

# Primary and Secondary Prevention Research in Humans Funded by NIH During 2012-2017

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## Selection of Activity Codes

- ODP worked with staff from many ICs to identify activity codes likely to support NIH prevention research that met ODP's definition.
  - Basic and preclinical research were excluded.
  - Awards for community services, facilities, infrastructure, loan repayment, meetings, planning, and training were excluded.
  - Intramural research was excluded.
  - Contracts were excluded.
  - Methodological research was included only if it yielded products that were applicable to prevention research without additional development.
- We included all remaining R, P, and U activity codes with at least 500 awards across FY12-17 or at least \$500M awarded across FY12-17.
  - Several of these activity codes involved awards with multiple subprojects; as a result, we sampled projects or subprojects instead of awards.

# 12 Activity Codes Included in the Portfolio Analysis

Code	Total Awards FY12-17	Total Projects FY12-17
R01	32176	32190
R21	11992	11992
R43	3439	3439
R03	2932	2932
U01	2188	2187
R56	1943	1945
R44	1901	1902
P01	534	3755
U54	328	1939
P50	268	2143
U19	203	1328
<b>UM1</b>	<b>200</b>	<b>232</b>

Code	Total Costs FY12-17
R01	\$14500 M
R21	\$2600 M
U01	\$2000 M
R44	\$1200 M
P01	\$996 M
R56	\$815 M
R43	\$780 M
U54	\$747 M
UM1	\$742 M
P50	\$536 M
U19	\$527 M
<b>R03</b>	<b>\$259 M</b>

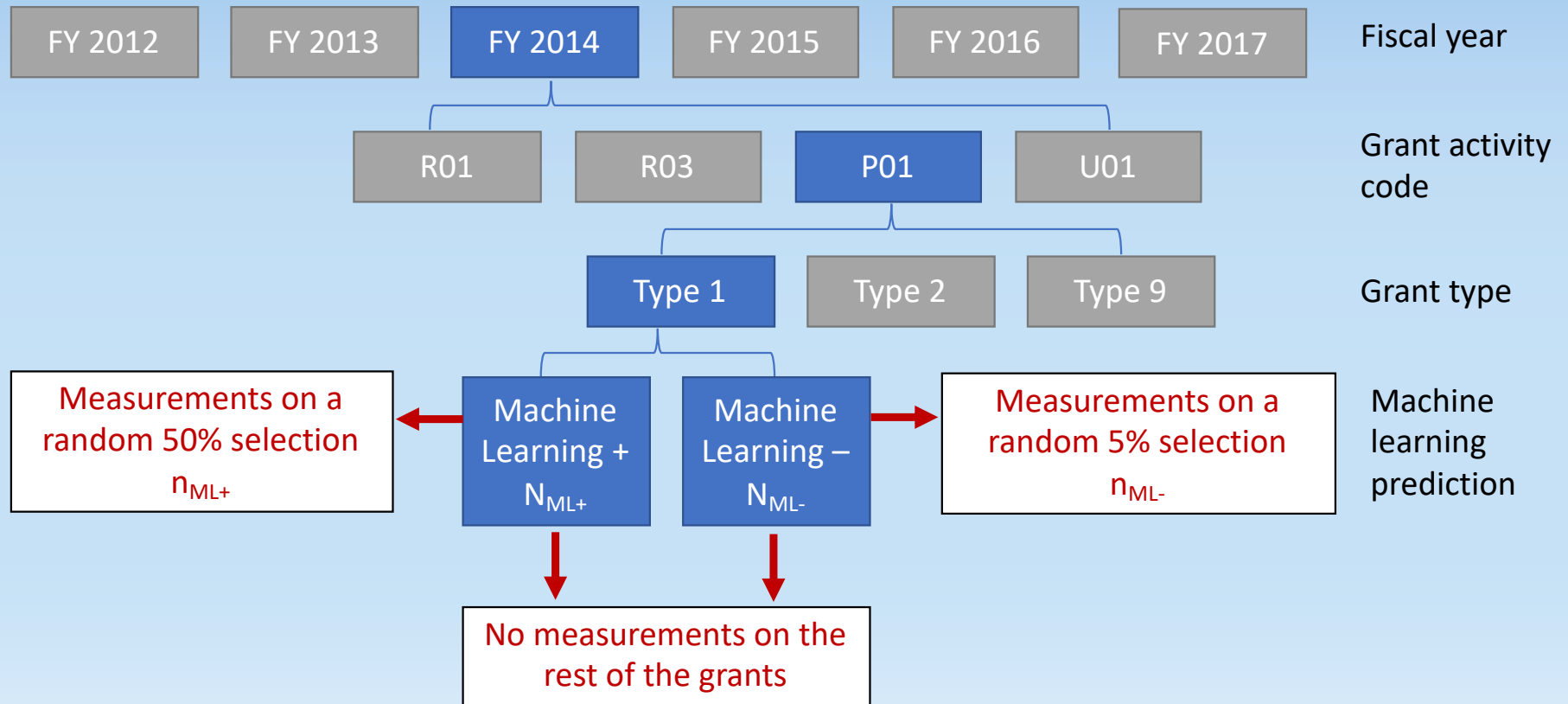
- We considered all Type I, 2, and 9 awards and projects from FY12-17 made using these activity codes.

