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Title: Preschool attendance: How researchers and practitioners are working together to understand and address absenteeism among our youngest students

Authors and Affiliations:

Stacy B. Ehrlich, University of Chicago Consortium on Chicago School Research
Julia Gwynne, University of Chicago Consortium on Chicago School Research
Elaine M. Allensworth, University of Chicago Consortium on Chicago School Research
Serah Fatani, Office of Early Childhood Education, Chicago Public Schools

Abstract Body

Background / Context:
In 2010, the Office of Early Childhood Education at a large, urban district recognized that preschool students in their schools were missing a substantial amount of school. They, along with a local funder, sought a partner who could shed light on some of the issues around absenteeism among preschool students. This resulted in a project that included various analyses on the prevalence of preschool absenteeism in their schools, the relationship between attendance and kindergarten readiness outcomes, and the relationship between preschool attendance and later learning outcomes in the early elementary years. This proposed paper presents these findings and discusses the collaborative relationship between researchers and our district partners as we conducted our work and continue to partner on improving preschool attendance.

Consistent school attendance is a key foundation of student learning. While missing one or two school days each year is not likely to have serious consequences, chronic absenteeism (missing 10% or more of enrolled school days) can seriously undermine the learning process (Allensworth & Easton, 2007). Much existing research on attendance focuses on children in the elementary, middle, or high school grades. However, newly-emerging research suggests that chronic absenteeism is a significant problem even among younger students, with 11% of kindergarteners nationwide chronically absent (Romero & Lee, 2007). Chronically absent students are more likely to be from low-income families, live with a single mother, and be racial/ethnic minorities. This is especially concerning because the impact of high absenteeism is more detrimental for these high-risk students, who benefit the most from being in school (Ready, 2010).

Given national efforts to increase the enrollment of at-risk children into high quality early education programs, understanding whether enrollment alone is sufficient for preparing students for kindergarten or whether regular attendance also matters is an important issue with direct policy implications. This paper begins to address that research gap. It also highlights how research collaborations with a local school district led to policy changes in ways that, we hope, will improve education for all students, particularly those in poverty.

Purpose / Objective / Research Question / Focus of Study:
Currently, there is limited evidence documenting how often young children are absent from school, but that evidence suggests that absenteeism rates are high. A recent study was the first to document the prevalence of absenteeism for preschool students, showing that more than one-third of preschoolers in one urban city are chronically absent (Connolly and Olson, 2012). These rates seem high, but given the dearth of comparative information, it is hard to know whether they are specific to one location or indicative of national trends. We also sought to better understand the relationship between preschool attendance and a) kindergarten readiness and b) 2nd grade learning outcomes. The proposed paper focuses on our local, urban school district and asks the following questions:

Research Question (RQ) 1: What percentage of preschool students are chronically absent during preschool? Among preschool students, who is most likely to be chronically absent? *RQ 2:* Is attendance in preschool related to academic and social-emotional learning outcomes in preschool? If so, is the relationship between attendance and learning outcomes the same for different groups of students? *RQ 3:* Is preschool attendance related to learning outcomes in 2nd grade even after taking into account attendance in kindergarten, 1st grade, and 2nd grade?

Setting:
Our research study focused on 4-year-old children served by school-based preschool programs in a large, urban district between 2008-09 and 2011-12. The district enrolls more than 20,000 3- and 4-year-old preschool students in their schools each year.

Population / Participants / Subjects:
For RQ 1: Overall descriptives on preschool attendance. The descriptive analyses in our study included all 4-year-olds enrolled in school-based preschool programs within the district, from 2009-10 through 2011-12 (see B.1). *For RQ 2: Relationship between preschool attendance and kindergarten readiness outcomes.* In 2010-11, the district conducted their own study on a stratified, random sample of classrooms, based on students' race, free lunch status, gender, and preschool program type. One-on-one child assessments were conducted with a sub-sample of 1,265 students; these comprised our sample for the analysis of kindergarten readiness outcomes See Table B.2, with background characteristics broken down by categories of absence rates. *For RQ 3: Relationship between preschool attendance and later learning outcomes.* Our analyses focused on a sample of 7,236 students who were enrolled as 4-year-olds in 2008-09 and were also administered the DIBELS (see "Data Collection") in 2011-12 as 2nd graders (see Table B.3).

