



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



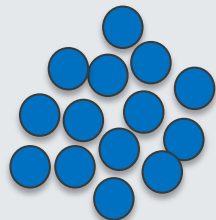
- ICD codes for staging of DR can be used reliably for database research

ICD Codes Form Foundation for Database Research

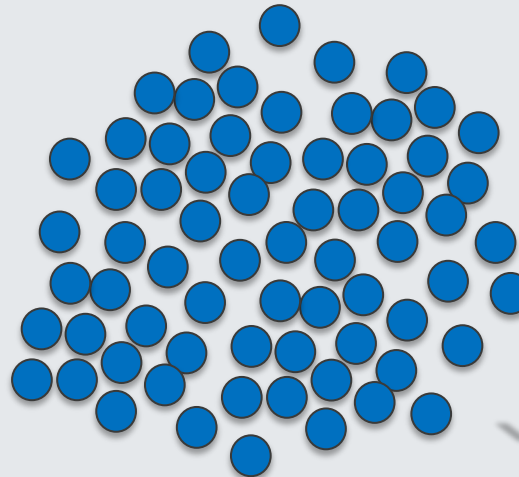


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ICD-9



14,000



ICD-10

69,000

 = 1,000 codes



For Example: Stage of Diabetic Retinopathy



ICD-9
362.01
362.02
362.03
362.04
362.05
362.06

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:

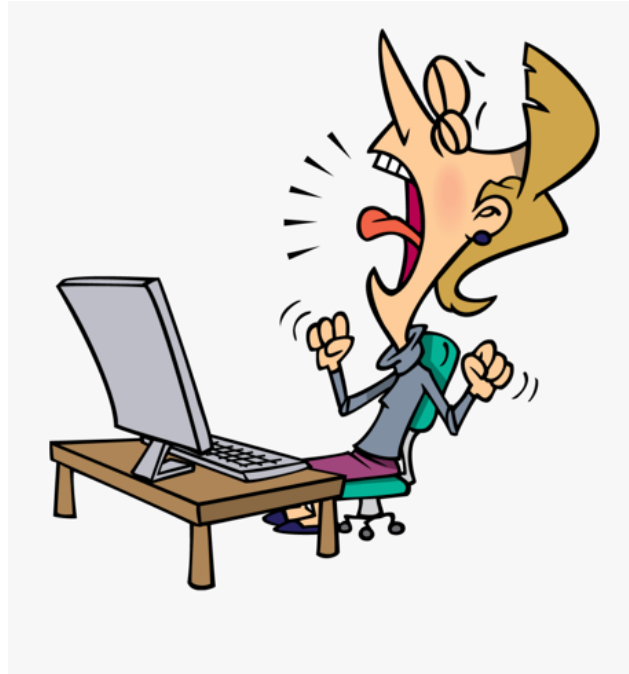
E08.33, E08.331, E08.331[1,2,3,9],
E08.339, E08.339[1,2,3,9], E10.33,
E10.331, E10.331[1,2,3,9], E10.339,
E10.339[1,2,3,9], E11.33, E11.331,
E11.331[1,2,3,9], E11.339,
E11.339[1,2,3,9], E13.33, E13.331,
E13.331[1,2,3,9], E13.339,
E13.339[1,2,3,9], E09.33, E09.331,
E09.331[1,2,3,9], E09.339,
E09.339[1,2,3,9]

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]

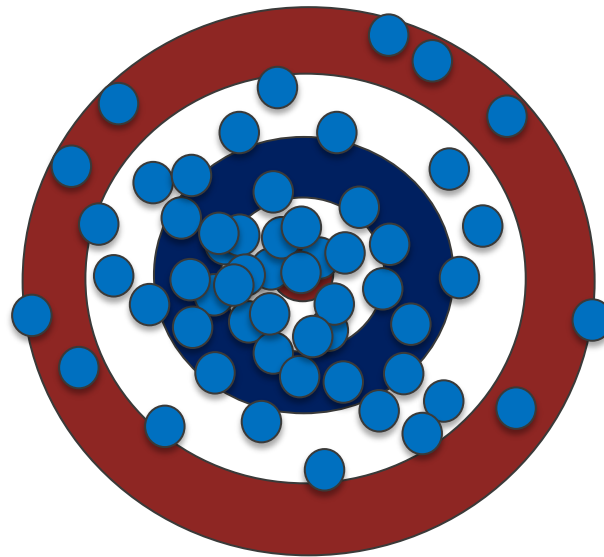
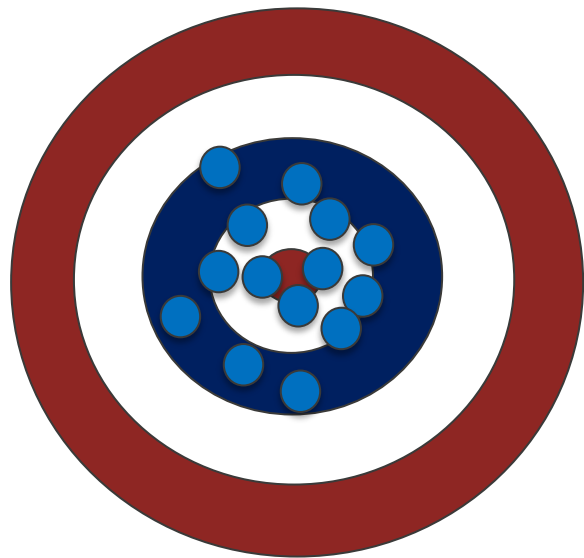
PDR:

