



# **CARLISLE**

# **TRENDS**

**Demographic &  
Financial**

**Presenter:**  
**John Ballantine**

**Wednesday April 10<sup>th</sup> 2019**

**Organized by the Carlisle Master Plan Steering Committee and members of the Master Plan  
Advisory Committee**

# John W. Ballantine, Jr. Carlisle resident since 1985

- Housing Authority
- Finance Committee
- Board of Selectmen
- Personnel Committee
- Highland Committee
- Cranberry Bog Committee
- Counsel on Aging
- Carlisle surveys (1989, 2009)
- Carlisle Mosquito
- Growing Pains and CPS building demographics
- Economist and Brandeis professor
- Town volunteer



# AGENDA

- Demographics



- Carlisle Public Schools Enrollment



- Budget and Taxes and Burden



- Issues / Challenges / Our Future? ? ? ?





# Demographics

We all get older with changing demands / needs

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Our shifting population mix

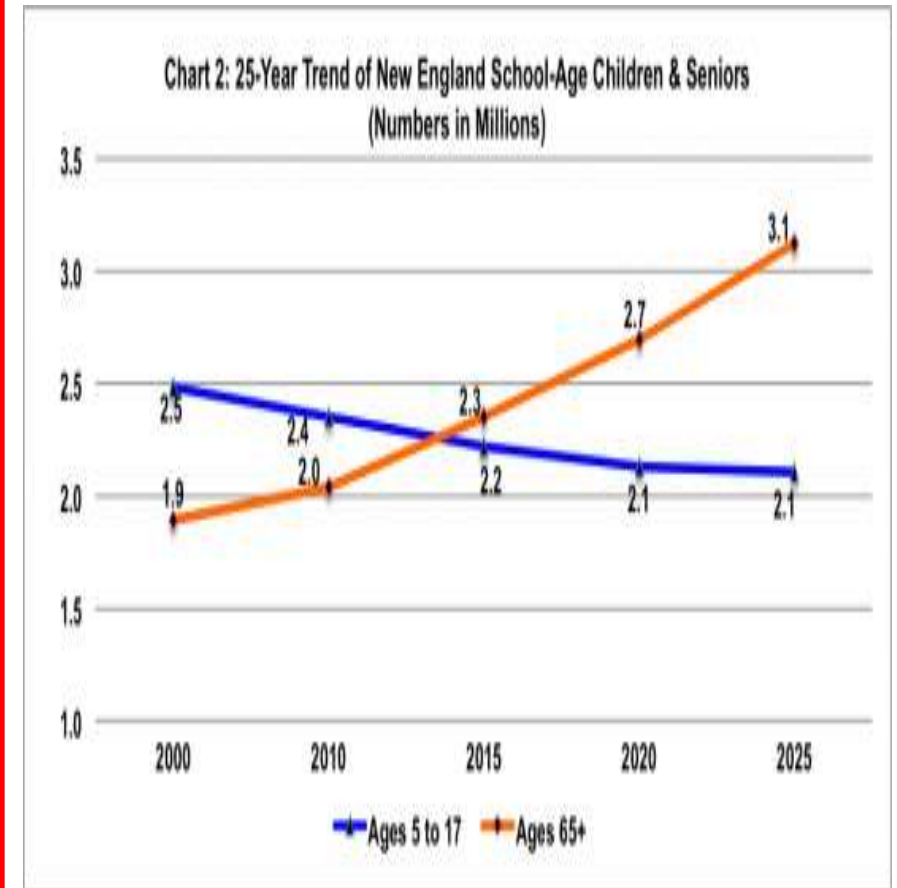
# Changing age profile over time

Actual numbers -- USA & Carlisle census

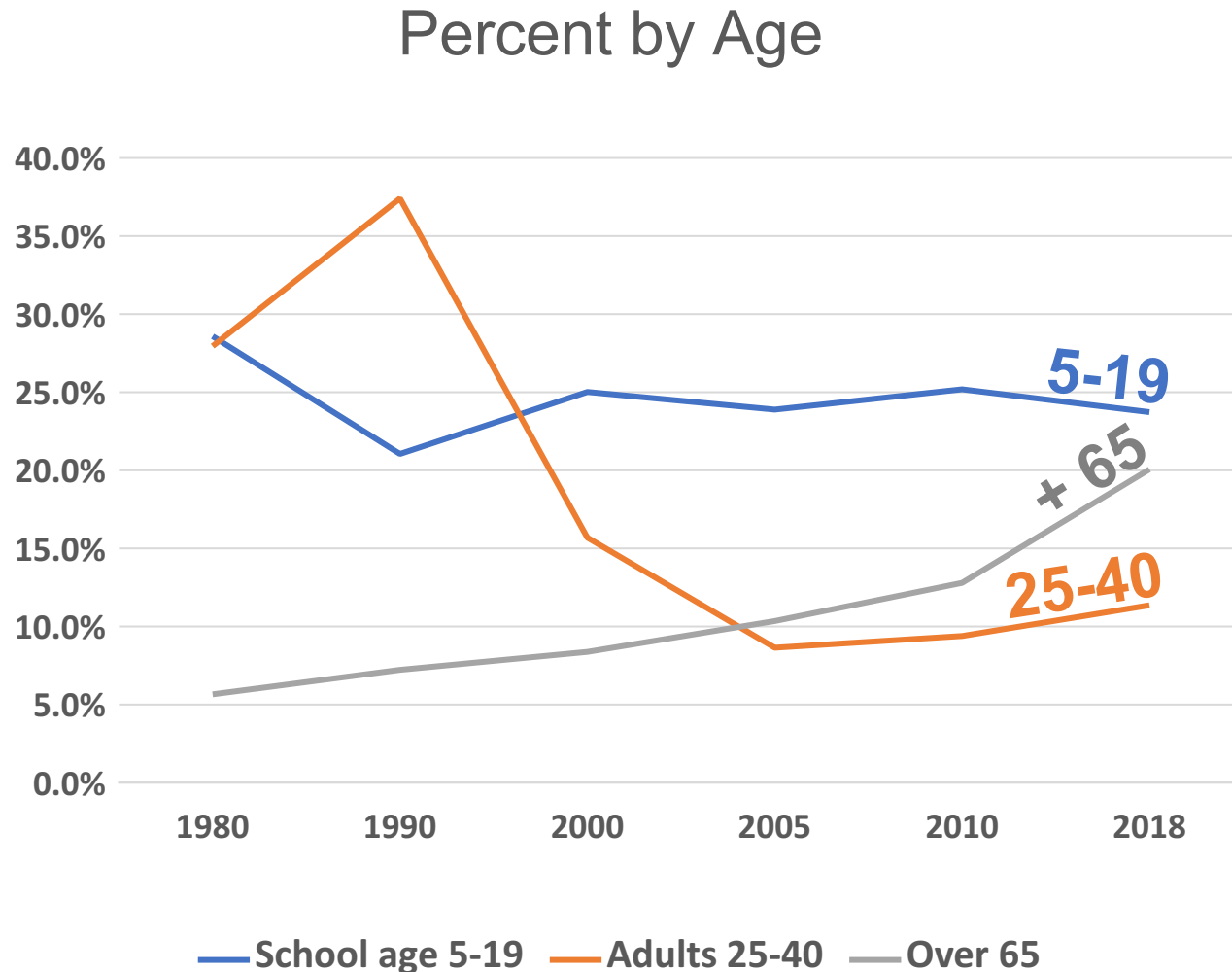
Age	1980	1990	2000	2005	2010	2018
0 - 24	1286	1464	1605	2040	1926	1503
25 - 40	924	<b>1621</b>	740	476	545	<b>589</b>
40 +	1096	1248	2372	2993	3119	3092
Total	<b>3306</b>	<b>4333</b>	<b>4717</b>	<b>5509</b>	<b>5590</b>	<b>5184</b>
50 +	719	1178	1615	1941	2294	2455
over 65	<b>187</b>	<b>313</b>	<b>395</b>	<b>570</b>	<b>715</b>	<b>1040</b>
school, 5 - 19	<b>945</b>	<b>912</b>	<b>1180</b>	<b>1316</b>	<b>1408</b>	<b>1230</b>

Carlisle census

## Massachusetts aging population



# Carlisle and Massachusetts Are Aging



- Town services and needs
- Population growth, buildable lots
- Housing mix, families, and affordability
- School enrollment
- Life cycle changes: 2030 and 2040