## Portfolio Coverage by These Activity Codes

	All Activity Codes	R, P, U Activity Codes	Research R, P, U Activity Codes	ODP's Selected Activity Codes	% Research R, P, U Activity Codes
Total Awards	111,626	68,757	63,381	58,104	91.7%
Total Costs	\$57.5 B	\$32.6 B	\$30.6 B	\$25.7 B	84.1%


- All figures based on Type I, 2, and 9 awards from FY12-17, excluding parent awards for projects with sub-awards to avoid double counting.

# Weighting the Coded Projects



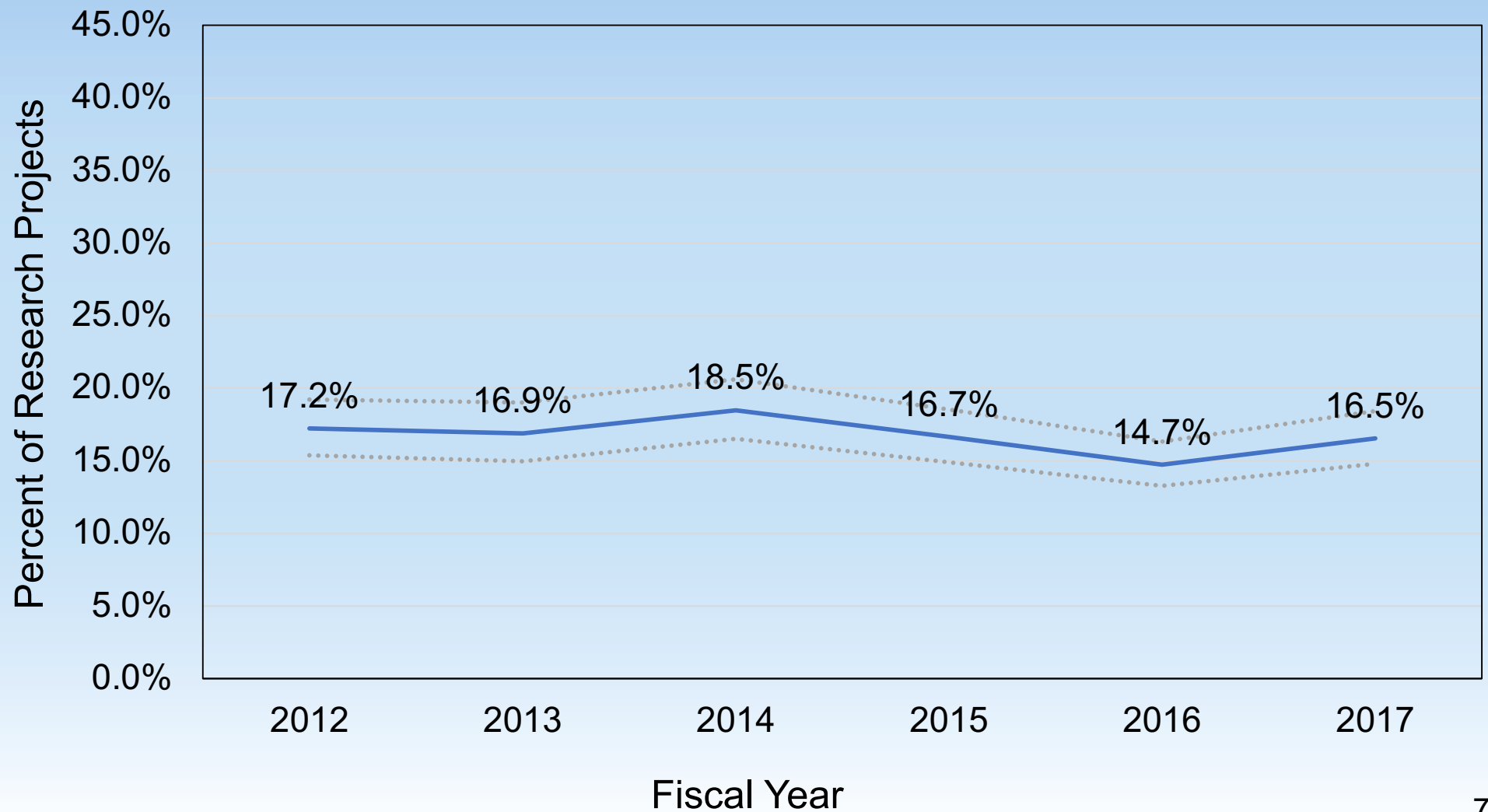
Weights for FY14, P01, type 1, Machine Learning + =  $N_{ML+} / n_{ML+}$

