

HPMS: Trends & Reassessment Benefits

RPUG

Austin, TX

October 27, 2008

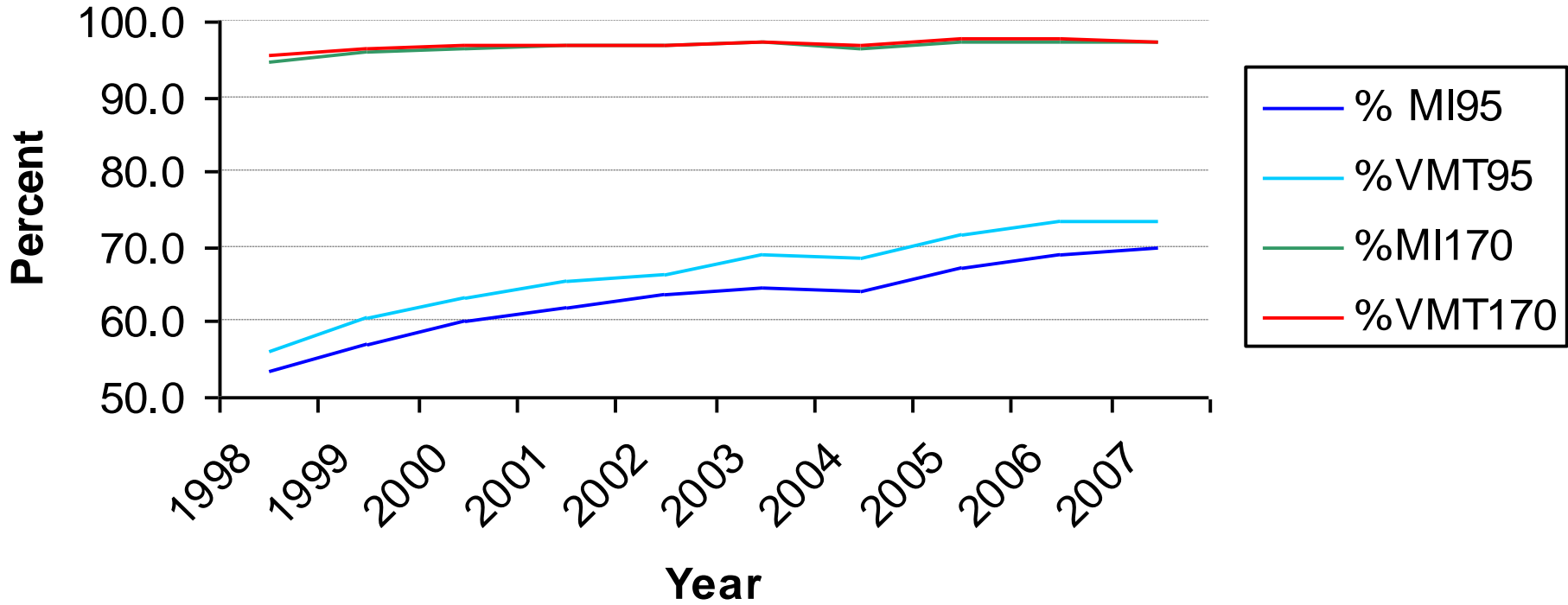
Agenda

- HPMS IRI Trends
- HPMS 2010+ Reassessment
 - Overview: pavement data, uses, & needs
 - Benefits (new data model)

