Effect of ICD-9 to ICD-10 Transition on Accuracy of Codes for Stage of Diabetic Retinopathy and Related Complications: Results from the CODER Study

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None
Summary

- ICD codes for staging of DR can be used reliably for database research
ICD Codes Form Foundation for Database Research

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ICD-9
14,000

ICD-10
69,000

= 1,000 codes

Duke Eye Center
For Example: Stage of Diabetic Retinopathy

Unspecified NPDR:
- E08.31, E08.31[1,9], E08.37, E08.37X[1,2,3,9], E10.31, E10.31[1,9], E10.37, E10.37X[1,2,3,9], E11.31, E11.31[1,9], E11.37, E11.37X[1,2,3,9], E13.31, E13.31[1,9], E13.37, E13.37X[1,2,3,9], E09.31, E09.31[1,9], E09.37, E09.37X[1,2,3,9]

Mild NPDR:
- E08.32, E08.321, E08.321[1,2,3,9], E08.329, E08.329[1,2,3,9], E10.32, E10.321, E10.321[1,2,3,9], E10.329, E10.329[1,2,3,9], E11.32, E11.321, E11.321[1,2,3,9], E11.329, E11.329[1,2,3,9], E13.32, E13.321, E13.321[1,2,3,9], E13.329, E13.329[1,2,3,9], E09.32, E09.321, E09.321[1,2,3,9], E09.329, E09.329[1,2,3,9]

Moderate NPDR:
- E08.33, E08.331, E08.331[1,2,3,9], E08.339, E08.339[1,2,3,9], E10.33, E10.331, E10.331[1,2,3,9], E10.339, E10.339[1,2,3,9], E11.33, E11.331, E11.331[1,2,3,9], E11.339, E11.339[1,2,3,9], E13.33, E13.331, E13.331[1,2,3,9], E13.339, E13.339[1,2,3,9], E09.33, E09.331, E09.331[1,2,3,9], E09.339, E09.339[1,2,3,9]

Severe NPDR:
- E08.34, E08.341, E08.341[1,2,3,9], E08.349, E08.349[1,2,3,9], E10.34, E10.341, E10.341[1,2,3,9], E10.349, E10.349[1,2,3,9], E11.34, E11.341, E11.341[1,2,3,9], E11.349, E11.349[1,2,3,9], E13.34, E13.341, E13.341[1,2,3,9], E13.349, E13.349[1,2,3,9], E09.34, E09.341, E09.341[1,2,3,9], E09.349, E09.349[1,2,3,9]

PDR:
- E08.35, E08.351, E08.351[1,2,3,9], E08.359, E08.359[1,2,3,9], E10.35, E10.351, E10.351[1,2,3,9], E10.359, E10.359[1,2,3,9], E11.35, E11.351, E11.351[1,2,3,9], E11.359, E11.359[1,2,3,9], E13.35, E13.351, E13.351[1,2,3,9], E13.359, E13.359[1,2,3,9], E09.35, E09.351, E09.351[1,2,3,9], E09.359, E09.359[1,2,3,9]
Does Complexity Come at the Expense of Accuracy? (…and physician frustration?)
Does Complexity Come at the Expense of Accuracy?

What is accuracy of coding for stage of DR (and related complications) during the ICD-9 to ICD-10 transition?
• Retrospective study
• Patients >18yo
• Diagnosis: diabetic retinopathy
3 time periods

ICD-9  Early ICD-10  Late ICD-10
Outcome:
- Agreement between the ICD code and documented clinical standard (progress note)

Evaluated for:
- Stage of diabetic retinopathy
- Diabetic retinopathy related complications
  - Vitreous hemorrhage
  - Tractional or combined tractional/rhegmatogenous retinal detachment
  - Neovascular glaucoma
600 patients randomly selected

- Age: mean 61 years (range 25 – 93)
- Gender: 47% male, 53% female
- Race: 50% African American, 41% Caucasian, 9% Unknown/Other
- 82% seen by retina, 18% other services
Results: Stage of Diabetic Retinopathy

κ statistic: 0.66 (SE 0.02)

Substantial agreement between ICD code for stage of DR and documented standard
### Results: Stage of Diabetic Retinopathy

<table>
<thead>
<tr>
<th>Code</th>
<th>Group</th>
<th>$\kappa$ (± standard error)</th>
<th>N (coded)</th>
<th>PPV (%)</th>
<th>NPV (%)</th>
<th>Sensitivity (%)</th>
<th>Specificity (%)</th>
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<tbody>
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<td>NPDR</td>
<td>Total</td>
<td>0.88 (± 0.03)</td>
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<td>Mild NPDR</td>
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<td>99.49</td>
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</table>
Results: Stage of Diabetic Retinopathy

• PDR compared to NPDR
  – OR: 19.70 (95% confidence interval (CI): 11.54 – 33.64, p<0.0001)

• “early” ICD-10 and “late” ICD-10 compared to ICD-9
  – OR: 2.67 (95% CI: 1.49 – 4.76, p < 0.001)
  – OR: 3.96 (95% CI: 2.34 – 6.69, p < 0.0001)
Results: Diabetic Retinopathy-Related Diagnoses

- Vitreous hemorrhage
  - κ statistic: 0.61 (SE 0.03)

- Tractional or combined tractional/rhegmatogenous retinal detachment
  - κ statistic: 0.48 (SE 0.03)

- Neovascular glaucoma
  - κ statistic: 0.52 (SE 0.03)
Conclusions

- Stage of DR became more accurately coded despite the increased complexity of ICD-10 coding compared to ICD-9

- ICD codes for staging of DR can be used reliably for database research
Thank You