

- Risk Adjustment
  - Almost any outcome can be further informed by a patients clinical status at a point in time
  - Few discrete measures capture this more completely than lab results

- Clinical Resource Use Evaluation
  - Often the decision to use a treatment or intervention is guided either completely or in part by lab results
  - Evaluating if a treatment was optimally used would be just a guessing game without detailed lab findings

- Safety and Quality Measures
  - Adverse events such as hypoglycemia, kidney/liver impairment, ion abnormalities, blood loss and a myriad of other events are not only captured by labs, but given a granular severity due to the temporal nature of continuous results

- More Granular and Accurate Clinical Cohort Definitions
  - While administrative data can inform if a patient had a general condition like anemia or diabetes, it does little to inform us if the disease was controlled or uncontrolled, acute or chronic, moderate or severe
  - Labs help inform on whether a condition is controlled, acute, and/or severe

Source: CDB-RM, CY 2015, All AMCs reporting Lab Values for DRGs 870-872, Grouped by Maximum Lactate Levels

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Sepsis Population – Risk Adjustment Example
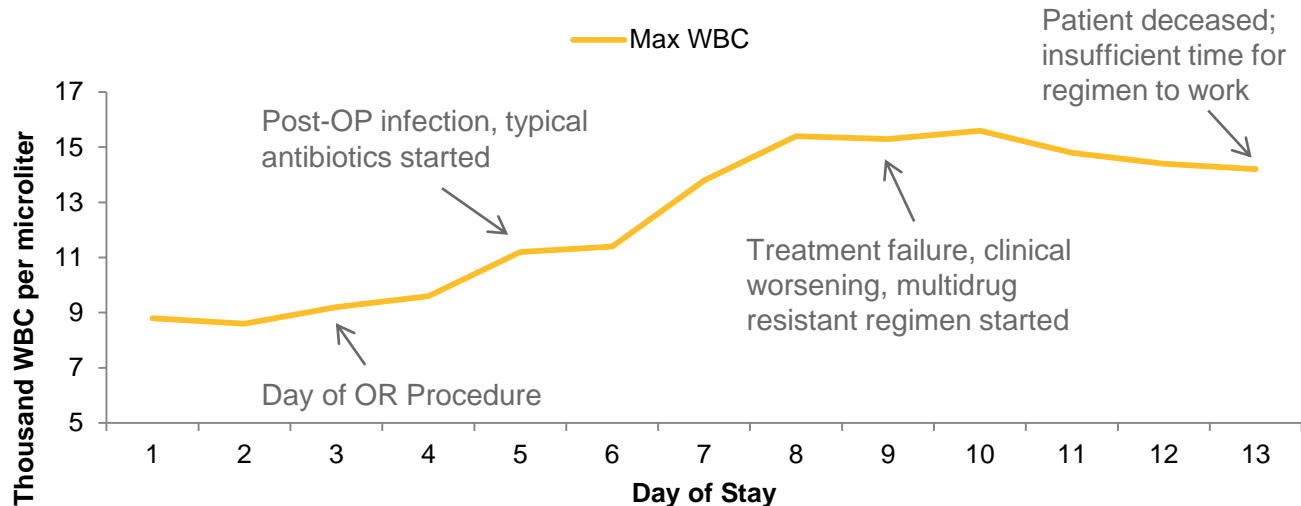

Risk models derived from patient demographics and coded diagnoses predict some of the variation in mortality. Lab values expand our capability to explain mortality variation, especially at the extremes.

Source: CDB-RM, CY 2015, All AMCs reporting Lab Values for DRGs 870-872, Grouped by Maximum Lactate Levels

