

# Report on Senior Surveys for Academic Year 2019-2020

Survey of Undergraduate Degree Applications for  
Aug 2019, Dec 2019 & May 2020 Graduation Dates

Results for Chemical Engineering (ChemE)

Produced by  
The Office of Student Affairs  
University of Michigan, College of Engineering  
Tuesday, July 14, 2020

## **Purpose and Approach**

Each year, the College of Engineering (CoE) conducts a Senior Survey of degree applicants in our undergraduate programs. The Office of Student Affairs distributes, collects, and processes the surveys on behalf of the undergraduate programs. The survey's purpose is to provide departments with assessment data from recent graduates. When combined with other types of assessment data, results from the annual senior survey can help departments identify strengths in their undergraduate programs and opportunities for improvement.

## **Methods**

### *Identifying Recipients*

Queries into U-M's online system for submission of degree applications identified CoE and Computer Science in Literature, Sciences, and Arts degree applications. Each semester, a query identified the degree applicants for the current term, which became the list of survey recipients for the semester. Each degree applicant's official U-M email address was compiled into the address list.

### *Distribution and Collection*

The Office of Student Affairs sent email invitations to every CoE degree applicant about four to six weeks before the end of the semester. An email reminder was sent once, a week before closing the survey. As an incentive to complete the survey, respondents who completed the survey were entered in a drawing to win several \$500 gift cards to U-M Computer Showcase. Response rates by survey year are in the graph on the next page.

## **Analysis**

Analysis has been completed only for fixed-response items. Fixed-response items are questions on which respondents were forced to choose from fixed, existing alternatives similar to a multiple-choice test.

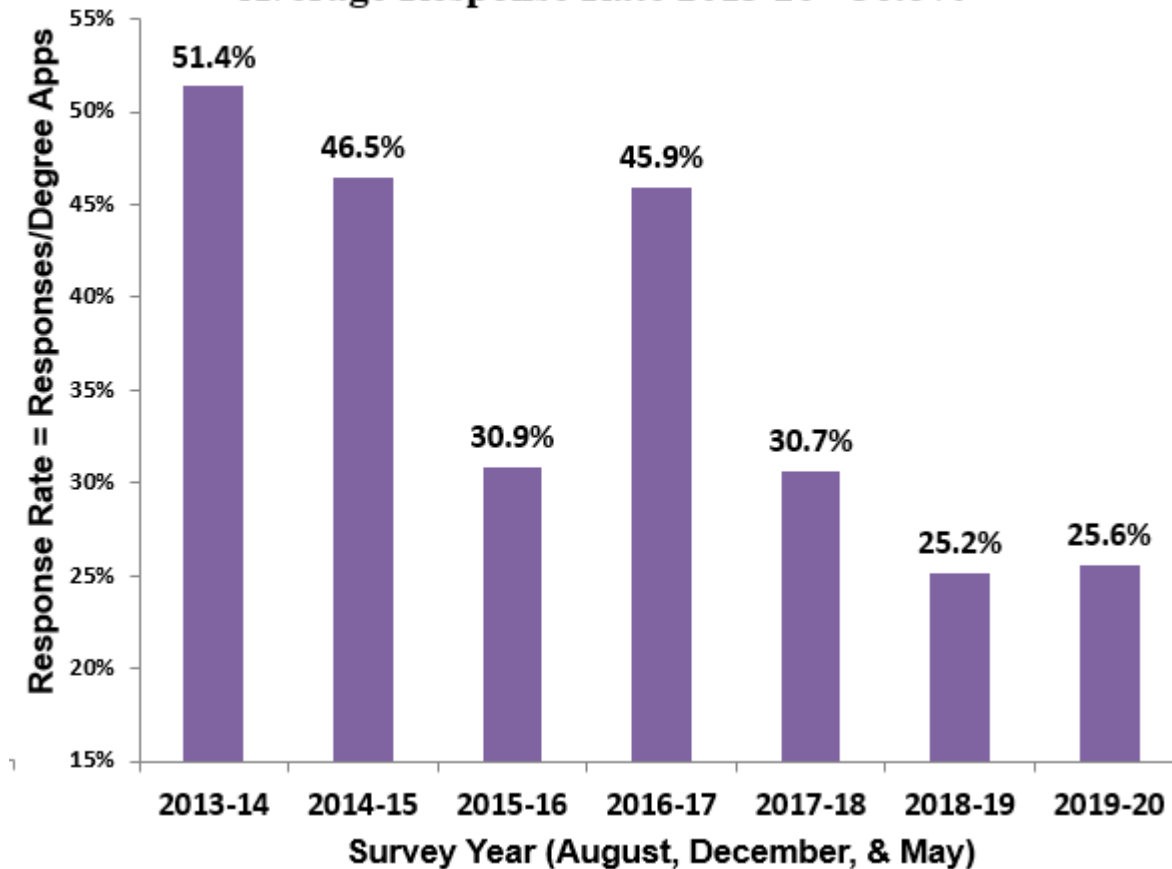
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### Analysis (continued)

