



# The Importance of Statistics

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- My ideal world: All educated citizens should be able to answer those and similar questions by the time they graduate from secondary school.
- Basic literacy in statistics and probability does not require advanced mathematics.
- How do we get there?



## K-12 (Primary and Secondary) Statistics Education in the US

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Some history:

- **Early 1980s:** The Quantitative Literacy Project first recommended teaching statistics in K-12
- **1997:** Advanced Placement (AP) Statistics exam first offered (secondary school course for college credit – more later)
- **1989, 2000:** National Council of Teachers of Mathematics (NCTM) reports recommended adding “Data analysis and probability” as one of 5 content strands for K-12 Mathematics



## More History of K-12 Statistics Education in the US

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- **2005:** American Statistical Association (ASA) report “Guidelines for Assessment and Instruction in Statistics Education” (GAISE) Report in 2 parts – K to 12 and College
  - K-12 report has 108 pages of detailed guidelines on teaching statistics in K-12, with examples, teaching strategies, and so on
- **1997 to 2013:** Exponential growth in AP Statistics from 7500 exams in 1997 to almost 170,000 exams in 2013.



## Even More History of K-12 Statistics Education in the US

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- **2010:** Common Core State Standards published (more on this next)
- **2010:** Conference Board of the Mathematical Sciences (CBMS) report “The Mathematical Education of Teachers II” (known as MET2), a 100-page report on educating math teachers for the Common Core, including Statistics and Probability
- **Present challenge:** How to educate math teachers to teach statistics and probability



# What Happened (or Did Not)?

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- Until 2010, Advanced Placement Statistics was the only real success story in K-12
  - AP teachers formed an online community
  - Workshops offered by The College Board
  - About 600 teachers come together for a week in June to grade the exams
  - Excellent professional development opportunities for teachers
- Impact of earlier reports was small
- Common Core to the rescue!



# Common Core State Standards (CCSS)

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- Initiated by State Governors' Association and Chief State School Officers
- Includes Mathematics Standards and English Language Arts Standards
- Report with standards was finished in 2010
- Previously each state had its own standards
- Already CCSS has had much broader recognition than earlier reports by math and statistics professional societies



## Common Core, continued

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- So far, 45 (of 50) states, 4 (of 5) territories and Washington DC have adopted CCSS.
- Full implementation differs by state, most are there by this year (2013-14)
- Two standardized assessment tests will become available for 2014-15 school year:
  - Partnership for Assessment of Readiness for College and Careers (PARCC) ([www.parcconline.org](http://www.parcconline.org))
  - Smarter Balanced Assessment Consortium (SBAC) ([www.smarterbalanced.org](http://www.smarterbalanced.org))



# New Topic: More About Advanced Placement Statistics

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- The Advanced Placement Program is offered for over 30 college subjects.
- Students take course in secondary school, then take an exam (in May).
- If they do well on the exam, many colleges accept the course for college credit. The score required to receive college credit differs by college. Some don't accept AP courses at all.
- AP Statistics is a full school year and covers more than the typical introductory course





# Advanced Placement, continued

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- The Statistics exam consists of two parts:
  - 40 multiple choice questions (computer graded)
  - 6 “free response” questions, including one “investigative task” requiring students to reason beyond what they learned in class
- Free-response questions are graded by over 600 teachers who meet in June. Extensive rubrics are used to ensure consistency.
- May need to revise this course when the Common Core becomes fully implemented



# The Success of AP Statistics

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- It has grown exponentially and continues to grow, including an international exam (in English).
- It has brought together college and high school teachers, who grade the exams and also have online discussion groups.
- It has helped secondary students become aware of Statistics as a possible major in college.
- Next step: Inform AP teachers about careers in Statistics, so they can tell their students.



# Some Resources

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- ASA K-12 GAISE Report (written before Common Core)  
[http://www.amstat.org/education/gaise/GAISEPreK-12\\_Full.pdf](http://www.amstat.org/education/gaise/GAISEPreK-12_Full.pdf)
- The MET 2 Report (addresses Common Core)  
[www.cbmsweb.org/MET2/met2.pdf](http://www.cbmsweb.org/MET2/met2.pdf)
- Common core website:  
<http://www.corestandards.org/>
- ASA Education Website  
<http://www.amstat.org/education/index.cfm>
- Engage NY, project of the NY State Dept of Education, creating Grades 6 to 12 Stat modules:  
<http://www.engageny.org/mathematics>