# Carlisle Public Schools

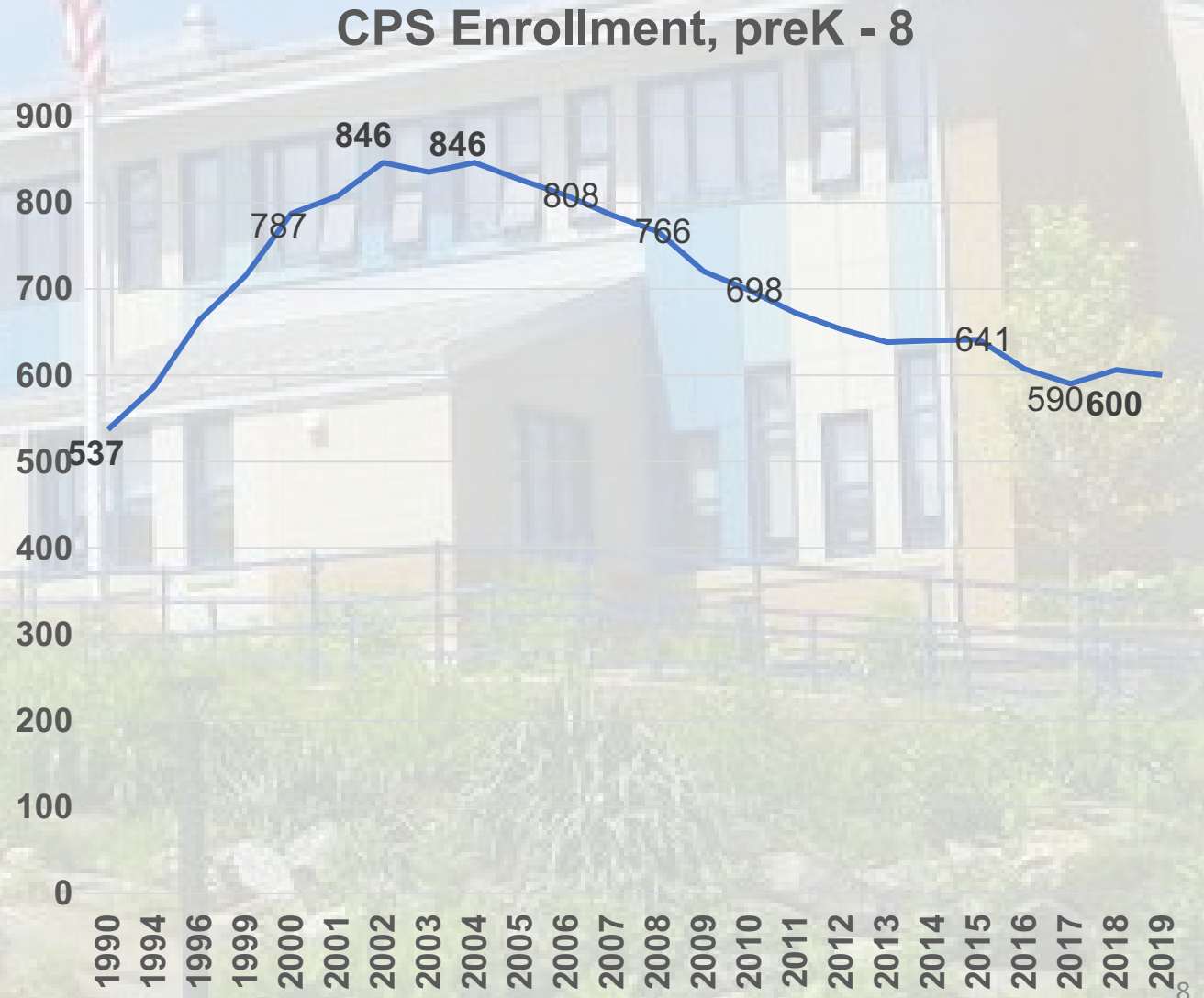
Enrollment trends

Cohort model

Costs

# Carlisle Public Schools (CPS)

- Growth from
  - 537 in 1990 to
  - 846 in 2002, down to
  - 600 in 2019
- Two school building projects (CPS, CCHS)
  - approximately \$120 million
  - state funding support / debt
  - CPS capacity in 700 + range
- CPS enrollment expected fall to low 600s.
- Why?
  - births
  - move-ins





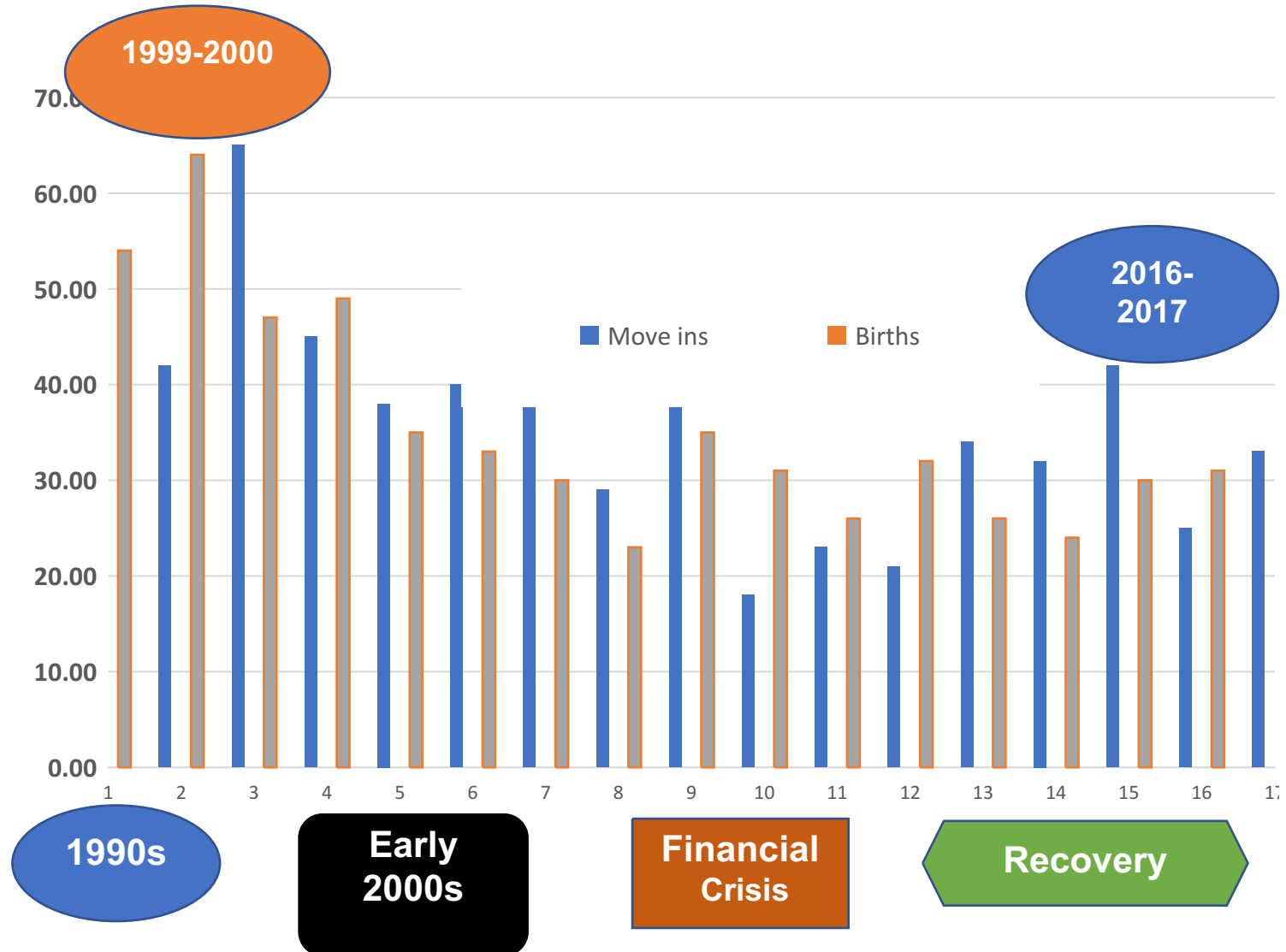
# Why Changing Enrollment?