Free-response items are questions that allow the recipient to compose their own response, similar to a short-answer test. To allow each reader of this report to interpret degree applicants' comments for themselves, comments are listed in the reports in alphabetical order by question. The comments are verbatim, with the exception of replacing the names of individuals with dashes (e.g., "Dr. John Smith" is listed as "Dr. ---- ----"). Comments are listed in the reports for specific programs, but not in the report for the College of Engineering Overall.

**Senior Survey Response Rates  
by Survey Year (CoE Overall)**  
Average Response Rate 2013-20= 36.6%



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## Results

Responses from degree applications in the semester(s) and program(s) listed above 38

Degree applications from students in the semester(s) and program(s) listed above: 113

Response Rate (responses/ degree applications): 33.6%

Degrees granted to undergraduates in the semester(s) and program(s) listed above: 113

**Note: Response Ratios (below) are calculated for respondents to that particular question.**

### PART I. EDUCATIONAL BACKGROUND

1. How did you enter the U-M College of Engineering or CSLSA? As a:		
	Number of Responses	Response Ratio
First year student (freshman), first time in college	30	79%
Transfer student from a two-year college	2	5%
Transfer student from a four-year college	1	3%
Transfer student from another U-M school or college	5	13%
Totals	38	100%

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### 2. What is your undergraduate major? (Check all that apply)

	Number of Responses	Response Ratio
Aerospace Engineering	0	0%
Biomedical Engineering	0	0%
Chemical Engineering	38	100%
Civil Engineering	0	0%
Climate and Space Sciences and Engin	0	0%
Computer Engineering	0	0%
Computer Science Engineering	0	0%
Computer Science LSA	0	0%
Data Science	0	0%
Electrical Engineering	0	0%
Engineering Physics	0	0%
Environmental Engineering	0	0%
Industrial and Operations Engineering	0	0%
Materials Science and Engineering	0	0%
Mechanical Engineering	0	0%
Naval Architecture and Marine Engineering	0	0%
Nuclear Engineering and Radiological Sciences	0	0%
Other (please specify):	0	0%
Totals	38	100%

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### 3. When did you decide on your engineering major?

	Number of Responses	Response Ratio
Prior to first year (=0)	14	37%
First year (=1)	18	47%
Second year (=2)	6	16%
Third year (=3)	0	0%
Mean = 0.8	Totals 38	100%

### 4. Will you complete a minor from the College of Engineering or from the College of Literature, Science, and the Arts?