Weights for FY14, P01, type 1, Machine Learning - =  $N_{ML-} / n_{ML-}$

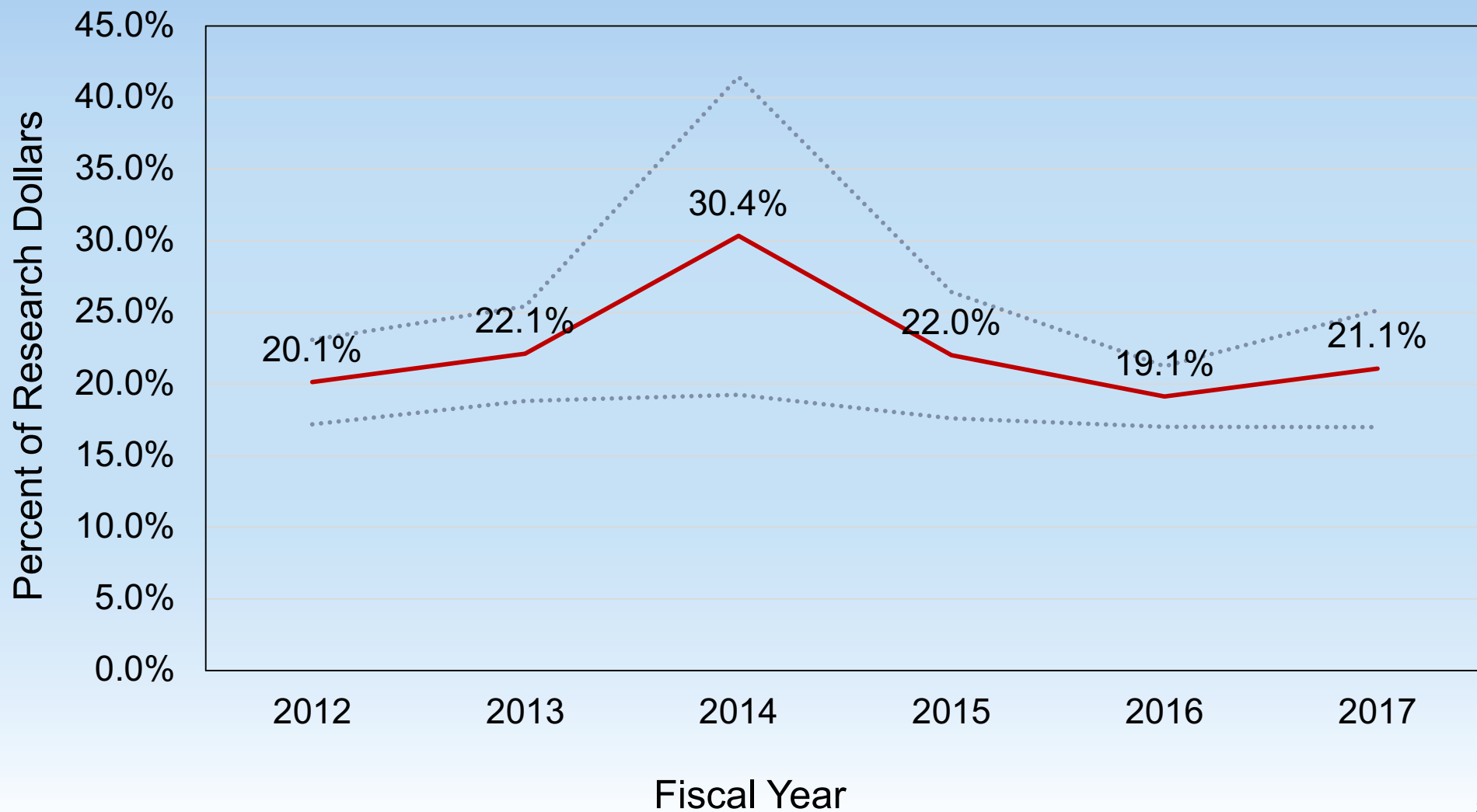


## Prevention as a Fraction of the NIH Research Portfolio

# Primary and Secondary Prevention Research in Humans: FY12-17




# Primary and Secondary Prevention Research in Humans: FY12-17





## Primary and Secondary Prevention Research in Humans by Activity Code FY12-17

Activity Code	Research Projects	% of Research Projects (95% CI)
P01	3,226	8.4% (6.0-11.8)
P50	1,896	18.3% (13.3-24.6)
R01	32,190	16.8% (15.8-17.9)
R03	2,932	26.9% (23.1-31.2)
R21	11,992	15.0% (13.4-16.7)
R43	3,439	9.6% (7.4-12.3)
R44	1,902	11.4% (8.6-15.0)
R56	1,945	13.3% (9.6-18.2)
U01	2,187	43.8% (37.7-50.1)
U19	1,130	12.9% (8.2-19.8)
U54	1,680	13.8% (10.2-18.3)
UM1	225	33.6% (18.5-53.1)



