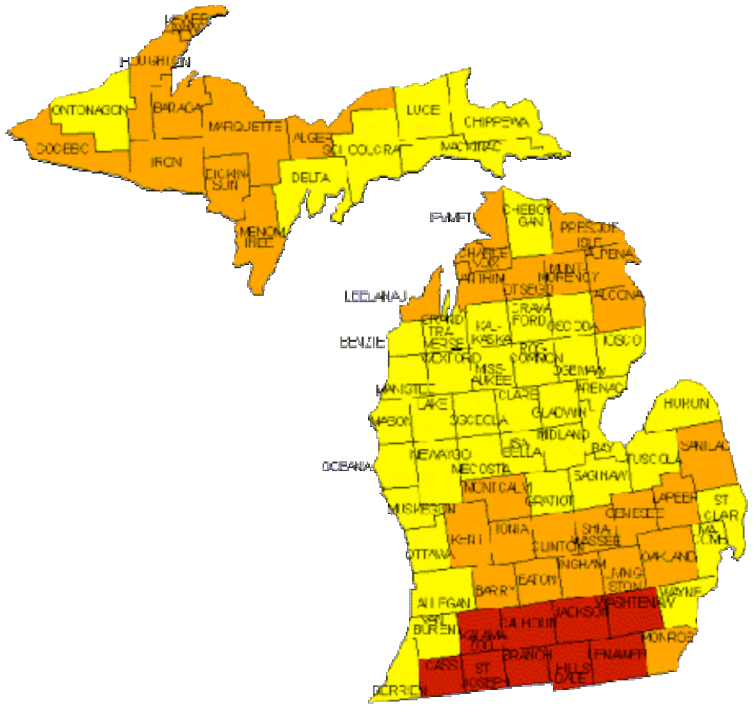
Developing Mathematics Teacher Education in Michigan



- Assets
- Challenges
- Core areas for focus

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Assets

- Experienced community with long history working across institutions, districts, and regions
- Some strong intermediate school districts with tradition of professional development
- Major NSF projects (e.g., *Connected Mathematics*, *Core Plus*, Math-Science Partnerships [MSP], Centers for Teaching and Learning [CLT])
- Leaders in state well-represented among national leadership (e.g., NCTM, MSEB, NBPTS, NRC committees)
- Major funded initiatives in teacher education and professional development
- Mathematicians interested in and committed to mathematics education