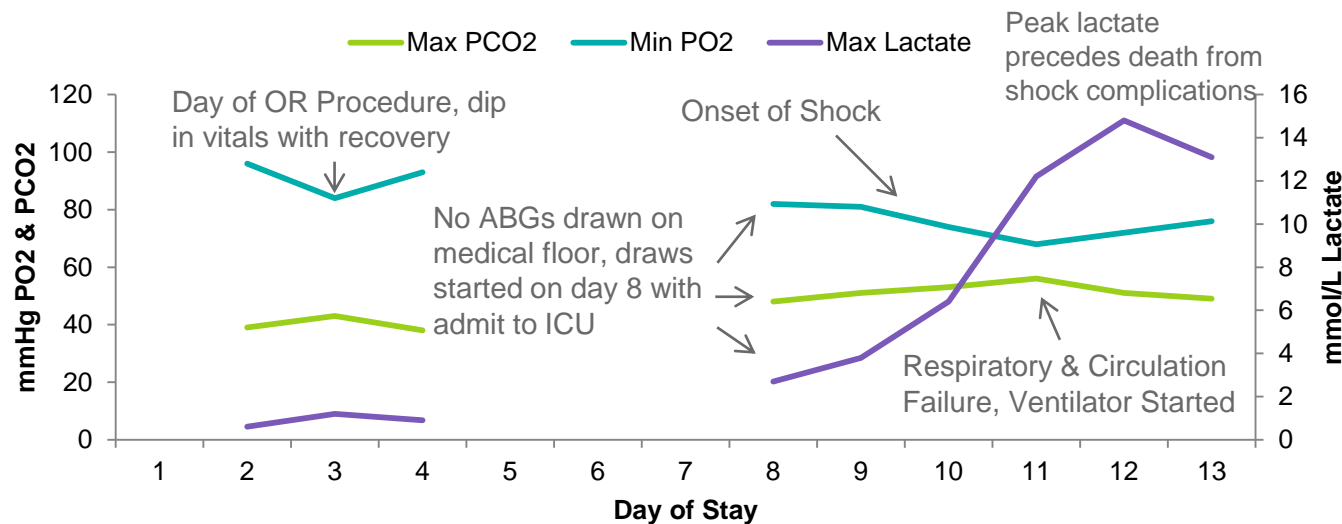vizient

Using Labs to Inform Resource Use – A Case Example

Sepsis Case WBC Count Over Time

White blood cell count over time shows progression of infection despite initial antibiotics

Legend: Max WBC

Patient deceased; insufficient time for regimen to work

Post-OP infection, typical antibiotics started

Day of OR Procedure

Treatment failure, clinical worsening, multidrug resistant regimen started

Y-axis: Thousand WBC per microliter (5 to 17)
X-axis: Day of Stay (1 to 13)

Sepsis Case Arterial Blood Gases Over Time

Arterial Blood Gases (ABGs) show when infection progresses to Septic Shock: progressive lack of oxygen for the tissue and resulting buildup of lactic acid
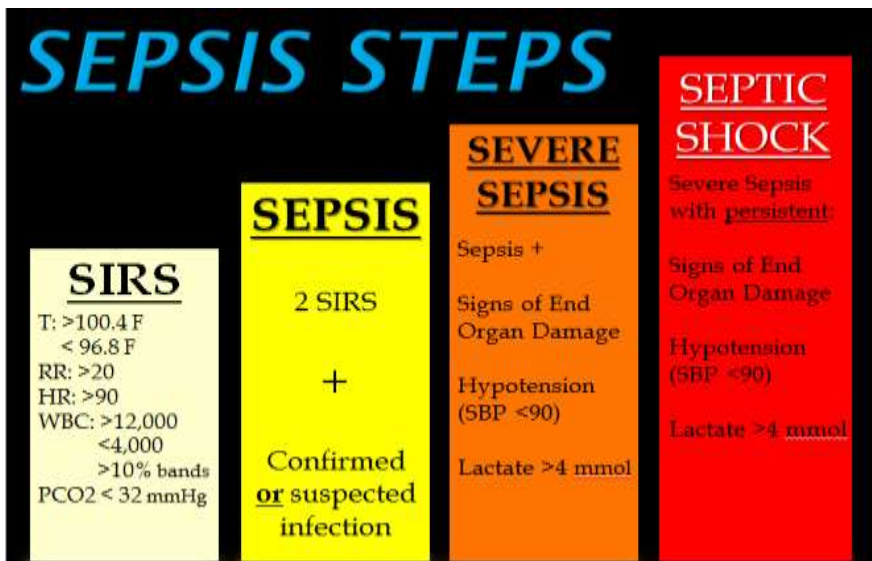
Legend: Max PCO2, Min PO2, Max Lactate

Peak lactate precedes death from shock complications

Day of OR Procedure, dip in vitals with recovery

Onset of Shock

No ABGs drawn on medical floor, draws started on day 8 with admit to ICU

Respiratory & Circulation Failure, Ventilator Started

Left Y-axis: mmHg PO2 & PCO2 (0 to 120)
Right Y-axis: mmol/L Lactate
X-axis: Day of Stay (1 to 13)

Source: CDB-RM, CY 2015, Single Case from DRG 870-872 example

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Lab Informed Metric Examples

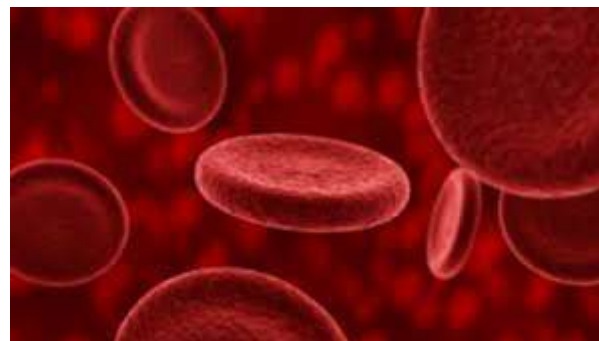Rate of Moderate-Severe Hypoglycemia (blood glucose < 50) Following Insulin Use In Adult Type 2 Diabetics

Rate of excessive anticoagulation following administration of warfarin (INR >5)

Portion of Sepsis present on admission cases with lactate result measured within 12 hours of other admission lab results

Portion of RBC Transfusions given where patient's minimum hemoglobin was > 9 g/dl for the past 24 hours

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Challenges of Using Lab Results with Administrative Data

- Events in administrative data lack the granularity of lab results, making choosing the correct lab result(s) to relate to an administrative data point difficult

- Lab results alone can lack a greater context or be misleading in narrow circumstances

- Method and equipment for testing can have different confidence levels

- Often times a single lab result is insufficient; need to evaluate multiple labs in time series can make for complicated analyses

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Summary

- **Improved risk adjustment for comparative effectiveness**

- **Improved understanding of resource demand, including temporal influences**

- **Improved metric development**

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