# Characterizing the NIH Prevention Research Portfolio

## Study Rationales FY12-17

Topic	% of Prevention Projects (95% CI)	Topic	% of Prevention Projects (95% CI)
Mortality	28.0% (26.0-30.1)	Tobacco	6.5% (5.5-7.6)
Cancer	17.8% (16.1-19.7)	Diabetes	5.5% (4.7-6.4)
Infectious Disease	17.8% (16.2-19.6)	Alcohol	5.7% (4.9-6.6)
MPCH	13.2% (11.9-14.7)	Lung Disease	3.7% (2.9-4.8)
Heart Disease	10.2% (9.0-11.6)	Alzheimer's Disease	3.1% (2.3-4.2)
Mental Health	10.2% (9.0-11.5)	Kidney Disease	2.8% (2.0-3.8)
Stroke	8.6% (7.5-9.8)	Musculoskeletal Disease	2.6% (1.9-3.4)
Substance Abuse	9.1% (8.0-10.2)	Gastrointestinal Disease	2.7% (1.9-3.9)
Neurological Disease	8.0% (6.7-9.4)	Unintentional Injuries	2.0% (1.5-2.6)
Obesity	7.3% (6.5-8.2)	Suicide	1.3% (1.0-1.8)

- Coders selected all categories that applied to each project; percentages do not sum to 100%.