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?

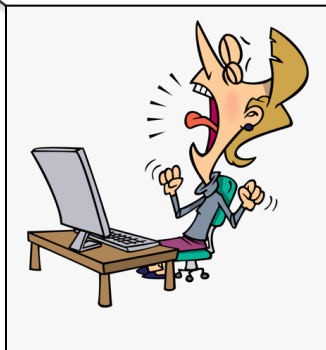


What is accuracy of coding for stage of DR (and related complications) during the **ICD-9** to **ICD-10** transition?



- Retrospective study
- Patients >18yo
- Diagnosis: diabetic retinopathy

3 time periods



- 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



κ statistic: 0.66 (SE 0.02)

Substantial agreement between ICD code for stage of DR and documented standard

Results: Stage of Diabetic Retinopathy



Code	Group	κ ($\pm$ standard error)	N (coded)	PPV (%)	NPV (%)	Sensitivity (%)	Specificity (%)
NPDR	Total	0.88 ($\pm$ 0.03)	587	90.12	97.88	97.60	91.19
	ICD-9		200	89.50	97.00	96.76	90.23
	"early" ICD-10		200	88.50	98.00	97.79	89.50
	"late" ICD-10		187	92.51	98.59	98.30	93.75
Unspecified NPDR	Total	-0.01 ($\pm$ 0.03)	73	2.74	96.54	4.88	93.87
	ICD-9		46	0.00	98.59	0.00	88.35
	"early" ICD-10		21	9.52	94.20	8.33	94.95
	"late" ICD-10		6	0.00	96.95	0.00	98.45
Mild NPDR	Total	0.56 ($\pm$ 0.03)	271	53.51	96.23	80.56	87.65
	ICD-9		138	50.00	91.60	75.82	77.67
	"early" ICD-10		87	59.77	99.04	94.55	89.86
	"late" ICD-10		46	52.17	97.18	70.59	93.99
Moderate NPDR	Total	0.62 ($\pm$ 0.03)	164	76.83	92.08	60.58	96.17
	ICD-9		10	60.00	87.69	11.11	98.84
	"early" ICD-10		63	76.19	93.47	68.57	95.45
	"late" ICD-10		91	79.12	96.12	85.71	93.99
Severe NPDR	Total	0.67 ($\pm$ 0.03)	79	84.81	95.90	59.29	98.90
	ICD-9		6	100.00	92.64	17.14	100.00
	"early" ICD-10		29	72.41	97.04	65.63	97.83
	"late" ICD-10		44	90.91	98.31	86.96	98.87
PDR	Total	0.94 ($\pm$ 0.03)	592	95.78	97.86	97.76	95.97
	ICD-9		200	92.50	99.50	99.46	92.99
	"early" ICD-10		197	95.43	98.03	97.92	95.67
	"late" ICD-10		195	99.49	96.10	96.04	99.49

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, $p < 0.0001$)

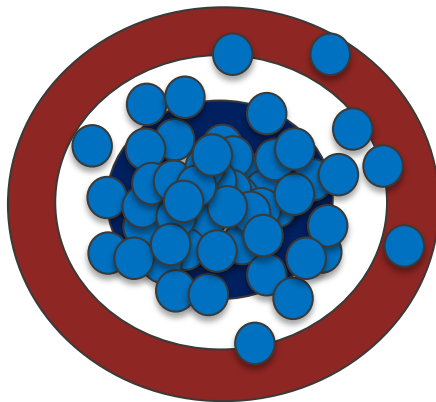
Results: Diabetic Retinopathy-Related Diagnoses



- 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



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