Research Design:
The research study was conducted as secondary analyses on existing data.

Data Collection:
Background and Attendance Data. Available administrative data on all students within the district included race/ethnicity, gender, grade level, birthdate, free or reduced-price lunch eligibility, special education status, English Language Learner (ELL) status, and home address. Using the home address of each student, census information was used to create measures of the economic conditions of students' residential block group, including measures of *neighborhood concentration of poverty* and *neighborhood social status.* The authors also received end-of-year attendance data on all students and additional daily attendance files for all 4-year-old preschool students were made available for the school years 2008-09 through 2011-12.

Preschool Outcome Data (for RQ 2). The district administered the *Woodcock-Johnson III* (WJ-III; Woodcock, McGrew, and Mather, 2001) to a sample of 4-year-old students at the beginning and end of their preschool year (fall 2010, spring 2011). All 4-year-olds were also assessed at the end of the year using a district-developed kindergarten readiness test ("KRT"). In Spring 2011, the KRT consisted of 86 items administered one-on-one to students by their teacher, and 8 items filled out by teachers. Rasch analysis identified four subscales: math, letter recognition, pre-literacy, and social-emotional development. In analyses, the KRT is a measure of kindergarten readiness and the WJ-III is a control variable for incoming skills.

Second Grade Outcome Data (for RQ 3). 2nd grade learning outcomes was measured using the *Dynamic Indicators of Basic Early Literacy Skills-Oral Reading Fluency* (DIBELS ORF; Good and Kaminski, 2002), with data provided by the district. DIBELS ORF is a standardized reading fluency assessment designed for use with students between 1st and 3rd grade.

Analyses:
For RQ 1. We ran descriptive statistics to examine how rates of chronic absenteeism differed depending on students' race, gender, neighborhood poverty and social status, ELL status, special education status, and whether students had prior preschool experience in the district. Logistic regressions were used to determine which background characteristics were most strongly

associated with attendance, after controlling for all other background characteristics.

For RQ 2. We used hierarchical models to examine the relationship between preschool attendance and learning outcomes on each of the four KRT subscales, controlling for background characteristics and initial skill level. Model 1 examines the bivariate relationship between students' absence categories and their KRT scores, while Model 2 controls for differences in students' background characteristics and incoming skills. Analyses were based on a measurement model in which a student's score on a KRT subtest was adjusted at level 1 for measurement error (Raudenbush & Bryk, 2002). Adjusted scores were nested within students at level 2, nested within preschools at level 3. Model 2 is as follows:

Level 1 Model

$$(\text{KRT Score/Standard Error})_{ijk} = \pi_{1jk}(1/\text{Standard Error}_{ijk}) + e^*_{ijk} \quad \textit{where } e^*_{ijk} \sim N(0,1)$$

Level 2 Model

$$\pi_{1jk} = \beta_{10k} + \beta_{11k}(\text{Absence Category 2}_{jk}) + \beta_{12k}(\text{Absence Category 3}_{jk}) + \beta_{13k}(\text{Absence Category 4}_{jk}) + \beta_{14k}(\text{Absence Category 5}_{jk}) + \beta_{15k}(\text{Absence Category 6}_{jk}) + \beta_{16k}(\text{African American}_{jk}) + \beta_{17k}(\text{Latino}_{jk}) + \beta_{18k}(\text{Other Race}_{jk}) + \beta_{19k}(\text{Neighborhood Poverty}_{jk}) + \beta_{110k}(\text{Neighborhood Social Status}_{jk}) + \beta_{111k}(\text{English Language Learner}_{jk}) + \beta_{112k}(\text{Special Education}_{jk}) + \beta_{113k}(\text{Male}_{jk}) + \beta_{114k}(\text{First Preschool Year}_{jk}) + \beta_{115k}(\text{Fall WJ Letter-Word Identification Score}_{jk}) + r_{1jk}$$

Level 3 Model

$$\beta_{10k} = \gamma_{100} + u_{10k}$$
$$\beta_{11k} = \gamma_{110}$$
$$\ldots$$
$$\beta_{115k} = \gamma_{1150}$$

In addition, we examined whether there were significant interactions between initial skill level and attendance for each outcome—that is, whether attendance had different relationships with outcomes depending on students' initial skill levels. In Model 3, we include a linear standardized rate (rather than the absence categories included above). The interaction terms are interactions between the linear absence rate and the incoming WJ-III Letter-Word Identification score.