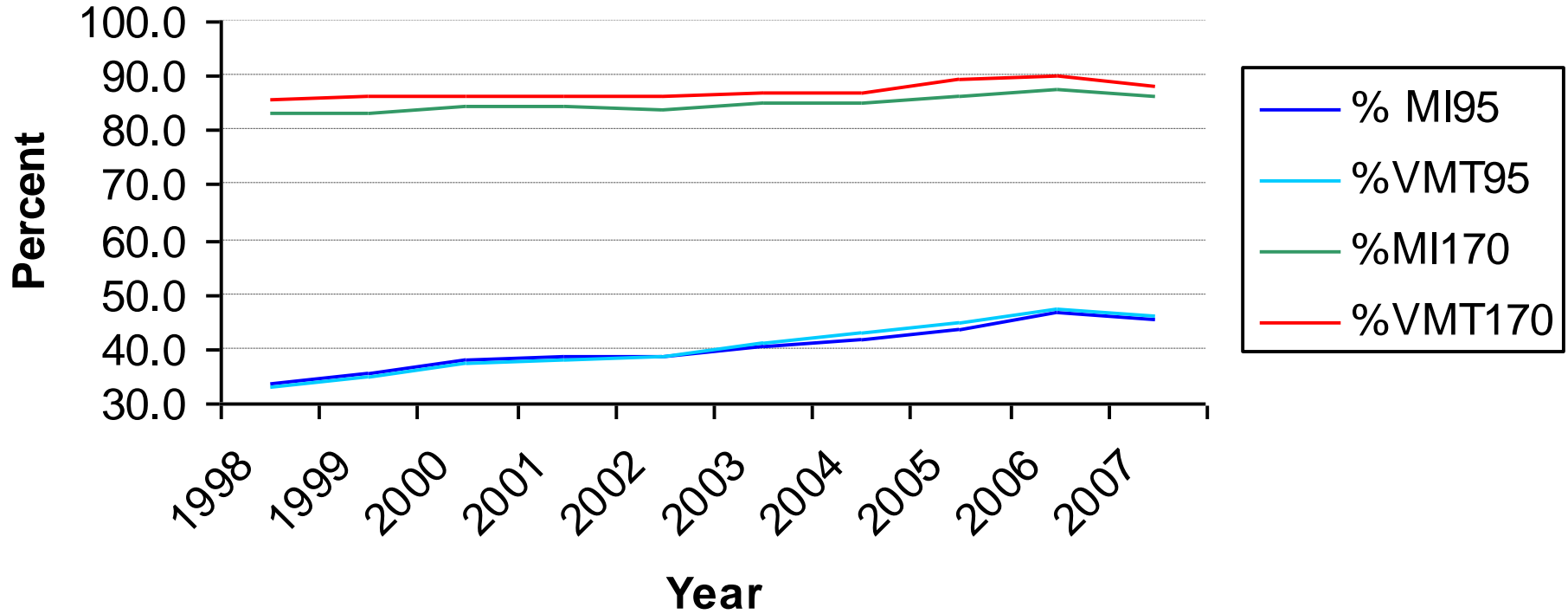
HPMS IRI Reporting Requirements

- Universe: NHS, all Principal Arterials (including Interstate)
- Sample: Rural Minor Arterials
- Report Mean Roughness Index (MRI)
- Quarter-car simulation
- Recommend AASHTO R43-07/R43M
- Include structures (2010+)