	Number of Responses	Response Ratio
No	19	50%
Yes (please specify):	19	50%
	Totals 38	100%

### 5. How many credits did you take in an average semester?

	Number of Responses	Response Ratio
Less than 12 credits/semester	1	3%
12-14 credits/semester	13	34%
15-17 credits/semester	24	63%
18+ credits/semester	0	0%
	Totals 38	100%

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## PART II. CURRICULUM

### 6. How well did your high school science and math courses prepare you for your studies at U-M?

	Number of Responses	Response Ratio
Excellent Preparation (=5)	12	32%
Good Preparation (=4)	15	39%
Adequate Preparation (=3)	8	21%
Unsatisfactory Preparation (=2)	2	5%
No Preparation (=1)	1	3%
Mean = 3.9	Totals 38	100%

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### 7. How well did the following courses at U-M prepare you for your courses in engineering? (Select "N/A" (Not Applicable) for any categories in which you did not take classes at U-M.)

The percentage is the fraction of respondents giving the specific response to the given question. In bold is number of respondents.	5 =	4 =	3 =	2 =	1 =	N/A =	Response Ratio
	Excellent Preparation	Good Preparation	Adequate Preparation	Unsatisfactory Preparation	No Preparation	Not Applicable	Total Responses Mean
First Year Math (e.g., 105, 115/116)	0% <b>0</b>	19% <b>7</b>	11% <b>4</b>	5% <b>2</b>	0% <b>0</b>	65% <b>24</b>	100% <b>37</b> <b>3.4</b>
Sophomore Math (e.g., 214/215/216)	11% <b>4</b>	30% <b>11</b>	30% <b>11</b>	14% <b>5</b>	0% <b>0</b>	16% <b>6</b>	100% <b>37</b> <b>3.5</b>
Chemistry (e.g., 125/126/130 or 210/211)	0% <b>0</b>	0% <b>0</b>	0% <b>0</b>	0% <b>0</b>	0% <b>0</b>	100% <b>3</b>	100% <b>3</b>
Physics (e.g., 140/240)	0% <b>0</b>	0% <b>0</b>	0% <b>0</b>	0% <b>0</b>	0% <b>0</b>	0% <b>0</b>	100% <b>0</b>
Intro to Computers and Programming (ENG 101)	19% <b>7</b>	24% <b>9</b>	35% <b>13</b>	5% <b>2</b>	3% <b>1</b>	14% <b>5</b>	100% <b>37</b> <b>3.6</b>
Intro to Engineering (ENG 100)	22% <b>8</b>	32% <b>12</b>	22% <b>8</b>	5% <b>2</b>	3% <b>1</b>	16% <b>6</b>	100% <b>37</b> <b>3.8</b>
College Writing (English 125)	0% <b>0</b>	5% <b>2</b>	8% <b>3</b>	0% <b>0</b>	0% <b>0</b>	86% <b>32</b>	100% <b>37</b> <b>3.4</b>

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### 8. Please rate how important you predict the following competencies and attitudes will be to you in your PROFESSIONAL CAREER.

The percentage is the fraction of respondents giving the specific response to the given question. In bold is number of respondents.	5 = Extremely Important	4 = Quite Important	3 = Somewhat Important	2 = Slightly Important	1 = Not at all Important	Response Ratio <b>Total Responses</b>  <b>Mean</b>
Math, science and engineering skills	46% <b>17</b>	43% <b>16</b>	8% <b>3</b>	0% <b>0</b>	3% <b>1</b>	100% <b>37</b> <b>4.3</b>
Ability to design and conduct experiments	41% <b>15</b>	30% <b>11</b>	24% <b>9</b>	3% <b>1</b>	3% <b>1</b>	100% <b>37</b> <b>4</b>
Ability to analyze and interpret data	70% <b>26</b>	27% <b>10</b>	0% <b>0</b>	0% <b>0</b>	3% <b>1</b>	100% <b>37</b> <b>4.6</b>
Ability to design a system, component or process	41% <b>15</b>	43% <b>16</b>	14% <b>5</b>	0% <b>0</b>	3% <b>1</b>	100% <b>37</b> <b>4.2</b>
Ability to function on a team	84% <b>31</b>	16% <b>6</b>	0% <b>0</b>	0% <b>0</b>	0% <b>0</b>	100% <b>37</b> <b>4.8</b>
Engineering problem solving skills	78% <b>29</b>	19% <b>7</b>	0% <b>0</b>	0% <b>0</b>	3% <b>1</b>	100% <b>37</b> <b>4.7</b>
Understanding of professional and ethical responsibility	78% <b>29</b>	14% <b>5</b>	8% <b>3</b>	0% <b>0</b>	0% <b>0</b>	100% <b>37</b> <b>4.7</b>
Written communication skills	62% <b>23</b>	35% <b>13</b>	0% <b>0</b>	3% <b>1</b>	0% <b>0</b>	100% <b>37</b> <b>4.6</b>
Oral communication skills	78% <b>29</b>	19% <b>7</b>	3% <b>1</b>	0% <b>0</b>	0% <b>0</b>	100% <b>37</b> <b>4.8</b>