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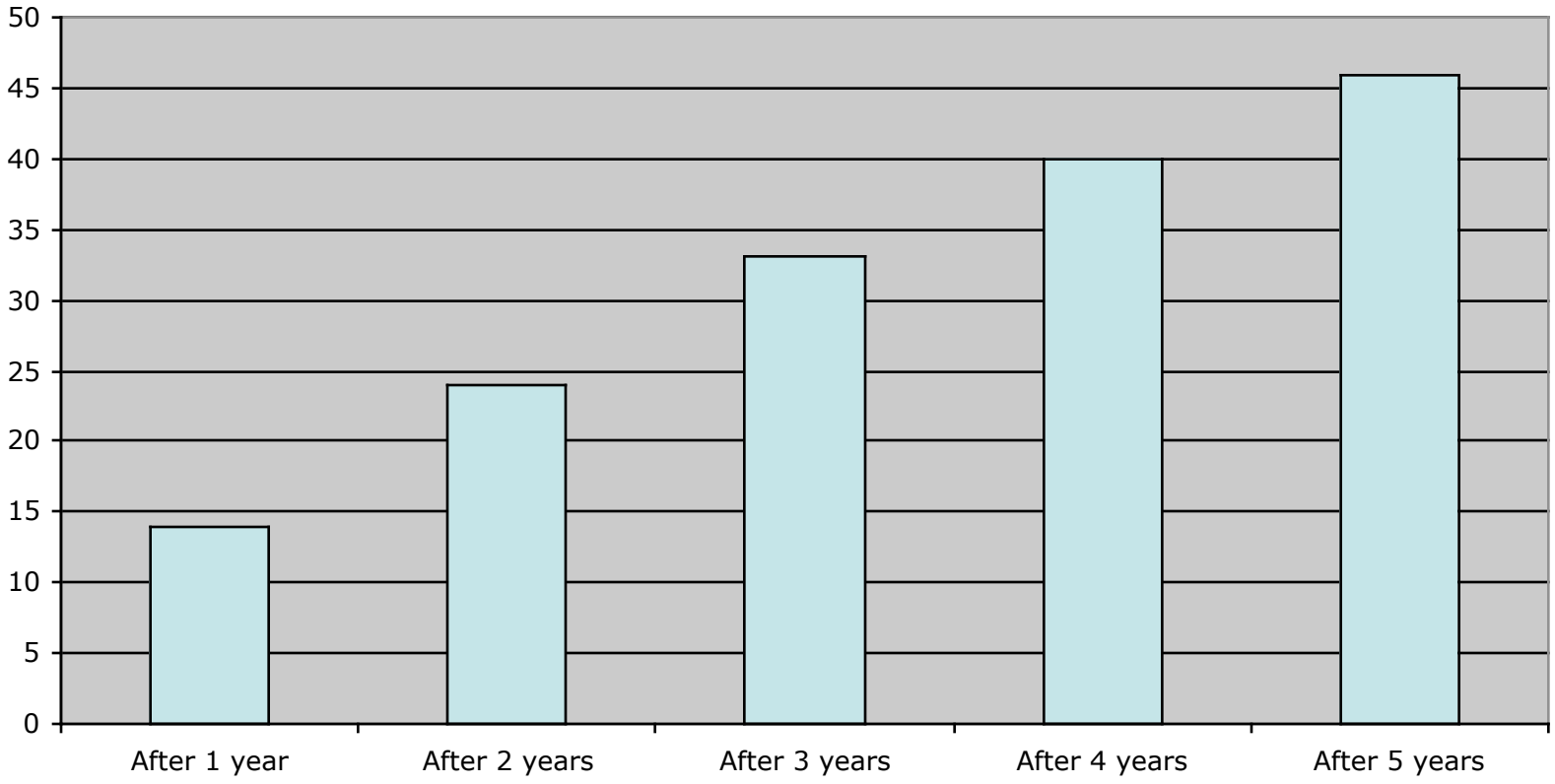
Challenges

- Diverse settings (over 35 very different institutions prepare teachers); 576 school districts)
- Large and diverse teacher population
- High attrition from teaching within the first 5 years
- Low number of mathematics support and specialist teachers compared with English/language arts
- Wide variation in curriculum used around the state
- Increasingly diverse student population
- Widespread weaknesses in teachers' knowledge of mathematics
  Some teacher certification undergraduate; some master's level
- Many unqualified or uncertified teachers in urban districts
- Mathematics preparation unaligned with professional demands
- Lack of continuum of professional education