For RQ 3. To examine the relationship between 2nd grade learning outcomes and attendance over the early elementary years, we conducted two 2-level HLM analyses with students nested within their preschool. Model 1 includes a dummy variable for each year students were chronically absent between preschool and 2nd grade. We tested for interactions between multiple years of chronic absenteeism, but none existed suggesting that the relationship between chronic absenteeism and learning outcomes is additive. Model 2 adds background characteristics (i.e., race, neighborhood poverty and social status, special education status, and gender). Because there were no data available, we did not control for any prior achievement.

Findings / Results:

RQ 1. In 2011-12, 36% of four-year-olds in the district were chronically absent, meaning they missed at least 10% of their enrolled days. Of these students, at least one-third missed 20% or more of school. This is equivalent to missing 30 days, or at least six weeks, over the school year. Table B.4 presents logistic regression model results, with the R^2 presented to show how much variance is explained by the variables included in the model. Across all models, it becomes evident that in our sample, race—or being African American—is the strongest predictor of being chronically absent, even when controlling for neighborhood poverty. (Also see Figure B1.)

RQ 2. As shown in Table B.5, there is a significant relationship between attendance rates and

KRT outcomes (see Model 1). Controlling for background characteristics and incoming scores does account for some of this relationship; in other words, some of the relationship between absences and outcomes is due to the fact that children who missed more school and had lower scores were also the students who entered school with the lowest skills (Model 2). However, even with those controls, there is still a significant relationship between absences and KRT outcomes for math, letter recognition, and social-emotional development. We also found significant interaction effects between absences and incoming skills, which indicates that the relationship between attendance and some learning outcomes, including letter recognition, are stronger for students who enter preschool with the weakest skills (Model 3).

RQ 3. Preschool attendance is related to 2nd grade DIBELS scores, even after controlling for attendance in the years more proximal to that grade (K, 1st, and 2nd grades). The more years a student was chronically between preschool and 2nd grade, the lower their DIBELS scores were at the end of 2nd grade (see Table B.6). Students who were chronically absent in both preschool and kindergarten, but not chronically absent after that, had reading fluency scores indicating they were at-risk for needing reading intervention. Students who were chronically absent all four years between preschool and second grade had reading fluency scores that were, on average, close to the benchmark for being at risk for *substantial* reading intervention. This means that many students in this group are in need of intensive reading intervention before they even enter third grade. Other analyses also showed that there is a relationship—although not deterministic—between preschool attendance and attendance in the early elementary years, such that students who are chronically absent in preschool are the most likely to be chronically absent in the early elementary years (see Table B.7).

Conclusions:

Our findings show that chronic absenteeism is common among preschool students. The students who miss the most school are those who enter with the weakest skills and end up even further behind at the end of the year. For those students, the higher risk for ongoing chronic absenteeism into the early elementary grades has continued implications for ongoing learning. Schools' abilities to organize themselves in ways that support preschool attendance may be key to preventing later attendance and learning struggles.

Because researchers on this study were engaged with district partners from the very start of the research process, this study sought to answer questions that were directly of interest to district staff—questions they contend with on a daily basis. The proposed paper will share how these findings led to changes in practice at the district level. For example, the district has implemented regular updates to principals that include attendance data for their preschool students (when in the past, they did not). Within central office, there have been intentional efforts to align the messages that teachers and staff receive about attendance across the full preschool-12th grade continuum. Weekly e-blasts to preschool teachers also provide reminders about value of good preschool attendance and tips for how to keep an emphasis on good or improved attendance.

The continued relationship between the authored researchers and district partners has also lead to a follow-up study. Now that we understand how much preschool absences occur and that they are related to learning outcomes, the next question has become, "What can schools *do* about it?" Together, we are embarking on a new study that will examine efforts being made by schools, which ones seem to have some traction, and what barriers exist around improving preschool attendance. This is an example of how our work and our engagement with the district can lead to an iterative process of questioning, studying, understanding, and then questioning further.