- births part of K class in 5 years
- move-ins distributed K-8

## The Cohort model

- births plus move-ins
- over life of CPS student 13 years
- graduate and then part of CCHS

In coming CPS students: births and move-ins



# How the Cohort Model Works – Move ins

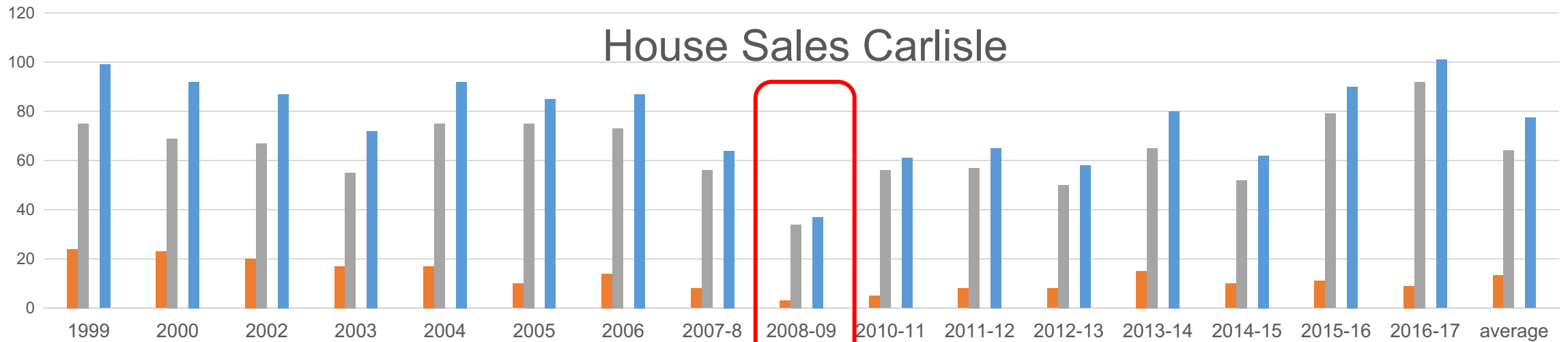
Law small numbers: lots variance with declining inflows tied to sales of Turnover and New homes

INFLOW	<u>1999</u>	<u>2000</u>	<u>2002</u>	<u>2003</u>	<u>2004</u>	<u>2005</u>	<u>2006</u>	<u>2007</u>	<u>2008</u>	<u>2010</u>	<u>2012</u>	<u>2013</u>	<u>2014</u>	<u>2015</u>	<u>2016</u>	<u>2017</u>
of kids																
Pre-school	22	22	18	22	13	33	24	27	20	17	15	17	12	34	13	15
K-8	20	43	27	16	27	8	5	14	-2	6	6	17	20	8	12	18
Annual Net kids for CPS	<b>42</b>	<b>65</b>	<b>45</b>	<b>38</b>	<b>40</b>	<b>41</b>	<b>29</b>	<b>41</b>	<b>18</b>	<b>23</b>	<b>21</b>	<b>34</b>	<b>32</b>	<b>42</b>	<b>25</b>	<b>33</b>

- **Children born** in Carlisle approximately **30-50** are the beginning of the cohort for future K class
- Children move into Carlisle: new homes and turnover homes:
  - pre-school move in kids join a future K cohort depending on age
  - children flow into all age groups / grades -- 6 to 40 flow into various grade levels each year (k-8)
- Total Cohort of one grade is
  - births **plus** inflow pre-k kids flowing into age cohort to K
  - K-8 inflow to respective grade

# House Sales in Carlisle

More children in New homes (0.93) vs Turnover (net 0.45)



	<u>1999</u>	<u>2000</u>	<u>2002</u>	<u>2003</u>	<u>2004</u>	<u>2005</u>	<u>2006</u>	<u>2007</u>	<u>2008</u>	<u>2010</u>	<u>2011</u>	<u>2012</u>	<u>2013</u>	<u>2014</u>	<u>2015</u>	<u>2016</u>	<u>average</u>
<b>NEW</b>	24	23	20	17	17	10	14.0	8	3	5	8	8	15	10	11	9	13.3
Turn over	75	69	67	55	75	75	73.0	56	34	56	57	50	65	52	79	92	64.1
<b>TOTAL</b>	99	92	87	72	92	85	87	64	37	61	65	58	80	62	90	101	77.4

**Financial  
Crisis**

# Examples of Cohort change over time

very dependent on #s and assumptions

- 40 children born in Carlisle
- Over first four years, 20 plus children join specific age cohort
- Starting **K class of 60** (40 + 20)
- Then 20 additional students join the K class cohort or 60 + 20
- Graduating 8<sup>th</sup> grade of **80** students
- Average class size 60 + 80 over time at Carlisle == **70**
- CPS population based on averages  
70 times 9 grades == **630** students

- 30 children born in Carlisle
- And over first four years 20 plus children join age cohort
- Starting **K class of 50** (30 + 20)
- Then 15 additional students join the K class cohort or 50 + 15
- Graduating 8th grade of **65** students
- Average class size 55 + 65 over time at Carlisle == **58**
- CPS population based on averages 58 time 9 grades == **522 students**