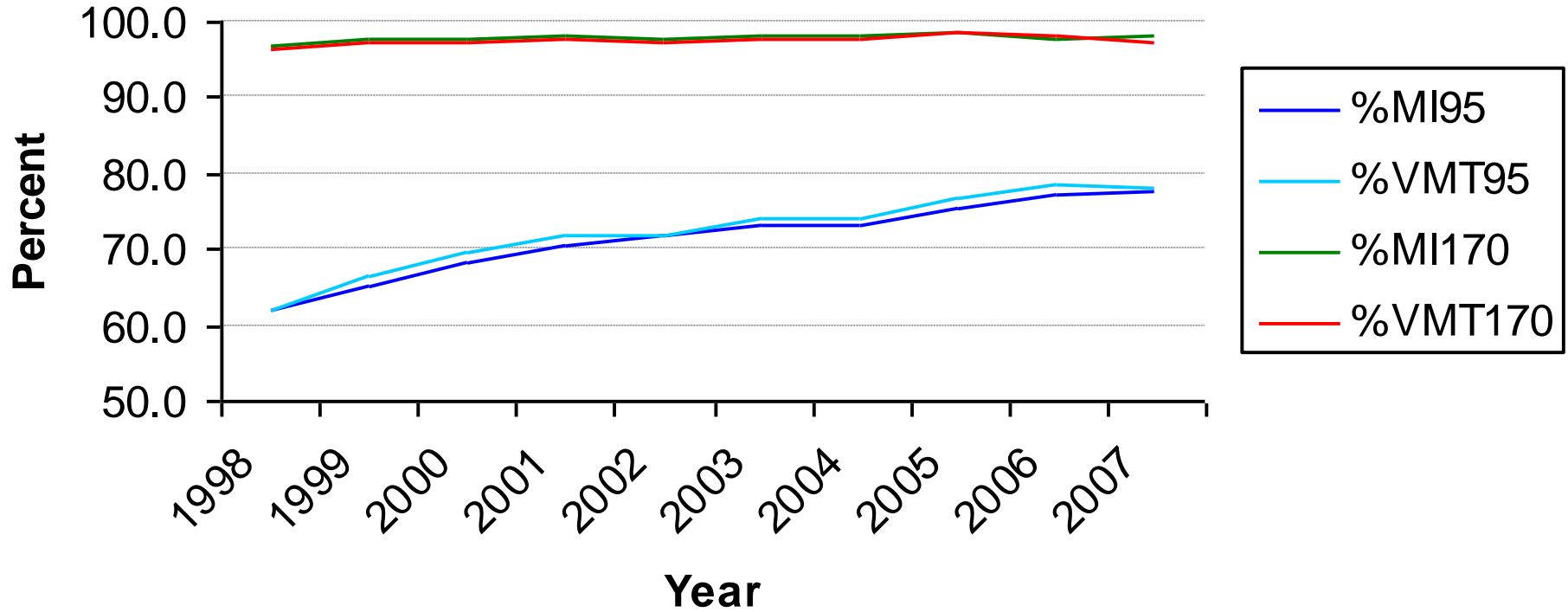
RURAL NHS IRI



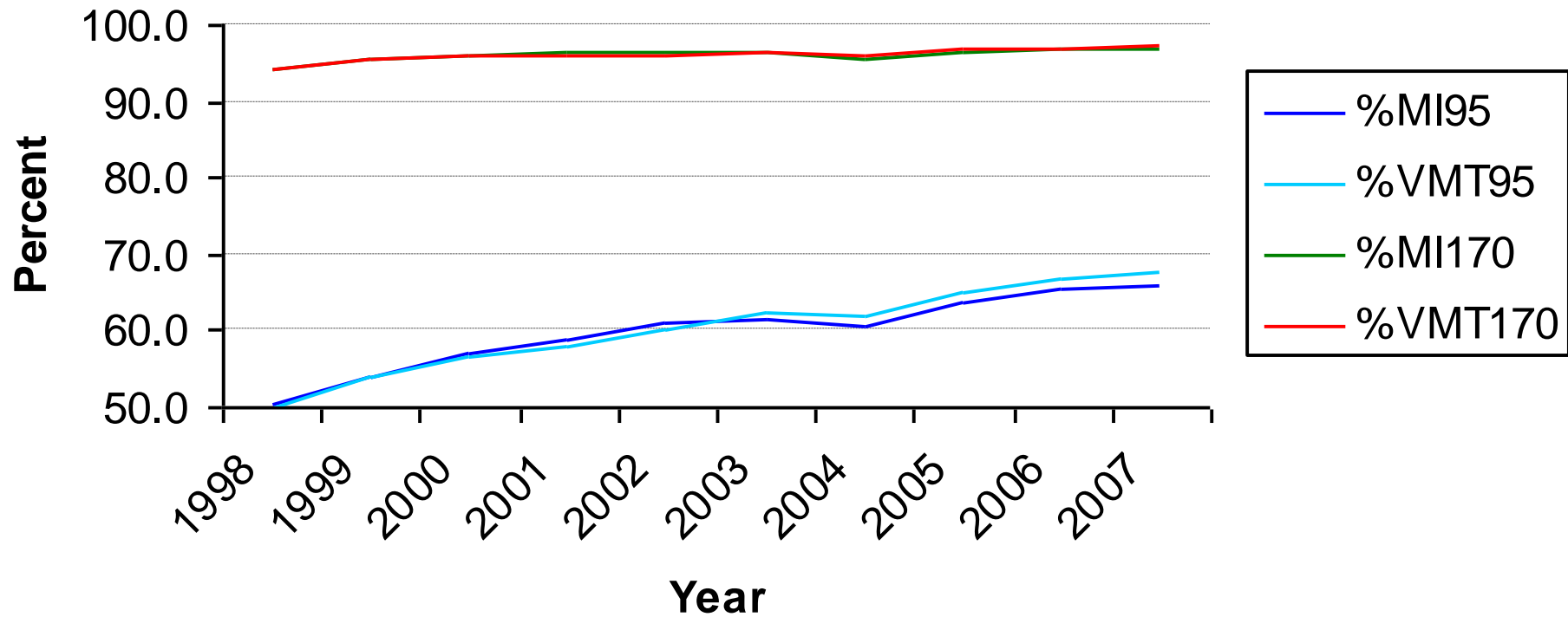
URBAN NHS IRI



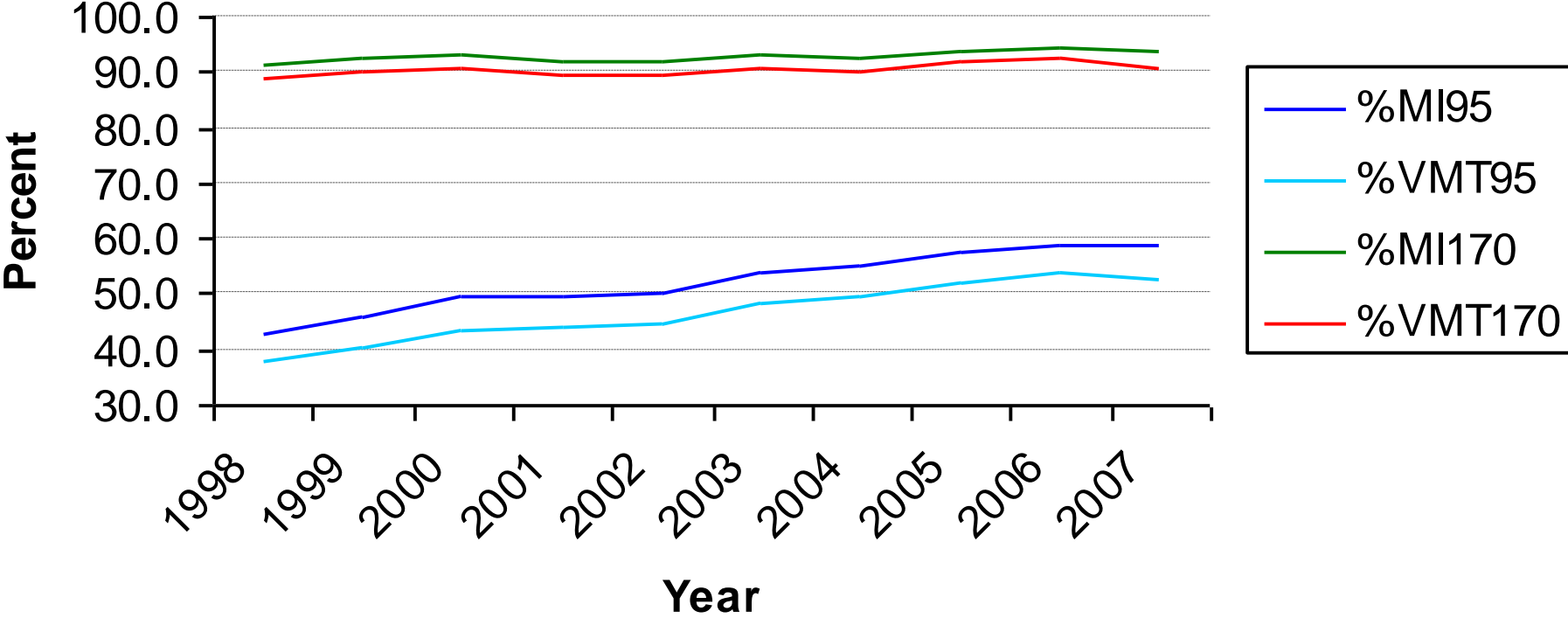
Rural Interstate



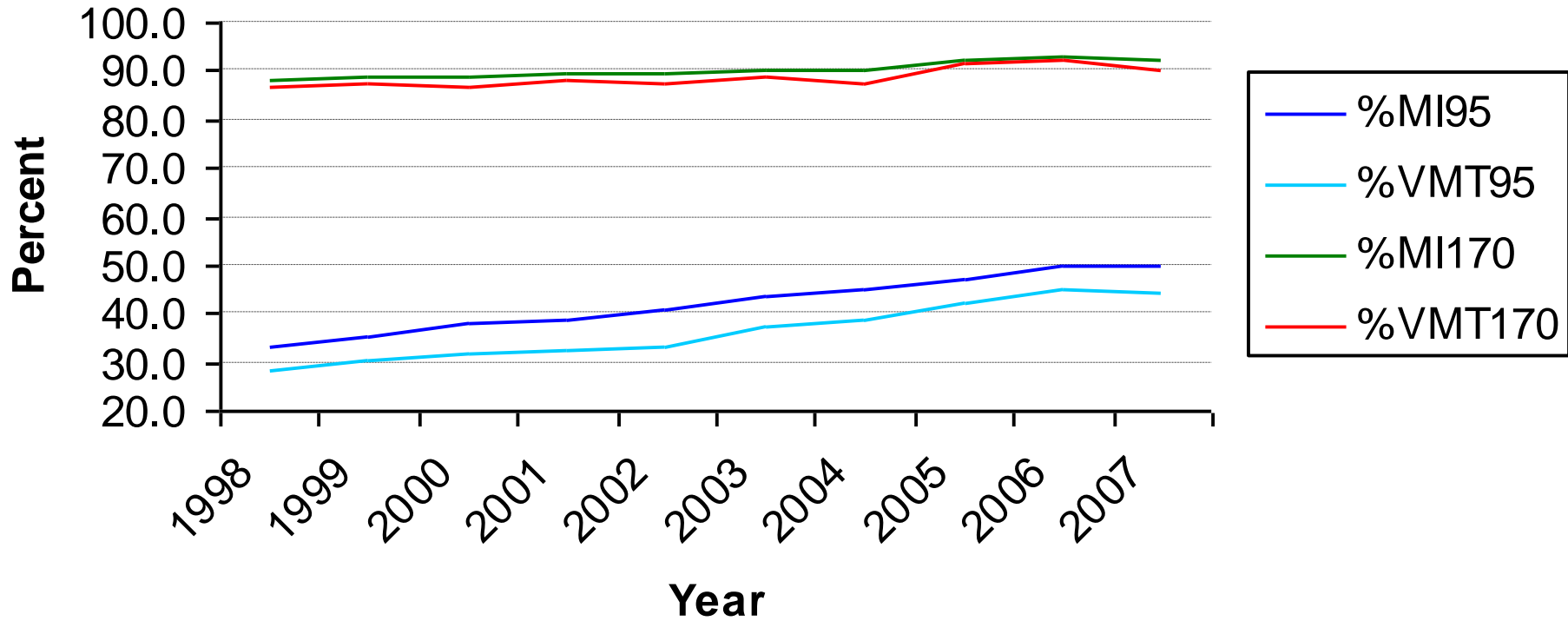
Rural Other Principal Arterial



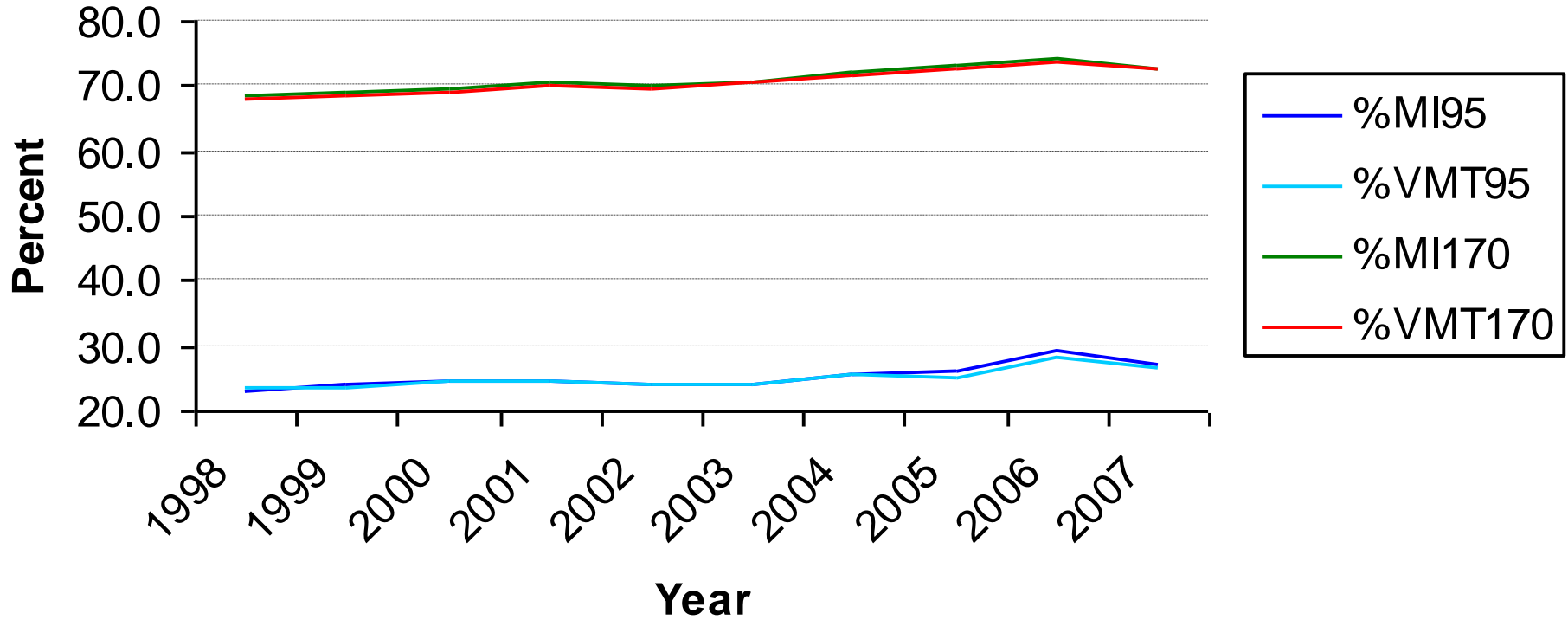
Urban Interstate



Urban Other Freeways & Expressways



Urban Other Principal Arterials



2007 HPMS IRI Reporting

- 3 functional systems where PSR is required if no IRI reported-- sample sections only
 - Rural Major Collector: 72% has IRI (20 States report 100%)
 - Urban Minor Arterial: 63% has IRI (15 States report 100%)
