Centers for Disease and Control and Prevention's Community Assessment for Public Health Emergency Response (CASPER) — Extreme Weather Response Tool?

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# Community Assessment for Public Health Emergency Response (CASPER)

Epidemiologic survey technique that provide quick and at low cost, <u>household-based</u> information about an community's needs in a simple format to decisionmakers.

#### Goals of CASPER

- Rapidly survey and identify needs of a particular community
- Produce accurate population- based estimates of needs
- Assess new or changing needs during the recovery period

# **Community Assessment for Public Health Emergency Response (CASPER) - Phases**

#### Prepare for the CASPER

- Determine objectives
- Determine assessment area
- Develop 1-page questionnaire
- Select first stage sample (30 clusters)
- Conduct the CASPER in the field
  - Select second stage sample (7 households)
  - Organize and train assessment teams
  - Conduct household interviews
- Analyze the data
  - Determine sampling weight
  - Calculate weighted frequencies and percentages
- Write the report and share results

### **Determine the Assessment Area(s)**

Define the assessment area (sampling frame) in the impact area (storm track)

- Most affected,
- Least available knowledge,
- Area without local health services,
- Political/jurisdictional layout or state (resource distribution).

#### Geographic size

- County (or groups of counties)
- City (or groups of cities) or Zip Code
- Between key landmarks (highways or waterways as boundaries for hardest hit areas, more vulnerable populations, etc)

### **CASPER Methodology Overview**

Sampling Frame: All households within the selected assessment area

Two stage probability sampling

- First Stage : 30 clusters
- Second Stage : 7 households

Household-interview = 210 households (30 x 7)

Data weighting to adjust for non-random sampling and obtain population estimates

## **First Stage: Selecting Clusters**

#### What is a cluster?

- Mutually exclusive
- Known number of housing units

#### Census blocks are ideal clusters

#### Select with probability proportional to size

- This ensures that clusters with more housing units have a higher chance of being selected
- Corrected during data analyses by weighting

# **Create a Map for Each 30 Clusters Selected**



# **Conducting the CASPER in the field**

- Develop 1-page questionnaire based on objectives
- Identify 10 interview 2-person teams (20 volunteers)
- Determine dates to conduct the CASPER, need 2-3 days
- First day of CASPER
  - Conduct "Just in Time" training of field interview teams
  - Assign the selected clusters to teams
  - Explain 2<sup>nd</sup> stage sampling or assessment methodology show how to select 7 households to interview using the cluster maps
  - Identify data entry and analysis staff

# Second Stage : Systematic Selection of Houses Using Cluster Maps

#### Interview Teams

- Randomly select starting point
- Count every nth house
- Continue until 7 interviews are complete



# Second Stage: Systematic Selection of 7 Houses in Each of the 30 Clusters

- Randomly select starting point
- Count every nth house
- **Continue until 7 interviews are complete**



# CDC-NWS Extreme Cold CASPER in North Dakota Question:

# Main source of severe winter weather information

Main Information source	Frequency (n=188)	% of HH	Projected HH	Weighted %	95% CI
тv	149	79.3	27,839	81.0	73.8 - 88.1
Internet	11	5.9	2,036	5.9	1.8 –10.1
NOAA weather radio	9	4.8	1,717	5.0	0.6 – 9.4
Commercial radio station*	15	8.0	1,627	4.7*	1.4 – 8.0
Neighbor/ friend/ family/ word of mouth	2	1.1	593	1.7	0 – 4.2
Other	2	1.1	559	1.6	0 - 4.0

\*Rural (23.5%, 95% CI = 13.8 – 33.3) more likely than urban (3.9%, 95% CI = 0.5 – 7.3)

# Impact of Past CASPERs

#### Resources

- Allocate scarce resources
- Data cited to support requests/needs
- Target specific needs (e.g., oxygen, medication)

#### Communications

- Provide valid information to governors, news media, etc.
- Target communication messages
- Assess the public's methods to receive messaging

#### Future planning

- Prompted modification of emergency management plans
- Identify education needs in the community

# Conclusion

CASPER can be a used as a weather response survey tool

Generalizable data (provides population estimates)

Timely

Relatively low cost

Simple reporting format

Flexible



### **CASPER Resources**

Website with toolkit: <u>http://www.cdc.gov/nceh/hsb/disaster/ca</u> <u>sper.htm</u>

CDC's Disaster Epidemiology Community of Practice: partner.cdc.gov/DECoP

# **Thank You**

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For more information please contact Centers for Disease Control and Prevention

1600 Clifton Road NE, Atlanta, GA 30333 Telephone, 1-800-CDC-INFO (232-4636)/TTY: 1-888-232-6348 E-mail: cdcinfo@cdc.gov Web: www.cdc.gov

The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention.



Health Studies Branch, National Center for Environmental Health Division of Environmental Hazards and Health Effects

# **Census FactFinder2 Website: County Level**



American FactFinder provides access to data about the United States, Puerto Rico and the Island Areas. The data in American FactFinder come from several censuses and surveys. For more information see Using FactFinder and What We Provide.

#### Using American FactFinder

Learn about American FactFinder's functions and features.

#### What We Provide

The following data are available on American FactFinder:

American Community Survey more » L get data »

#### News and Notes

Mar 14, 2013

GET EMAIL UPDATES



County and Puerto Rico Municipio Population Estimates: July 1, 2012...



view all news, release schedules, and more »

Address Search

Find Census data by entering a street address.