# Look At Our Actual Carlisle Cohorts

## high count and low count cohorts

<b>CPS</b>	<u>YE</u> <u>2005</u>	<u>YE</u> <u>2006</u>	<u>YE</u> <u>2007</u>	<u>YE</u> <u>2008</u>	<u>YE</u> <u>2009</u>	<u>YE</u> <u>2010</u>	<u>YE</u> <u>2011</u>	<u>YE</u> <u>2012</u>	<u>YE</u> <u>2013</u>	<u>YE</u> <u>2014</u>	<u>YE</u> <u>2015</u>	<u>YE</u> <u>2016</u>	<u>YE</u> <u>2017</u>	<u>YE</u> <u>2018</u>	<u>YE</u> <u>2019</u>
<b><u>Enrollment</u></b>															
Pre K	16	14	15	16	15	16	14	13	17	17	12	12	14	8	14
K	<b>79</b>	57	68	73	<b>56</b>	63	47	<b>54</b>	47	69	52	54	51	63	58
1	84	<b>84</b>	62	71	80	<b>62</b>	66	49	<b>60</b>	56	70	52	58	57	62
2	75	88	<b>89</b>	64	76	80	<b>66</b>	69	55	<b>66</b>	58	74	54	60	62
3	95	74	89	<b>88</b>	64	75	79	<b>68</b>	72	61	<b>70</b>	56	73	59	60
4	104	88	76	88	<b>90</b>	65	77	74	<b>66</b>	76	70	<b>63</b>	59	75	62
5	112	106	87	77	87	<b>95</b>	69	75	75	<b>66</b>	76	73	<b>70</b>	65	76
6	88	106	105	83	70	87	<b>95</b>	71	79	75	<b>72</b>	75	70	<b>70</b>	64
7	99	91	104	105	85	72	87	<b>94</b>	70	84	75	<b>68</b>	73	73	<b>71</b>
8	74	100	90	101	97	83	72	86	<b>97</b>	70	86	80	<b>68</b>	76	71
<b>Total CPS</b>	<b>826</b>	<b>808</b>	<b>785</b>	<b>766</b>	<b>720</b>	<b>698</b>	<b>672</b>	<b>653</b>	<b>638</b>	<b>640</b>	<b>641</b>	<b>607</b>	<b>590</b>	<b>606</b>	<b>600</b>

# CPS Future Enrollment?

- What **births rates** in Carlisle families -- the stock
- Who **move-ins** to Carlisle -- the flow
- Very dependent on assumptions and housing activity (flow of students into Carlisle for each age cohort)
- Historical averages based on 25 years of data (appendix)
  - inflow of students in New homes (average **1 new** child per home)
  - net inflow of students in Turnover homes (averaged **0.45 net new** child per home)

**More housing sales then more students  
coming into Carlisle**

**Lots of variance, stable Trends**

# Future Carlisle School Enrollment (CPS)

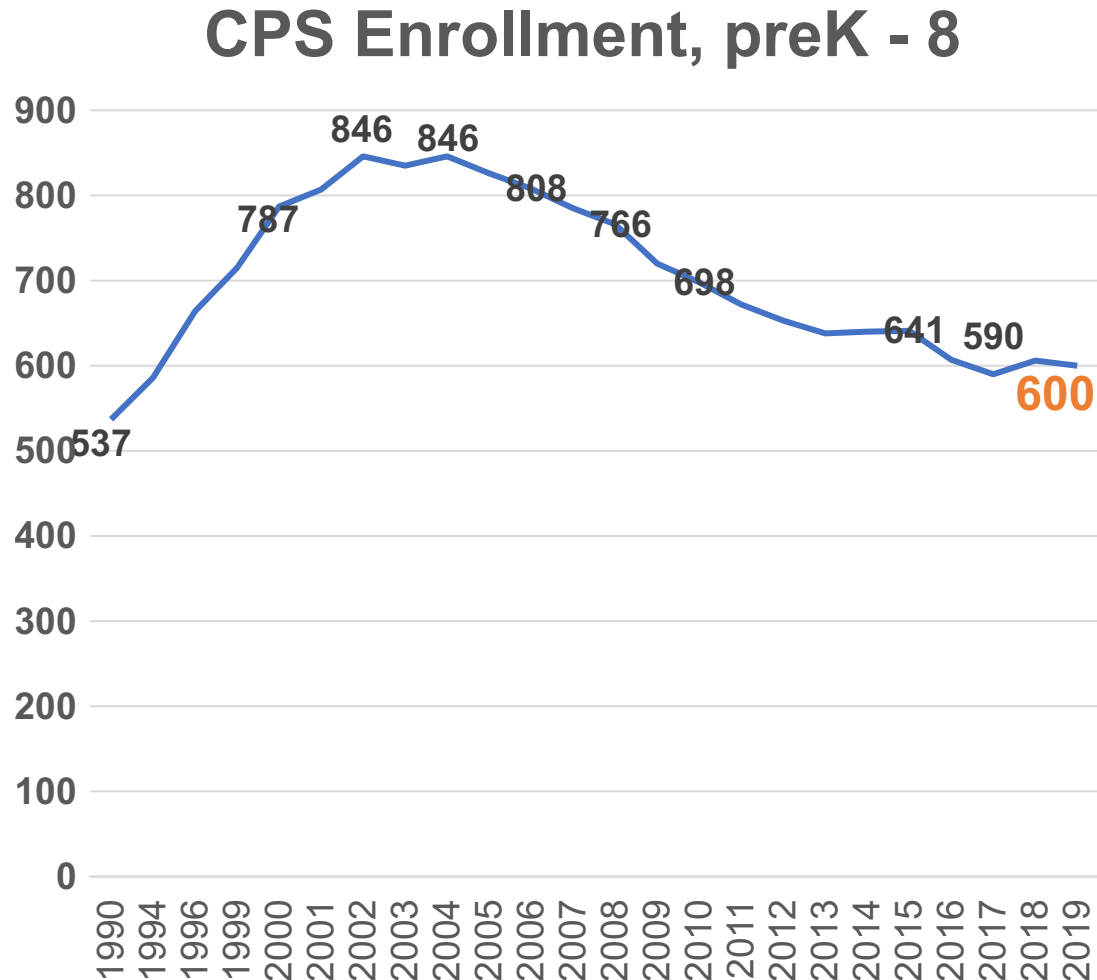
- Start with Births, averaging around 30
- Plus NET inflow of students from New & Turnover SALES averaging 30-40