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### 8. Please rate how important you predict the following competencies and attitudes will be to you in your PROFESSIONAL CAREER. (continued)

The percentage is the fraction of respondents giving the specific response to the given question. In bold is number of respondents.	5 = Extremely Important	4 = Quite Important	3 = Somewhat Important	2 = Slightly Important	1 = Not at all Important	Response Ratio <b>Total Responses</b> <b>Mean</b>
Understanding of the social, economic and environmental impact of my work	54% <b>20</b>	27% <b>10</b>	14% <b>5</b>	5% <b>2</b>	0% <b>0</b>	100% <b>37</b> <b>4.3</b>
Ability to continue formal or informal learning	51% <b>19</b>	32% <b>12</b>	11% <b>4</b>	3% <b>1</b>	3% <b>1</b>	100% <b>37</b> <b>4.3</b>
Knowledge of contemporary issues that affect my work	35% <b>13</b>	49% <b>18</b>	14% <b>5</b>	0% <b>0</b>	3% <b>1</b>	100% <b>37</b> <b>4.1</b>
Ability to use modern engineering techniques, skills & tools	57% <b>21</b>	32% <b>12</b>	8% <b>3</b>	0% <b>0</b>	3% <b>1</b>	100% <b>37</b> <b>4.4</b>

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## 9. Please rate how well you feel your UNDERGRADUATE PROGRAM at the University of Michigan prepared you in the following competencies and attitudes.

The percentage is the fraction of respondents giving the specific response to the given question. In bold is number of respondents.	5 = Excellent Preparation	4 = Good Preparation	3 = Adequate Preparation	2 = Unsatisfactory Preparation	1 = Poor Preparation	Response Ratio <b>Total Responses</b>  <b>Mean</b>
An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics	33% <b>12</b>	61% <b>22</b>	6% <b>2</b>	0% <b>0</b>	0% <b>0</b>	100% <b>36</b> <b>4.3</b>
An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors	39% <b>14</b>	42% <b>15</b>	19% <b>7</b>	0% <b>0</b>	0% <b>0</b>	100% <b>36</b> <b>4.2</b>
An ability to communicate effectively with a range of audiences	42% <b>15</b>	47% <b>17</b>	8% <b>3</b>	3% <b>1</b>	0% <b>0</b>	100% <b>36</b> <b>4.3</b>
An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental and societal contexts	36% <b>13</b>	44% <b>16</b>	17% <b>6</b>	3% <b>1</b>	0% <b>0</b>	100% <b>36</b> <b>4.1</b>

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### 9. Please rate how well you feel your UNDERGRADUATE PROGRAM at the University of Michigan prepared you in the following competencies and attitudes.