Appendices

Appendix A. References

Allensworth, E.M., and Easton, J.Q. (2007). *What matters for staying on-track and graduating in Chicago Public Schools: A close look at course grades, failures, and attendance in the freshman year.* Chicago, IL: Consortium on Chicago School Research at the University of Chicago.

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Raudenbush, S. W., & Bryk, A. S. *(*2002*). Hierarchical Linear Models*: *Applications and Data Analysis Methods, Second Edition.* Newbury Park, CA: Sage.

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Romero, M., and Lee, Y. (2007). *A national portrait of chronic absenteeism in the early grades.* New York: National Center for Children in Poverty, Columbia University.

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Appendix B. Tables and Figures

Table B.1. Population of 4-year-old students included in analyses for RQ 1.

Year	N	White	African American	Latino	Other Race	Special Education	Percent from High-Poverty Neighborhood
2008-09	15,713	11%	36%	49%	4%	7%	15%
2009-10	16,506	12%	36%	48%	4%	7%	16%
2010-11	15,571	11%	35%	50%	5%	8%	15%
2011-12	16,118	11%	35%	49%	5%	8%	15%

Table B.2. Characteristics of students included in analyses for RQ 2, 2010-11, broken down by absence rates.

Absence Rates	n	White	African American	Latino	Other	Special Education	Percent from High-Poverty Neighborhood	Incoming WJ Letter-Word Identification Score
0%<3.3%	275	17%	24%	53%	6%	6%	10%	343.9
3.3%<6.6%	344	25%	26%	43%	6%	3%	10%	341.5
6.6%<10%	203	15%	37%	43%	5%	4%	15%	339.2
10%<15%	206	15%	46%	35%	3%	5%	22%	338.8
15%<20%	125	10%	58%	30%	3%	7%	20%	335.2
20%+	110	9%	70%	20%	1%	7%	29%	325.6
TOTAL Sample	*1,265*	*17%*	*38%*	*42%*	*5%*	*5%*	*16%*	*339.2 (25.9)**

Table B.3. Characteristics of student included in analyses for RQ 3 (were 4 years old in 2008-09 and took 2nd grade DIBELS in 2011-12)

n	**White**	**African American**	**Latino**	**Other Race**	**Special Education (in second grade)**	**% from High-Poverty Neighbor-hood**	**Preschool Absence Rate**
7,236	11.60%	32.90%	50.40%	5.10%	4.80%	13.60%	10.30%

Table B.4. Logistic regression estimates examining student characteristics related to being chronically absent

	Model 1			Model 2			Model 3			Model 4		
	Estimate		S.E.	Estimate		S.E.	Estimate		S.E.	Estimate		S.E.
Intercept	-1.149	***	0.06	-0.655	***	0.02	-1.088	***	0.06	-0.896	***	0.06
African American	1.240	***	0.06				1.107	***	0.07	1.002	***	0.07
Latino	0.220	**	0.06				0.151	*	0.06	0.427	***	0.07
Other race	0.240	*	0.09				0.190	*	0.09	0.349	**	0.10
Neighborhood poverty				0.373	***	0.02	0.097	***	0.02	0.115	***	0.02
ELL status										-0.601	***	0.05
Special education status										0.342	***	0.07
Prior enrollment in preschool										-0.179	***	0.04
Male										-0.021		0.03
R^2	0.058			0.021			0.059			0.071		

Note: Probability modeled is "chronically absent"=1.

Figure B.1. African American preschool students in our sample were much more likely to be chronically absent than students of other racial/ethnic backgrounds, even after controlling for neighborhood poverty level.