Future classes at CPS for grade cohort could average in  
the  
**60-70 range**

- maybe lower, IF fewer NEW home and Turnover sales
- but, demographics could change → more children move in with T/O homes

**CPS enrollment range over next 10 years  
520 – 640 plus or minus**

# CPS Enrollment and Housing Trends



- House sales and price (new & old)
- Births, family size, and new families move into Carlisle
- Sustainable CPS enrollment

**Challenges for CPS:  
Capacity, Programs,  
and Budget**





# Carlisle Budget and Taxes

**Increases over time and tax burden and debt capacity**

# Carlisle Taxes: 2010 to 2019

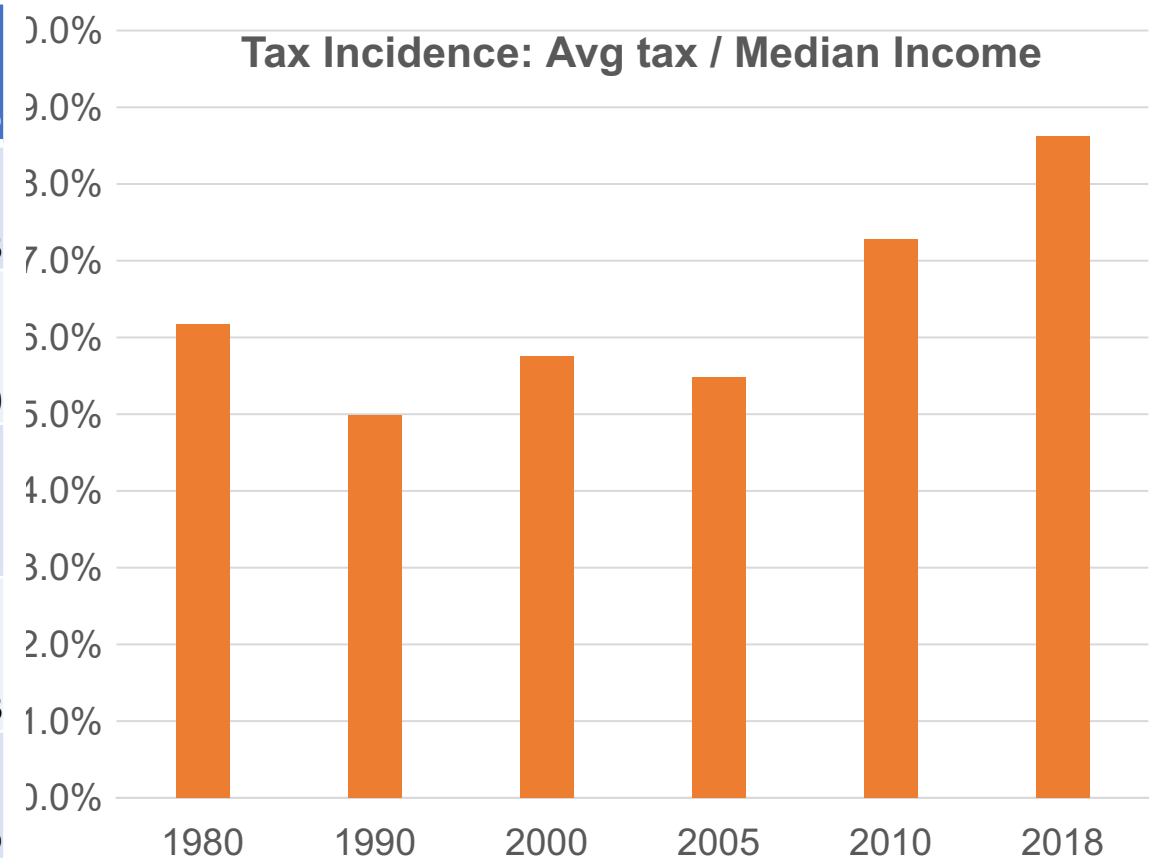
## Carlisle Assessors Office

	2010	2011	2012	2013	2014	2015	2016	2017	2018	% change
Population	5577	5601	5332	5418	5438	5308	5235	5419	5248	(5.9)
Avg. home assessed value	\$ 771,254	\$ 722,226	\$ 694,276	\$ 676,475	\$ 683,051	\$ 690,884	\$ 790,001	\$ 798,061	\$ 809,094	4.9
Tax rate	\$14.62	\$16.13	\$17.14	\$17.68	\$18.64	\$19.00	\$17.20	\$ 17.62	\$ 18.17	24.3
Avg tax bill	\$11,276	\$11,650	\$11,900	\$11,960	\$ 12,732	\$13,127	\$13,588	\$ 14,062	<b>\$14,701</b>	<b>30.4</b>