The percentage is the fraction of respondents giving the specific response to the given question. In bold is number of respondents.	5 = Excellent Preparation	4 = Good Preparation	3 = Adequate Preparation	2 = Unsatisfactory Preparation	1 = Poor Preparation	Response Ratio <b>Total Responses</b>  <b>Mean</b>
Ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives	56% <b>20</b>	39% <b>14</b>	6% <b>2</b>	0% <b>0</b>	0% <b>0</b>	100% <b>36</b> <b>4.5</b>
An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions	42% <b>15</b>	42% <b>15</b>	14% <b>5</b>	3% <b>1</b>	0% <b>0</b>	100% <b>36</b> <b>4.2</b>
An ability to acquire and apply new knowledge as needed, using appropriate learning strategies	39% <b>14</b>	50% <b>18</b>	8% <b>3</b>	3% <b>1</b>	0% <b>0</b>	100% <b>36</b> <b>4.2</b>

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### 10. How well were the courses in your curriculum integrated with each other (e.g., how well did prerequisites prepare you for subsequent courses)?

	Number of Responses	Response Ratio
Excellent Integration (=5)	6	16%
Good Integration (=4)	21	57%
Adequate Integration (=3)	9	24%
Unsatisfactory Integration (=2)	1	3%
No Integration (=1)	0	0%
Mean = 3.9	Totals 37	100%

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## 11. How important do you feel the following elements are for your learning in an engineering course?

The percentage is the fraction of respondents giving the specific response to the given question. In bold is number of respondents.

	5 = Extremely Important	4 = Quite Important	3 = Somewhat Important	2 = Slightly Important	1 = Not at all Important	Response Ratio <b>Total Responses</b>  <b>Mean</b>
Small class size	8% <b>3</b>	30% <b>11</b>	27% <b>10</b>	16% <b>6</b>	19% <b>7</b>	100% <b>37</b> <b>2.9</b>
Taught by a professor	35% <b>13</b>	32% <b>12</b>	19% <b>7</b>	11% <b>4</b>	3% <b>1</b>	100% <b>37</b> <b>3.9</b>
Quality of the lecture	70% <b>26</b>	27% <b>10</b>	3% <b>1</b>	0% <b>0</b>	0% <b>0</b>	100% <b>37</b> <b>4.7</b>
Quality of the discussions	22% <b>8</b>	42% <b>15</b>	17% <b>6</b>	17% <b>6</b>	3% <b>1</b>	100% <b>36</b> <b>3.6</b>
Quality of the homework and exams	59% <b>22</b>	27% <b>10</b>	11% <b>4</b>	0% <b>0</b>	3% <b>1</b>	100% <b>37</b> <b>4.4</b>
Accessibility of the professor	24% <b>9</b>	51% <b>19</b>	16% <b>6</b>	8% <b>3</b>	0% <b>0</b>	100% <b>37</b> <b>3.9</b>
Accessibility of the GSI	32% <b>12</b>	35% <b>13</b>	27% <b>10</b>	5% <b>2</b>	0% <b>0</b>	100% <b>37</b> <b>3.9</b>

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**12. What was your best course in engineering? Why?**

Number of Responses:	32
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Responses listed on subsequent pages.

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## PART III. CO-CURRICULAR ACTIVITIES

### 13. Which of the following activities/programs did you participate in during your time at U-M? (Check all that apply.)

	Number of Responses	Response Ratio
No participation in programs/activities outside of the requirements for my academic degree(s)	0	0%
Professional Societies (e.g., ASME, AIAA)	16	11%
Honor Societies (e.g., Eta Kappa Nu, Tau Beta Pi)	7	5%
Project Teams (e.g., Solar Car, Steel Bridge)	13	9%
Community Service	9	6%
Student Government (e.g., UMEC, MSA)	2	1%
Sports (Intercollegiate or Club)	10	7%
Music Performance (e.g., Marching Band, Glee Club)	8	5%
Religious Organizations	7	5%
Undergraduate Research Project	19	13%
Study Abroad	8	5%
Co-Op	4	3%
Internship	24	16%
Months or years experience in Co-op/Internship:	18	12%
Other	2	1%
<b>Totals</b>	<b>147</b>	<b>100%</b>

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**14. Indicate below how many hours, on average, you worked (including work study) during the terms in which you were taking classes.**