 - Urban Collector: 51% has IRI (13 States report 100%)
- 92% off-State system OPA miles have IRI coded where required.

2007 HPMS IRI Reporting

All Principal Arterials (IRI required)

OWNERSHIP	TOTAL MILES	% IRI=0
State Hwy.	191,834	0.5
County	4,796	10.1
Town/Township	1,230	28.4
Municipal Hwy.	14,535	6.5
Other State	3,355	0.4
Other Local	385	21.1
Federal	267	2.4
Other	4	0.0

Uses of HPMS Pavement Data

- National pavement needs 2010+
 - *Status of the Nation's Highways, Bridges, and Transit: Conditions & Performance*
 - Need to update models using enhanced HPMS pavement data (HERS and NAPCOM)
 - Performance measure (NHS IRI)
 - FHWA publications (*Highway Statistics, etc.*)
 - » IRI, PSR, and Pavement Type only
- Other studies

Pavement Models

■ Enhanced FHWA pavement models:

- Need to calculate remaining service life (RSL)
- Need to improve HERS predictions
- Need to improve cost estimates for the C&P Report
- Want to capitalize and update models based on recent developments, capabilities (ME-PDG, etc.), and technology
- Basically need better than what FHWA has now

■ Sensitivity analysis:

- Used ME-PDG and LTPP data to identify model inputs having greatest impact on predictions
- Identified critical State PMS data needed for National-level analysis
- ME-PDG offers default values that can minimize data burden for HPMS

Shapes Catalog

Region_Shapes			State_Shapes			County_Shapes			Climate_Shapes		
PK	Region_Code	NUMERIC(1,0)	PK	State_Code	NUMERIC(2,0)	PK	State_Code	NUMERIC(2,0)	PK	Climate_Zone	NUMERIC(1,0)
	Region_Abr	CHAR(2)		State_Abr	CHAR(2)	FK	County_Code	NUMERIC(3,0)		Description	VARCHAR(50)
	Region_Name	VARCHAR(100)		State_Name	VARCHAR(200)		County_Name	VARCHAR(200)		Shape	ST_GEOMETRY
	Shape	ST_GEOMETRY		Shape	ST_GEOMETRY		Shape	ST_GEOMETRY			