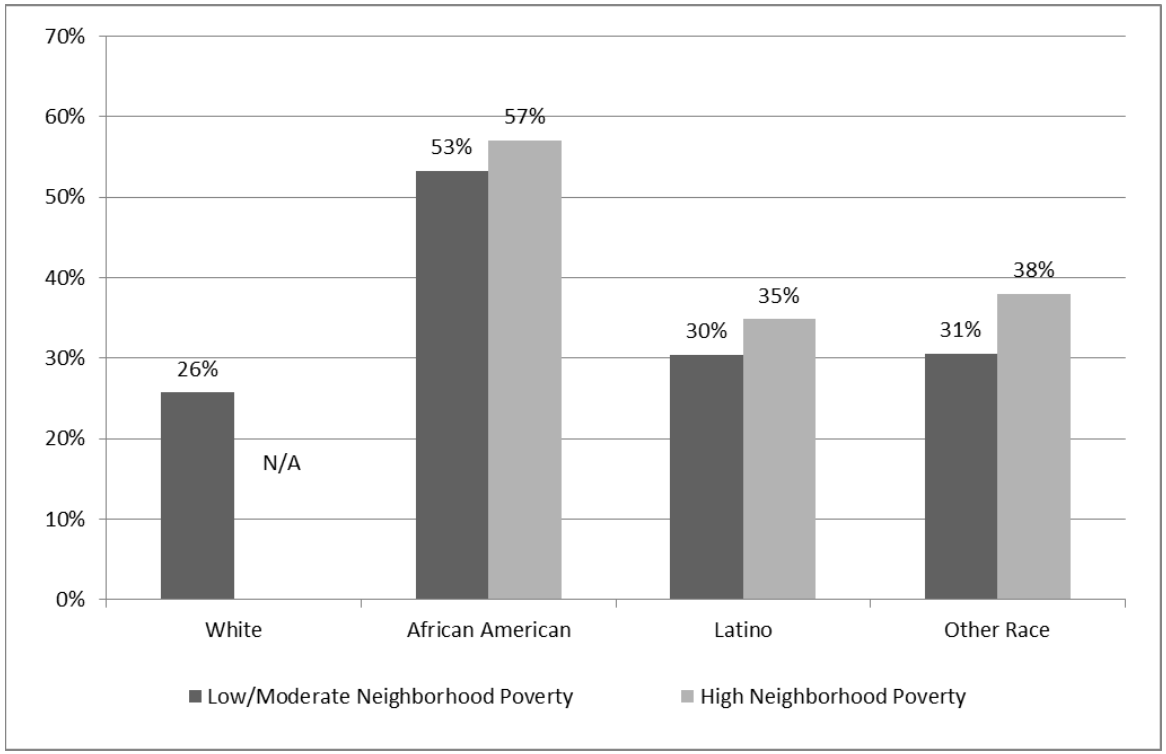

Table B.5. 3 Level Linear HLM Modelling Scores on the KRT for RQ 2.

	Math									Letter Recognition								
	Model 1			Model 2			Model 3			Model 1			Model 2			Model 3		
	B		SE	B		SE	B		SE	B		SE	B		SE	B		SE
Intercept	2.33	***	0.10	2.35	***	0.10	2.13	***	0.07	2.62	***	0.15	2.54	***	0.13	2.05	***	0.09
Absence Category 2	0.06		0.12	0.08		0.11				-0.18		0.16	-0.13		0.14			
Absence Category 3	-0.27	*	0.13	-0.13		0.12				-0.39	**	0.20	-0.27		0.16			
Absence Category 4	-0.45	***	0.12	-0.31	**	0.12				-0.59	***	0.20	-0.39	*	0.15			
Absence Category 5	-0.54	***	0.15	-0.35	**	0.13				-0.90	***	0.26	-0.74	***	0.21			
Absence Category 6	-0.96	***	0.18	-0.48	**	0.16				-1.75	***	0.25	-1.08	***	0.20			
Black				-0.62	***	0.14	-0.63	***	0.14				0.00		0.20	-0.01		0.20
Latino				-0.32	*	0.13	-0.35	**	0.13				-0.15		0.19	-0.20		0.19
Other Race				0.30		0.15	-0.27		0.15				-0.16		0.29	-0.11		0.29
Neighborhood Poverty				0.03		0.06	0.02		0.06				0.07		0.08	0.08		0.07
Neighborhood Social Status				0.00		0.05	0.00		0.06				-0.07		0.08	-0.07		0.08
Special Education Status				-0.73	***	0.17	-0.73	***	0.17				-0.62	**	0.24	-0.55	*	0.25
ELL Status				-0.39	**	0.13	-0.39	**	0.13				-1.00	***	0.20	-0.98	***	0.20
Male				0.00		0.07	-0.01		0.07				-0.22	*	0.10	-0.22	*	0.10
Prior enrollment in preschool				0.05		0.09	0.04		0.09				-0.14		0.12	-0.17		0.12
WJ-III Letter Word Score				0.02	***	0.00							0.04	***	0.00			
Absence Rate (Standardized)							-0.16	**	0.05							-0.27	***	0.05
WJ-III Letter Word Score (Standardized)							0.67	***	0.05							1.30	***	0.06
Absence Rate * WJ-III Letter Word							0.07	*	0.03							0.17	**	0.05
Level 2 Variance	0.73			0.36			0.37			2.53			1.20			1.18		
Level 3 Variance	0.55			0.44			0.45			1.37			0.53			0.54		

Table B.5 (continued). 3 Level Linear HLM Modelling Scores on the KRT for RQ 2.