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Beginning Teacher Attrition

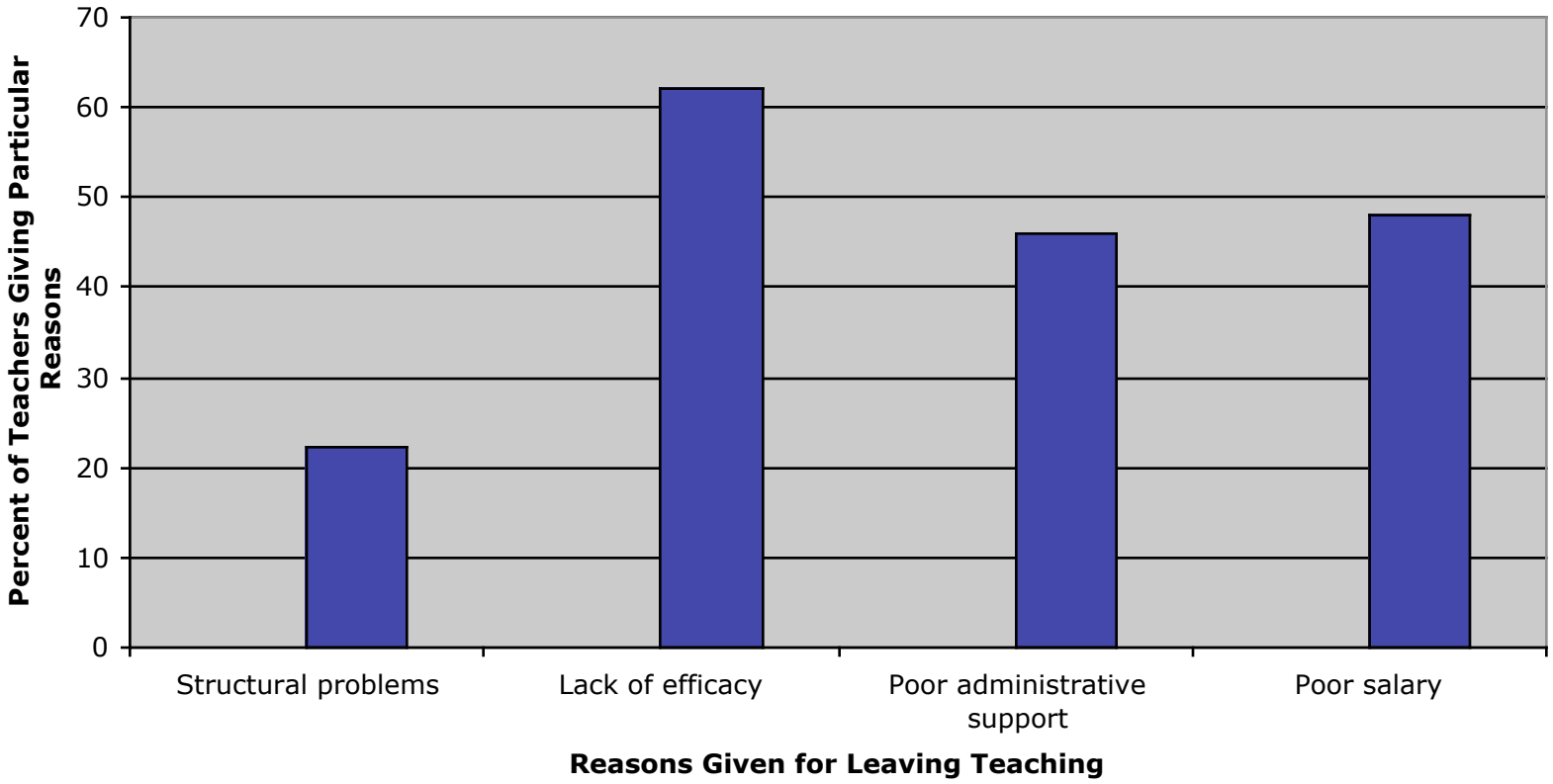
(Cumulative Percent of Teachers Having Left Teaching, By Years of Experience)



Source: Richard M. Ingersoll, based on analysis of Schools and Staffing Survey, 1987-2001)