	Number of Responses	Response Ratio
No job	12	32%
0-10 hours/week	15	41%
10-20 hours/week	8	22%
20+ hours/week	2	5%
Totals	37	100%



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## PART IV. SUPPORT SERVICES AND ENVIRONMENT

### 15. How satisfied were you with the following aspects of the DEPARTMENT in which you did your primary major?

The percentage is the fraction of respondents giving the specific response to the given question. In bold is number of respondents.	5 = Extremely Satisfied	4 = Satisfied	3 = Neutral	2 = Dissatisfied	1 = Extremely Dissatisfied	Response Ratio <b>Total Responses</b> <b>Mean</b>
Academic advising	83% <b>30</b>	14% <b>5</b>	3% <b>1</b>	0% <b>0</b>	0% <b>0</b>	100% <b>36</b> <b>4.8</b>
Career guidance from faculty	40% <b>14</b>	51% <b>18</b>	9% <b>3</b>	0% <b>0</b>	0% <b>0</b>	100% <b>35</b> <b>4.3</b>
Instruction by faculty	17% <b>6</b>	58% <b>21</b>	22% <b>8</b>	3% <b>1</b>	0% <b>0</b>	100% <b>36</b> <b>3.9</b>
Accessibility of faculty	19% <b>7</b>	64% <b>23</b>	11% <b>4</b>	6% <b>2</b>	0% <b>0</b>	100% <b>36</b> <b>4</b>
Contact with faculty	20% <b>7</b>	66% <b>23</b>	9% <b>3</b>	6% <b>2</b>	0% <b>0</b>	100% <b>35</b> <b>4</b>
Instruction by graduate students (GSI's)	14% <b>5</b>	46% <b>16</b>	34% <b>12</b>	6% <b>2</b>	0% <b>0</b>	100% <b>35</b> <b>3.7</b>
Accessibility of GSI's	20% <b>7</b>	71% <b>25</b>	6% <b>2</b>	3% <b>1</b>	0% <b>0</b>	100% <b>35</b> <b>4.1</b>
Percentage of teaching by faculty	37% <b>13</b>	60% <b>21</b>	3% <b>1</b>	0% <b>0</b>	0% <b>0</b>	100% <b>35</b> <b>4.3</b>
Contact with staff	19% <b>7</b>	64% <b>23</b>	14% <b>5</b>	3% <b>1</b>	0% <b>0</b>	100% <b>36</b> <b>4</b>
Sense of community among students	46% <b>16</b>	43% <b>15</b>	6% <b>2</b>	6% <b>2</b>	0% <b>0</b>	100% <b>35</b> <b>4.3</b>

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### 15. How satisfied were you with the following aspects of the DEPARTMENT in which you did your primary major? (continued)

The percentage is the fraction of respondents giving the specific response to the given question. In bold is number of respondents.	5 =	4 =	3 =	2 =	1 =	Response Ratio
	Extremely Satisfied	Satisfied	Neutral	Dissatisfied	Extremely Dissatisfied	<b>Total Responses</b>
						<b>Mean</b>
Research opportunities	43% <b>15</b>	37% <b>13</b>	20% <b>7</b>	0% <b>0</b>	0% <b>0</b>	100% <b>35</b> <b>4.2</b>
Classroom facilities	23% <b>8</b>	40% <b>14</b>	20% <b>7</b>	14% <b>5</b>	3% <b>1</b>	100% <b>35</b> <b>3.7</b>
Lab facilities	23% <b>8</b>	49% <b>17</b>	11% <b>4</b>	14% <b>5</b>	3% <b>1</b>	100% <b>35</b> <b>3.7</b>
Computing facilities	26% <b>9</b>	49% <b>17</b>	14% <b>5</b>	11% <b>4</b>	0% <b>0</b>	100% <b>35</b> <b>3.9</b>
Overall experience with your department	31% <b>11</b>	63% <b>22</b>	3% <b>1</b>	3% <b>1</b>	0% <b>0</b>	100% <b>35</b> <b>4.2</b>