Soil_Shapes		Subst_Route_Shapes			Urban_Shapes			NAAGS_Shapes			
PK	Soil_Type	NUMERIC(1,0)	PK	Year_Record	NUMERIC(4,0)	PK	Year_Record	NUMERIC(4,0)	PK	Year_Record	NUMERIC(4,0)
	Description	VARCHAR(50)	PK	State_Code	NUMERIC(2,0)	PK	Urban_Code	NUMERIC(1,0)	PK	NAAGS_Code	NUMERIC(3,0)
	Shape	ST_GEOMETRY	PK	Route_ID	VARCHAR(32)		Urban_Name	VARCHAR(30)	PK	Pollutant_Type	NUMERIC(1,0)
				Shape	ST_GEOMETRY		Census_Pop	NUMERIC(6,0)		Description	VARCHAR(50)
							Census_Land	NUMERIC(6,0)		Shape	ST_GEOMETRY
							Shape	ST_GEOMETRY			

Climate_Shapes (4 LTPP zones)

Soil_Shapes

Summaries Catalog

Subst_Summaries			Subst_Vehicle_Summaries			Subst_Urban_Summaries			Subst_County_Summaries		
PK	Year_Record	NUMERIC(4,0)	PK	Year_Record	NUMERIC(4,0)	PK	Year_Record	NUMERIC(4,0)	PK	Year_Record	NUMERIC(4,0)
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	Traffic_Rural_MCo	NUMERIC(8,0)		Motorcycles	DECIMAL(8,2)		Urban_Code	NUMERIC(3,0)	PK	County_Code	NUMERIC(3,0)
	Traffic_Rural_Local	NUMERIC(8,0)		Passenger_Cars	DECIMAL(8,2)		Urban_Name	VARCHAR(30)	PK	F_System	NUMERIC(1,0)
	Traffic_SmallBus_Local	NUMERIC(8,0)		Light_Trucks	DECIMAL(8,2)		Local_Length	NUMERIC(8,0)	PK	Rd_Code	NUMERIC(1,0)
	Rural_Trip	NUMERIC(8,0)		Buses	DECIMAL(8,2)		Local_Traffic	NUMERIC(8,0)	PK	Occurrence	NUMERIC(2,0)
	Rural_Land	NUMERIC(8,0)		SU_Trucks	DECIMAL(8,2)		State_Porkin_Pop	NUMERIC(8,0)		Non_FA_Length	NUMERIC(8,0)
	Small_Urban_Pop	NUMERIC(8,0)		CU_Trucks	DECIMAL(8,2)		State_Porkin_Land	NUMERIC(8,0)			
	Small_Urban_Land	NUMERIC(8,0)									
	Passenger_Rural_MCo	NUMERIC(8,0)									
	Passenger_Rural_Local	NUMERIC(8,0)									
	Passenger_Urban_Local	NUMERIC(8,0)									
	Unpaved_Rural_MCo	NUMERIC(8,0)									
	Unpaved_Rural_Local	NUMERIC(8,0)									
	Unpaved_Urban_Local	NUMERIC(8,0)									

New HPMS Data Model

References Catalog

Line_References			Point_References		
PK	Year_Record	NUMERIC(4,0)	PK	Year_Record	NUMERIC(4,0)
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PK	End_Point	NUMERIC(8,3)	PK	Data_Item	VARCHAR(25)
PK	Data_Item	VARCHAR(25)		Value_Numerics	NUMERIC(2,0)
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	Value_Text	VARCHAR(50)		Shape	ST_GEOMETRY

Metadata Catalog

Subst_Metadata		
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PK	Metadata_Code	NUMERIC(1,0)
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PK	In_Urban	NUMERIC(1,0)
PK	In_State_Overseas	NUMERIC(1,0)
	Value_Numerics	NUMERIC(6,2)

Metadata

Section data

Sections Catalog

Subst_Sections			Subst_Samples_Sections		
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PK	Begin_Point	NUMERIC(8,3)	PK	Begin_Point	NUMERIC(8,3)
PK	End_Point	NUMERIC(8,3)	PK	End_Point	NUMERIC(8,3)
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	Section_Length	NUMERIC(8,3)		Sample_ID	VARCHAR(12)
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	Value_Text	VARCHAR(50)			
	Value_Date	DATE			
	Comments	VARCHAR(50)			
	Shape	ST_GEOMETRY			

Estimates Catalog

Subst_Estimates		
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PK	In_Urban	NUMERIC(1,0)
PK	In_State_Overseas	NUMERIC(1,0)
	Value_Numerics	NUMERIC(5,1)

Estimates

New HPMS Data Model (Geospatial)

- Essential that accurately measured routes be used as backbone of the system.
- Data collected on the same network will provide the most accurate match (no transfer).
- Thus, HPMS will require submittal of the State network with the data.