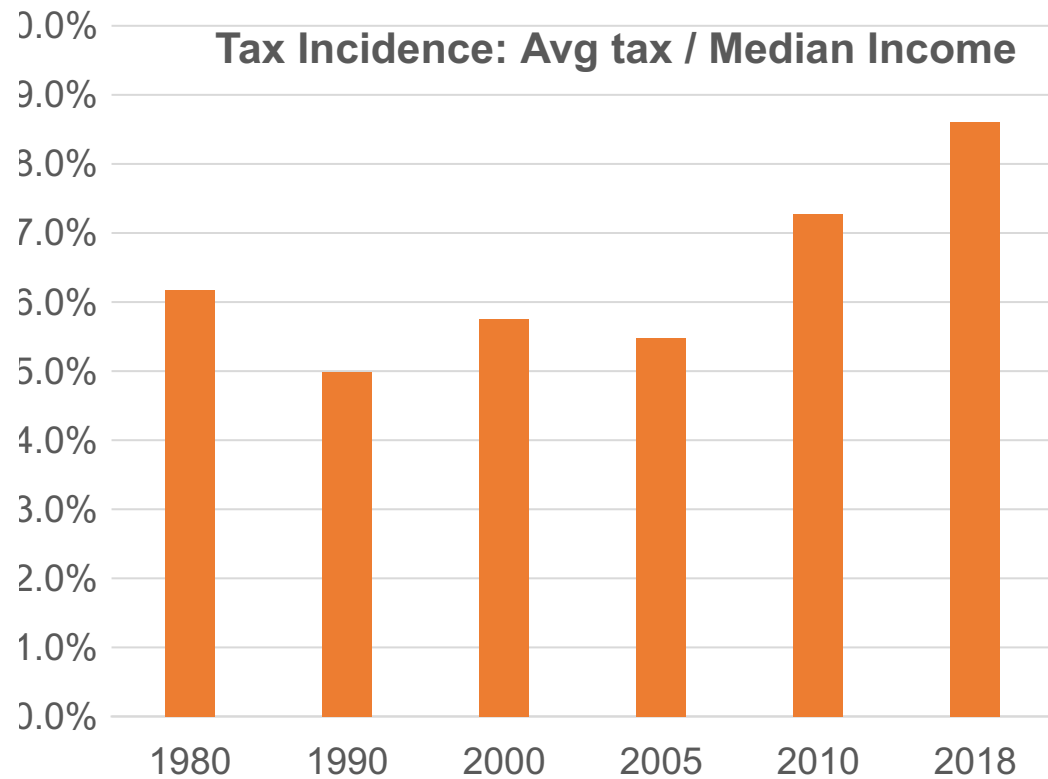
# Tax incidence over time – what percent we pay:

Your actual tax depends on house value and income

<b>Carlisle</b>	<b>1980</b>	<b>1990</b>	<b>2000</b>	<b>2005</b>	<b>2010</b>	<b>2018</b>
<b>Residents</b>	3306	4333	4717	5509	5577	5248
<b>Households units</b>	1055	1495	1655	1685	1,758	1830
<b>Average Tax</b>	<b>2,360</b>	<b>4,320</b>	<b>7,468</b>	<b>8,770</b>	<b>11,276</b>	<b>14,701</b>
<b>Median family income</b>	<b>38,250</b>	<b>86,660</b>	<b>129,800</b>	<b>160,000</b>	<b>155,000</b>	<b>170,703</b>
<b>Tax incidence</b>	<b>6.2%</b>	<b>5.0%</b>	<b>5.8%</b>	<b>5.5%</b>	<b>7.3%</b>	<b>8.6%</b>



# Our Budgets and Our Taxes



- Household disposable incomes:
  - minus state and Federal taxes
- Carlisle taxes similar to other towns
- Town budget drivers / expenses
- Other revenue sources
- Balancing our needs and costs
- Future investments



# Needs, Issues and Challenges

2030 and...  
2040

- Aging
- School enrollment
- Taxes / budget
- Life cycles



- **Population growth**
- **Age cohorts**
- **Housing costs / price**
- **School enrollment**
- **Shifting needs**
- **Paying for it**

## OUR CARLISLE MASTER PLAN

# Appendix – raw data

Home sale and net children in turnover and new home sales  
John Ballantine (cohort model) and Verna Gilbert (data collection)

# Home sales and children flowing into CPS

Rates of Growth (inflows pre-school and CPS)							
2017	Turnover	92 homes	Change	Rate	Combined Inflow /sales		
Sept - Aug y	pre-school	24-9	15	0.16			
	K-8	27-10	17	0.18	PreSchool	15+0	15
	Total	51-19	32	0.35	K-8	17+1	18
	New	9 homes	Change	Rate		Total	33
	pre-school			0.00			
	K-8		1	0.11	Rate		0.33
	Total		1	0.11	33/101		
	Total	101 homes	33 kids				
2016	Turnover	79 homes	Change	Rate	Combined Inflow		
Sept - Aug y	pre-school	14-3	11	0.14			
	K-8	17-10	7	0.09	PreSchool	11+2	13
	Total	31-13	18	0.23	K-8	7+5	12
	New	11 homes	Change	Rate		Total	25
	pre-school		2	0.18			
	K-8		5	0.45	Rate		0.28
	Total		7	0.64	25/90		
	Total	61 homes	23 kids				
2015	Turnover	52 homes	Change	Rate	Combined Inflow		
Sept - Aug y	pre-school	27-0	27	0.52			
	K-8	18-16	2	0.04	PreSchool	27+7	34
	Total	30-13	29	0.56	K-8	2+6	8
	New	10 homes	Change	Rate		Total	42
	pre-school		7	0.70			
	K-8		6	0.60	Rate		0.68
	Total		13	1.30	42/62		
	Total	62 homes	23 kids				