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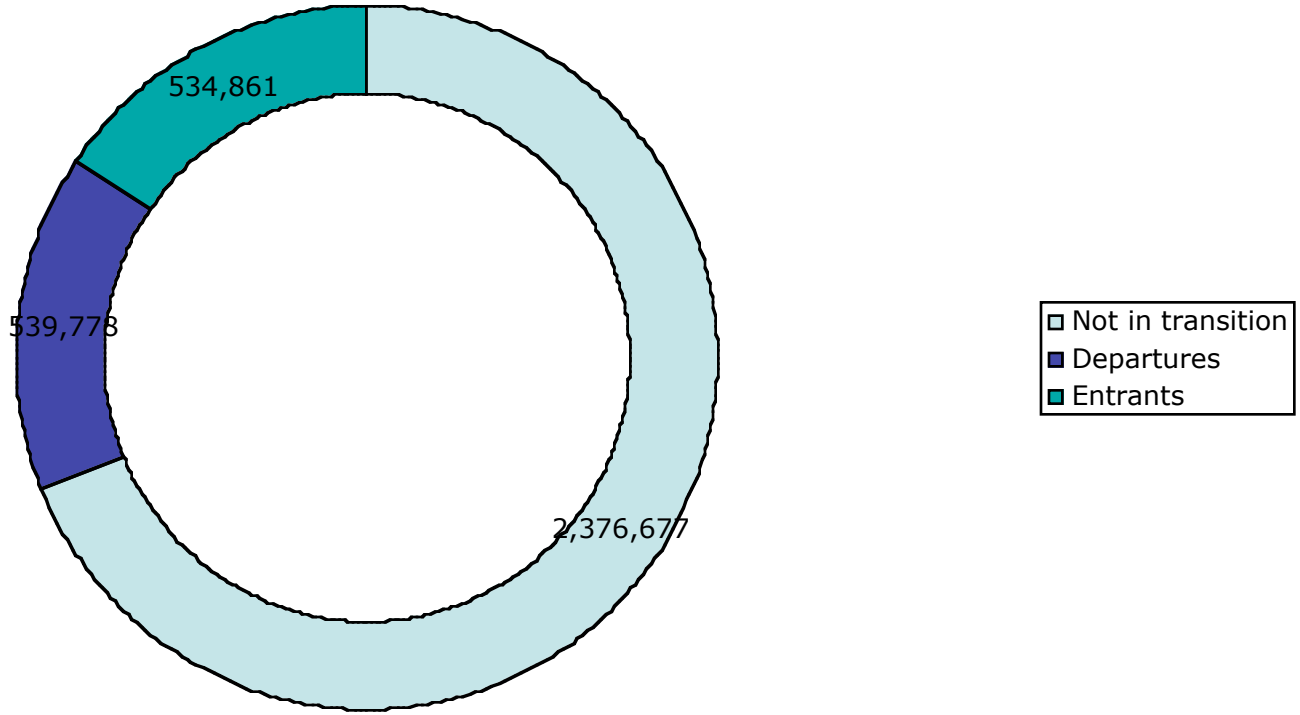
Reasons Teachers Give for Leaving Teaching



Source: Richard M. Ingersoll, based on analysis of Schools and Staffing Survey, 1987-2001)

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Numbers of Teachers in Transition 1999-2000



Source: Richard M. Ingersoll, based on analysis of Schools and Staffing Survey, 1987-2001)

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Core Areas for Focus

1. **Mathematical knowledge for teaching**
2. **Practice-based** professional education
3. The **continuum of teacher learning**
4. The **scale** problem of the teacher profession
5. **Connections** among mathematics, mathematics education, and practice
6. Preparation and professional development of **mathematics teacher educators**

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1. Mathematical Knowledge for Teaching

Teaching is mathematically-intensive work

Conventional mathematics study often does not prepare teachers for the mathematics of their work

- What are the mathematical demands of teaching? What mathematical problems do teachers have to solve regularly?
- What mathematical knowledge and insight provide resources for the work of teaching?
- How can teachers be helped to develop usable mathematical knowledge and insight?

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2. Practice-Based Professional Education

Teachers learn from experience, but experience is an unreliable teacher

- What are alternative forms to "harness" practice for study and learning?
- How can teaching and learning be made more visible for study?
- Focus on particularities
- Focus on diversity, equity, and social justice
- How can analysis and study of teaching support DOING teaching?

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3.The Continuum of Teacher Learning

Learning to teach occurs over time

Differentiating beginning teaching from more accomplished teaching

- What aspects of teaching are foundational for continuing to learn over time?
- What aspects of teaching are learnable at what points in one's development?
- What aspects of teaching practice are "high leverage" at the beginning, and what can be developed later?

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4. The Scale Problem in the Teaching Profession

- 90,000+ teachers
- Need ways of supporting high-quality and effective teaching that can be done reliably by "ordinary" people
- Bear in mind that most teachers are non-specialists, teach other subjects

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5. Connections among Mathematics, Mathematics Education, and Practice

Teaching and learning to teach is interdisciplinary work

- History of divide and distrust, conflict
- Different knowledge and expertise
- Successes often evident when work is grounded in real problems of practice

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6. Preparation and Professional Education of Mathematics Teacher Educators

Varied group (who is a "teacher educator"?

No professional preparation for most

May lack knowledge of mathematics for teaching

May lack understanding of practice

- Opportunities to learn mathematics, practice, etc.
- Opportunities to learn to teach
- Professional community
- Professional resources that support <u>their</u> learning

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