	Pre Literacy									Social Emotional Development								
	Model 1			Model 2						Model 1			Model 2			Model 3		
	B		SE	B		SE				B		SE	B		SE	B		SE
Intercept	1.63	***	0.11	1.69	***	0.10	1.48	***		3.20	***	0.14	3.27	***	0.13	2.99	***	0.10
Absence Category 2	-0.09		0.10	-0.09		0.09				-0.16		0.17	-0.16		0.16			
Absence Category 3	-0.26	*	0.13	-0.20		0.12				-0.32		0.17	-0.18		0.16			
Absence Category 4	-0.31	**	0.12	-0.21		0.11				-0.40	*	0.19	-0.25		0.17			
Absence Category 5	-0.42	**	0.15	-0.22		0.13				-0.67	**	0.24	-0.42		0.23			
Absence Category 6	-0.53	**	0.17	-0.16		0.15				-1.09	***	0.25	-0.62	*	0.25			
Black				-0.63	***	0.14	-0.62	***	0.14				-0.74	**	0.28	-0.73	**	0.28
Latino				-0.12		0.13	-0.13		0.13				-0.01		0.24	-0.03		0.25
Other Race				-0.26		0.17	-0.26		0.17				-0.17		0.32	-0.13		0.32
Neighborhood Poverty				0.03		0.05	0.03		0.05				-0.02		0.06	-0.02		0.06
Neighborhood Social Status				-0.03		0.05	-0.03		0.05				-0.08		0.08	-0.08		0.08
Special Education Status				-0.60	***	0.12	-0.60	***	0.12				-0.97	***	0.26	-0.92	***	0.25
ELL Status				-0.33	**	0.13	-0.32	*	0.13				-0.35		0.20	-0.33		0.20
Male				-0.04		0.06	-0.05		0.06				-0.35	**	0.11	-0.35	**	0.11
Prior enrollment in preschool				0.01		0.08	0.00		0.08				-0.03		0.13	-0.05		0.12
WJ-III Letter Word Score				0.02	***	0.00			0.00				0.02	***	0.00			
Absence Rate (Standardized)							-0.06		0.04							-0.15	*	0.07
WJ-III Letter Word Score (Standardized)							0.55	***	0.04							0.60	***	0.07
Absence Rate * WJ-III Letter Word							0.03		0.03							0.09		0.05
Level 2 Variance	0.34			0.11			0.12			1.62			1.22			1.21		
Level 3 Variance	0.54			0.47			0.47			1.14			0.98			0.99		

Table B.6. HLM model results for 2nd grade DIBELS scores

	Model 1			Model 2		
	B		SE	B		SE
Intercept	98.762	***	1.00	98.987	***	0.80
CA in preschool	-4.116	***	1.08	-3.209	***	1.01
CA in kindergarten	-5.772	***	1.64	-4.295	**	1.56
CA in 1st grade	-7.533	***	1.80	-6.896	***	1.70
CA in 2nd grade	-8.407	***	1.87	-7.542	***	1.85
African American				-21.374	***	2.27
Latino				-16.578	***	1.94
Other race				4.245		2.59
Neighborhood Poverty				-1.397	~	0.80
Neighborhood Social Status				2.557	**	0.83
Special education status				-30.395	***	1.76
Prior enrollment in preschool				2.521	**	0.90
Male				-5.051	***	0.87

Table B.7. Relationship between preschool absenteeism and being chronically absent in kindergarten and 2nd grade.

Preschool absence rate	% chronically absent in kindergarten	% chronically absent in 2nd grade
0<3.3%	3.90%	2.40%
3.3<6.6%	6.60%	3.00%
6.6<10%	12.50%	5.70%
10<15%	22.80%	11.10%
15<20%	36.50%	18.60%
20+%	58.50%	31.00%