New HPMS Data Model (Geospatial)

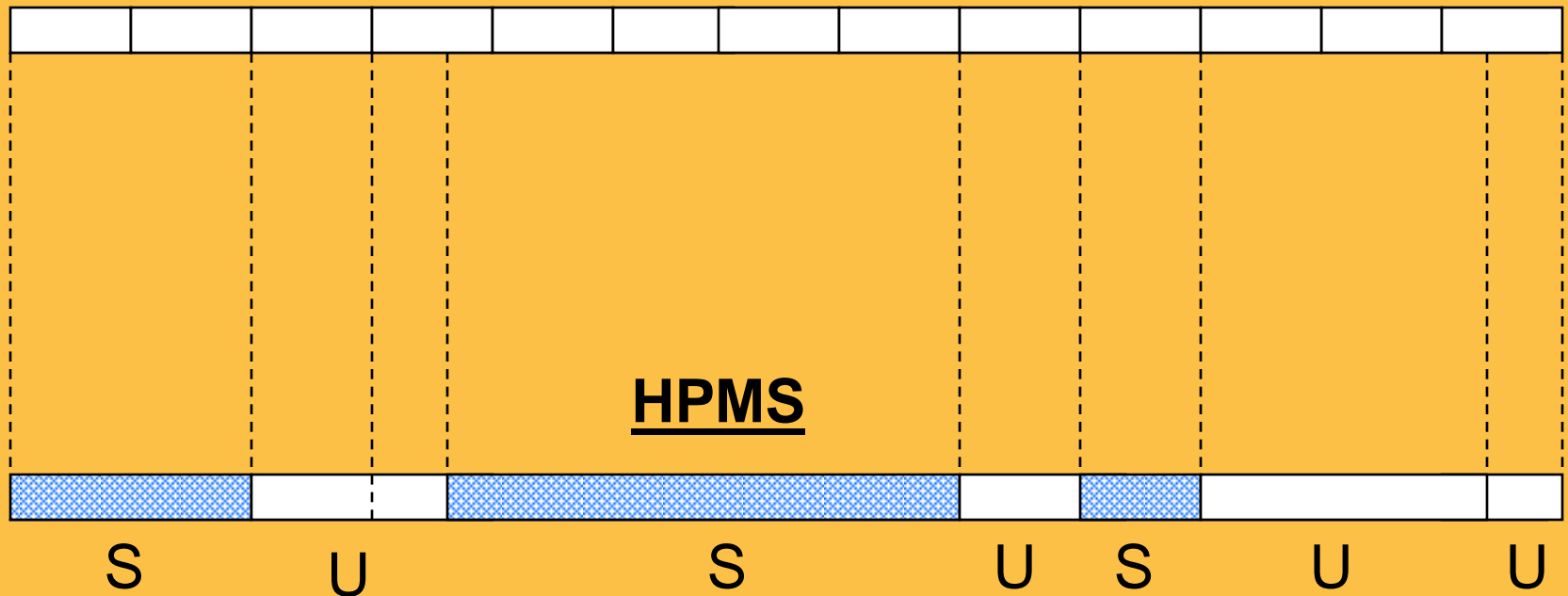
■ 6 “philosophies”:

- HPMS does not drive requirements.
- No “HPMS” data; only data that is used in HPMS.
- HPMS data base only contains existing feature data or data calculated/estimated from source, not where feature doesn’t exist.
- Data model is flexible and allows for growth, improvement, and modification.
- Do not request data where it is already known.
- Changes in a data element should not affect others.

New HPMS Data Model (Geospatial)

Reporting Pavement Items

State Inventory



U= universe

S= sample

New HPMS Data Model (Geospatial)

- Utilizes State's own geospatial network
- Streamlines State HPMS data submittal process
 - FHWA receives State geo-coded data directly (no “translation” to HPMS)
- Intended to help improve data quality and enhance analytic capabilities
- Expands coverage of “linkable” HPMS data
 - Easier link to other data files and “routable” networks (FAF, NBI, Safety, NHPN, etc.)

“The man with one watch always knows what time it is, the man with two is never sure.”

--George Carlin



Conclusion

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