## Study Exposures FY12-17

Topic	% of Prevention Projects (95% CI)	
Genetics	26.9%	(24.8-29.0)
Education/Counseling	14.3%	(13.2-15.4)
Medication/Device	9.8%	(8.4-11.5)
Diet/nutrition	5.2%	(4.4-6.1)
Healthcare Delivery	4.3%	(3.6-5.0)
Infectious Disease	3.8%	(3.0-4.6)
Chemical/Toxin	3.4%	(2.7-4.1)
Physical Activity	2.4%	(2.1-2.8)
Tobacco	2.6%	(2.1-3.4)
Substance Abuse	2.2%	(1.7-2.6)
Stress	2.1%	(1.6-2.6)
Microbiome	1.8%	(1.3-2.6)
Mental Health	1.7%	(1.3-2.1)
Alcohol	1.6%	(1.4-2.0)

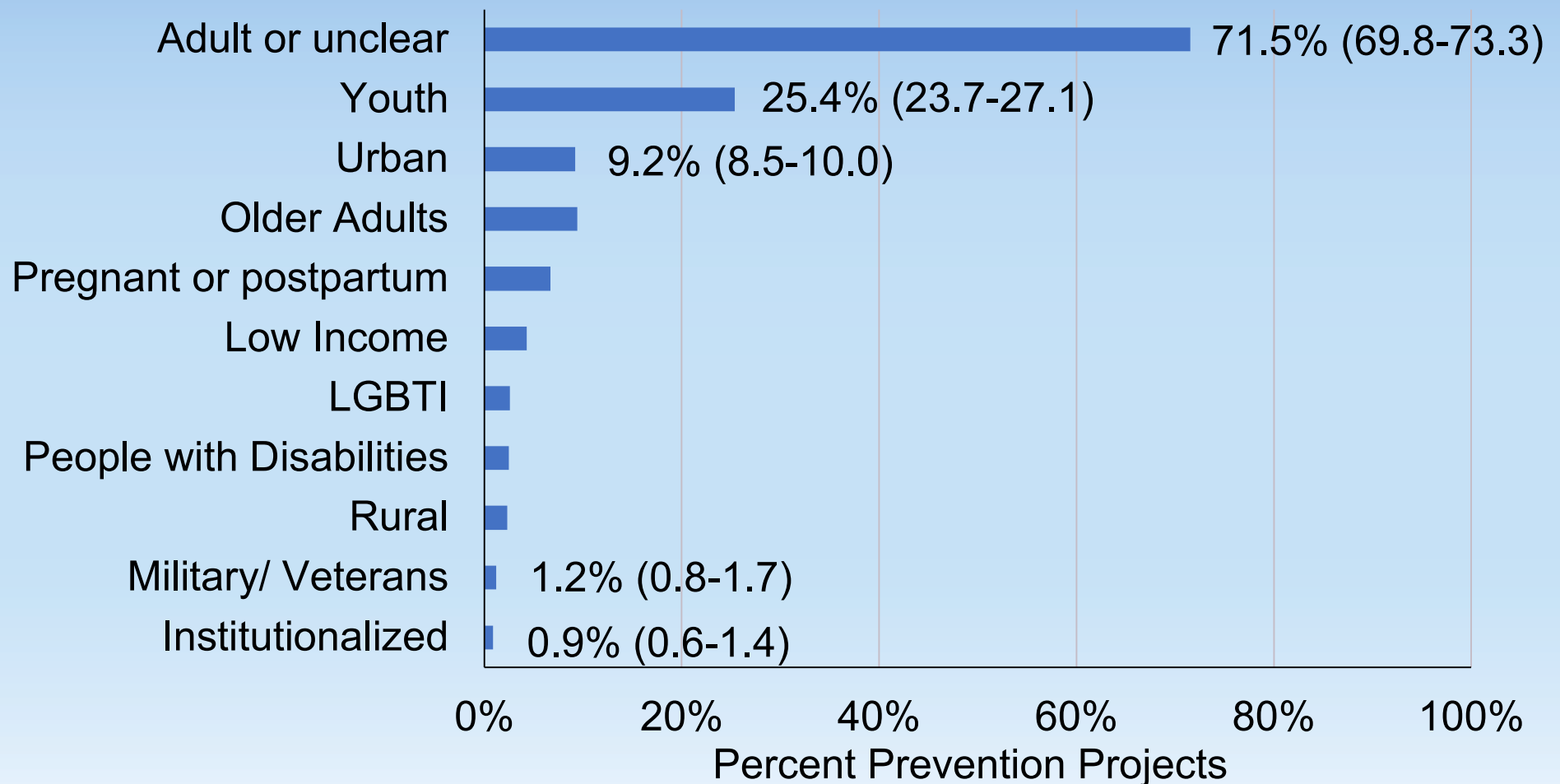
- Coders selected all categories that applied to each project; percentages do not sum to 100%.