- Carlisle Demographics 9/1/2016 - 8/31/2017 :
- ===== Total of 101 sales =====
- 92 were turnovers
- 9 were new homes
- 6 of sellers moved within town and have 9 children
- - the children are not counted in any statistics below
- - 1 moved to new houses, 5 were involved in turnovers
- 19 of sellers of turnovers have 27 children (excluding moves within town)
- 30 of buyers of turnovers have 54 children (excluding moves within town)
- 1 of buyers of new homes has 1 child (excluding moves within town)
- Distribution of children in bought houses (excluding moves within town):
- =====
- 24 preK (0 in new homes, 24 in turnovers)
- 28 K-8 (1 in new homes, 27 in turnovers)
- - some of these may be in private school, as not in Husky Handbook
- 3 HS (0 in new home, 3 in turnovers)
- - distribution between public & private HS unknow
- 55 total (including possible private schoolers)
- Distribution of children in sold houses (excluding moves within town):
- =====+=====
- 9 preK
- 10 K-8 (some of these may be in private school, as not in Husky Handbook)
- 8 HS (distribution between public & private HS unknown)
- 27 total (including possible private schoolers)
- ===== Change in distribution: =====
- **+15 preschool**
- **+18 K-8**
- **-05 HS**

# More Move-in and Birth Data

2014		Turnover	65 homes	Change	Rate	Combined Inflow	
Sept - Aug		pre-school	15-8	7	0.11		
y		K-8	<u>20-12</u>	<u>8</u>	<u>0.12</u>	PreSchool	13+4
		Total	35-20	15	0.23	K-8	4+2
		New	15 homes	Change	Rate		Total
		pre-school		5	0.33		
		K-8		<u>12</u>	<u>0.80</u>	Rate	0.40
		Total		17	1.13	32/80	
		Total	80 homes	32 kids			
2013		Turnover	50 homes	Change	Rate	Combined Inflow	
Sept - Aug		pre-school	18-6	12	0.24		
y		K-8	<u>22-8</u>	<u>14</u>	<u>0.28</u>	PreSchool	12+5
		Total	40-14	26	0.52	K-8	14+3
		New	8 homes	Change	Rate		Total
		pre-school		5	0.63		
		K-8		3	0.38	Rate	0.59
		Total		8	1.00	34/58	
		Total	61 homes	23 kids			
2012		Turnover	57 homes	Change	Rate	Combined Inflow	
Sept - Aug		pre-school	14-2	12	0.21		
y		K-8	<u>10-9</u>	<u>1</u>	<u>0.07</u>	PreSchool	12+3
		Total	30-13	13	0.23	K-8	1+5
		New	8 homes	Change	Rate		Total
		pre-school		3	0.50		
		K-8		<u>5</u>	<u>0.25</u>	Rate	0.32
		Total		8	1.00	21/65	
		Total	65 homes	23 kids			

- **2016-2017** Age distribution of children 5 and under  
=====

- Buyers (24)

Age 0: 4 (0 in new homes, 4 in turnover homes)  
 Age 1: 7 (0 in new homes, 7 in turnover homes)  
 Age 2: 3 (0 in new homes, 3 in turnover homes)  
 Age 3: 1 (0 in new homes, 1 in turnover homes)  
 Age 4: 4 (0 in new homes, 4 in turnover homes)  
 Age 5: 5 (0 in new homes, 5 in turnover homes)

- Sellers (9)

Age 0: 0 in turnover homes  
 Age 1: 3 in turnover homes  
 Age 2: 0 in turnover homes  
 Age 3: 2 in turnover homes  
 Age 4: 3 in turnover homes  
 Age 5: 1 in turnover homes

- Change in distribution (+15)

Age 0: +4  
 Age 1: +4  
 Age 2: +3  
 Age 3: -1  
 Age 4: +1  
 Age 5: +4

- Town-wide number of children 0-4 from census as of **8/31/17**

• =====

- Age 0-1: 25 born between 9/1/2016 and 8/31/2017
- Age 1-2: 34 born between 9/1/2015 and 8/31/2016
- Age 2-3: 39 born between 9/1/2014 and 8/31/2015
- Age 3-4: 31 born between 9/1/2013 and 8/31/2014

# Past CPS Cohort Projections – slower growth assumptions

<b>NORMAL GROWTH</b>	<b>Actual Today</b>	FORECAST		Births picking up					
<b>Jan-12</b>		more births, <b>more move ins.</b> 30-36 births + 20 move in before k and 16 plus after k-8 = 80+/- exiting class (8th grade)							
Age / grade	<u>2012</u>	<u>2013</u>	<u>2014</u>	<u>2015</u>	<u>2016</u>	<u>2017</u>	<u>2018</u>	<u>2019</u>	<u>2020</u>
<b>Pre-schoolers</b>									
0-1 estimate	26	28	30	30	30	32	32	32	34
1	27	31	33	35	35	35	37	37	37
2	33	32	36	38	40	40	40	42	42
3	34	38	37	41	43	45	45	45	47
4	43	39	44	43	47	49	51	51	51
Sub-total 1-4	137	140	150	157	165	169	173	175	177
5	15	15	15	15	15	15	15	15	15
CPS pre-school	14	14	14	15	15	15	16	16	16
<b><u>CPS</u></b>									
K	65	60	54	59	58	62	64	66	66
1	58	68	63	57	62	61	65	67	69
2	53	60	71	66	60	65	64	68	70
3	73	55	63	74	69	63	68	67	71
4	70	75	57	65	76	71	65	70	69
5	73	71	77	59	67	78	73	67	72
6	75	74	72	78	60	68	79	74	68
7	77	76	75	73	79	61	69	80	75
8	95	78	77	76	74	80	62	70	81
<b>CPS K-8 Total</b>	639	617	609	607	605	609	609	629	641