## Study Outcomes FY12-17

Topic	% of Prevention Projects (95% CI)	Topic	% of Prevention Projects (95% CI)
Cancer	11.8% (10.4-13.4)	Mortality	4.9% (4.1-5.8)
Infectious Disease	9.9% (8.7-11.2)	Alcohol	4.8% (4.1-5.6)
Healthcare Delivery	8.2% (7.3-9.2)	Obesity	4.5% (4.0-5.1)
Mental Health	7.3% (6.3-8.5)	Stroke	3.6% (3.0-4.4)
HRQOL	6.6% (5.6-7.7)	Genetics	3.6% (2.7-4.7)
Substance Abuse	6.2% (5.5-7.0)	Diet/Nutrition	3.5% (3.0-4.0)
Medication/Device	5.9% (4.7-7.3)	Physical Activity	3.3% (2.8-4.0)
Neurological Disease	5.6% (4.5-6.9)	Diabetes	3.1% (2.6-3.8)
Heart Disease	5.4% (4.5-6.6)	Lung Disease	2.8% (2.1-3.8)
Tobacco	5.1% (4.3-6.0)	Sexual Behavior	2.3% (2.0-2.6)

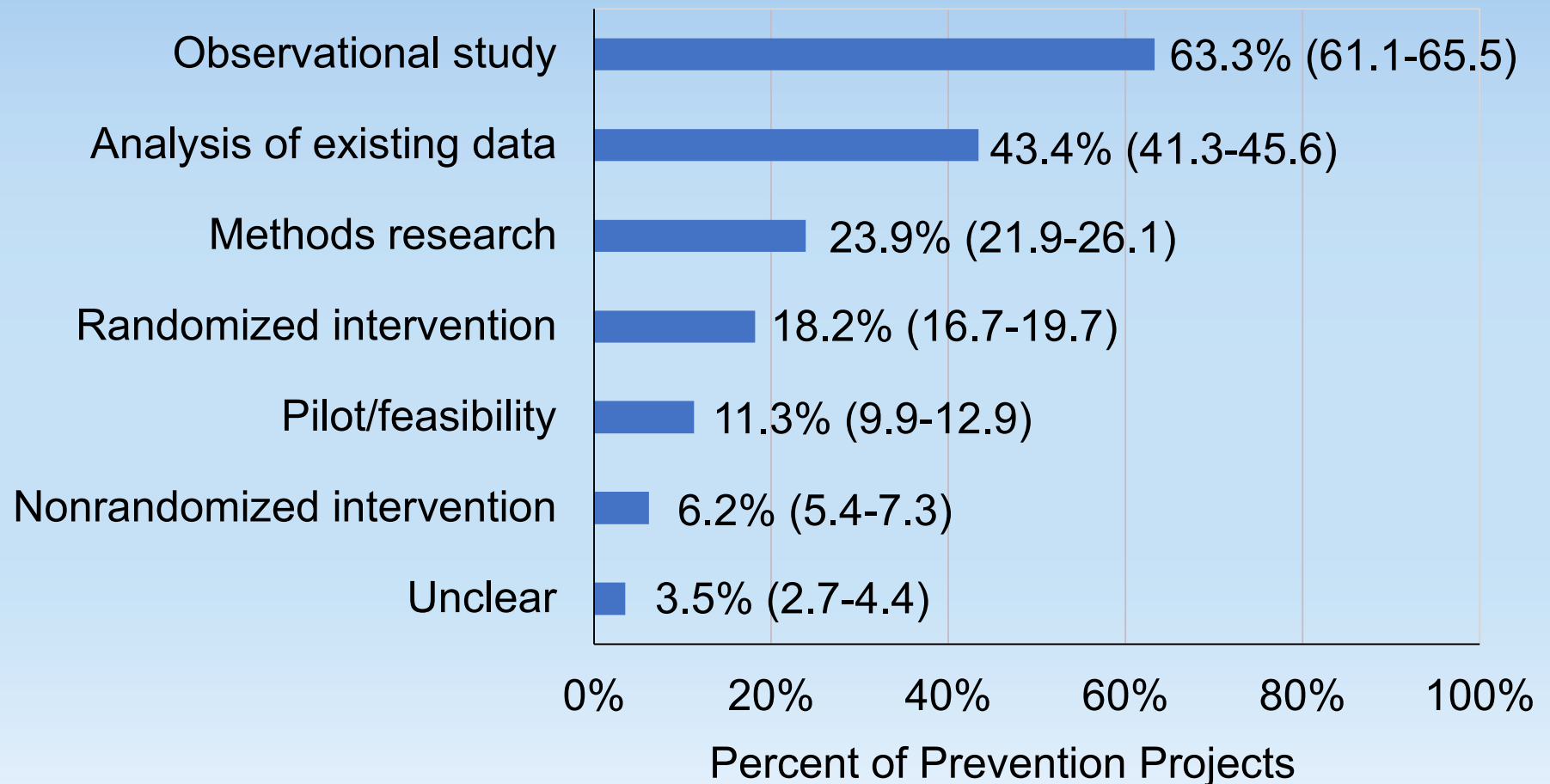
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## Populations Studied FY12-17



■ Coders selected all categories that applied to each project; percentages do not sum to 100%.

## Study Designs FY12-17



■ Coders selected all categories that applied to each project; percentages do not sum to 100%.

## Summary and Conclusions

- ODP coded 11,082 projects from 12 activity codes for FY12-17.
- Those codes represent 91.7% of all projects and 84.1% of all dollars used for research in NIH extramural grants and collaborative agreements.
- For those activity codes, primary and secondary prevention research in humans represented 16.7% of projects and 22.6% of dollars.
- 63.3% of the prevention projects included an observational study, 43.4% included an analysis of existing data, 23.9% included methods research.
- Only 18.2% included a randomized intervention, suggesting that only 3% of NIH resources for research are used for preventive intervention trials.
- Given that 74% of the variability in county-level life expectancy across the US is explained by established risk factors, it seems appropriate to devote a larger proportion of the NIH research portfolio to randomized prevention trials to address those risk factors.



## Next Steps for ODP

- We will work with colleagues across the ICs to examine our data for their portfolio and to consider the implications of those findings for their prevention research going forward.
- We will make IC-specific data available to interested ICs.
- We want to present our findings in articles and at conferences.
- We will extend the application of the machine learning algorithms to many of the 128 topics and assess sensitivity and specificity.
  - We hope this will allow us to reduce the level of manual coding.
- We will assess the progress and results of primary and secondary research in humans using metrics such as publications, citations in guidelines, citations in patent applications, etc.