#### http://factfinder2.census.gov/faces/nav/jsf/pages/index.xhtml

# **Download All Blocks within County**

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# **Choose the 30 Clusters**

- Navigate to <u>www.random.org</u>
- Have system generate 30 random numbers from 1 to the total number of housing units
  - For this example, the total number of housing units is 536,092
- Determine which block each random number occurs
  - Refer to the following screenshots for guidance

# **The 30 Random Numbers**

474,285 193,806 497,227 294,351 84,836 194,031 159,456 140,396 451,390 535,788 129,027 485,536 199,901 95,549 318,072 393,090 3,313 469,269 82,826 400,936 451,778 303,647 128,113 290,842 487,849 219,663 468,844 31,562 10,547 98,099

# Match Random Number to Corresponding Cluster

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18916	1000000US12057013	8031012	1.2057E+14	Block 1012, E	Block Grou	p 1, Cen	sus Tract 138.03	, Hillsboroug	gh County, Flori	da 26	3	29	474208	
18917	1000000US12057013	8031013	1.2057E+14	Block 1013, E	Block Grou	p 1, Cen	sus Tract 138.03	, Hillsboroug	gh County, Flori	da 25	7	32	474240	
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9725	1000000US12057010	08134003	1.2057E+14	Block 4003	3, Block Group 4	1, Censi	us Tract 108.13,	Hillsbor	ough County	, Florida	37	23	60	193500		
9726	1000000US12057010	08141000	1.2057E+14	Block 1000	), Block Group 1	L, Censi	us Tract 108.14,	Hillsbor	ough County	, Florida	8	8	16	193516		
9727	1000000US12057010	08141001	1.2057E+14	Block 1001	L, Block Group 1	L, Censi	us Tract 108.14,	Hillsbor	ough County	, Florida	35	14	49	193565		
9728	1000000US12057010	08141002	1.2057E+14	Block 1002	2, Block Group 1	L, Censi	us Tract 108.14,	Hillsbor	ough County	, Florida	15	9	24	193589		
9729	1000000US12057010	08141003	1.2057E+14	Block 1003	3, Block Group 1	L, Censi	us Tract 108.14,	Hillsbor	ough County	, Florida	0	0	C	193589		
9730	1000000US12057010	08141004	1.2057E+14	Block 1004	4, Block Group 1	L, Censi	us Tract 108.14,	Hillsbor	ough County	, Florida	129	80	209	193798		
9731	1000000US12057010	08141005	1.2057E+14	Block 1005	5, Block Group 1	L, Censi	us Tract 108.14,	Hillsbor	ough County	, Florida	248	91	339	194137	193,806	194,031
9732	1000000US12057010	08141006	1.2057E+14	Block 1006	5, Block Group 1	L, Censi	us Tract 108.14,	Hillsbor	ough County	, Florida	0	0	C	194137		
9733	1000000US12057010	08142000	1.2057E+14	Block 2000	), Block Group 2	2, Censi	us Tract 108.14,	Hillsbor	ough County	, Florida	380	35	415	194552		
9734	1000000US12057010	08142001	1.2057E+14	Block 2001	l, Block Group 2	2, Censi	us Tract 108.14,	Hillsbor	ough County	, Florida	341	110	451	195003		
9735	1000000US12057010	08142002	1.2057E+14	Block 2002	2, Block Group 2	2, Censi	us Tract 108.14,	Hillsbor	ough County	, Florida	57	33	90	195093		
9736	1000000US12057010	08151000	1.2057E+14	Block 1000	), Block Group 1	L, Censi	us Tract 108.15,	Hillsbor	ough County	, Florida	138	118	256	i <mark>195349</mark>		
9737	1000000US12057010	08151001	1.2057E+14	Block 1001	L, Block Group 1	L, Censi	us Tract 108.15,	Hillsbor	ough County	, Florida	49	8	57	195406		
9738	1000000US12057010	08151002	1.2057E+14	Block 1002	2, Block Group 1	L, Censi	us Tract 108.15,	Hillsbor	ough County	, Florida	190	8	198	195604		
9739	1000000US12057010	08151003	1.2057E+14	Block 1003	, Block Group 1	L, Censi	us Tract 108.15,	Hillsbor	ough County	, Florida	86	18	104	195708		
9740	1000000US12057010	08151004	1.2057E+14	Block 1004	I, Block Group 1	L, Censi	us Tract 108.15,	Hillsbor	ough County	, Florida	42	70	112	195820		
9741	1000000US12057010	08152000	1.2057E+14	Block 2000	), Block Group 2	2, Censi	us Tract 108.15,	Hillsbor	ough County	, Florida	0	0	C	195820		
9742	1000000US12057010	08152001	1.2057E+14	Block 2001	L, Block Group 2	2, Censi	us Tract 108.15,	Hillsbor	ough County	, Florida	0	0	C	195820		
9743	1000000US12057010	08152002	1.2057E+14	Block 2002	2, Block Group 2	2, Censi	us Tract 108.15,	Hillsbor	ough County	, Florida	0	0	C	195820		
9744	1000000US12057010	08152003	1.2057E+14	Block 2003	, Block Group 2	2, Censi	us Tract 108.15,	Hillsbor	ough County	, Florida	0	0	C	195820		
9745	1000000US12057010	08152004	1.2057E+14	Block 2004	, Block Group 2	2, Censi	us Tract 108.15,	Hillsbor	ough County	, Florida	0	0	C	195820		
97/6	100000011\$12057010	08152005	1 2057E+1/	Block 2005	Block Group (	Consi	us Tract 108 15	Hillshor	ough County	Florida	0	0		195820		

# **Create Maps in TigerWeb2010**

U.S. Census Bureau

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# **Cluster 1 (2006)**

#### U.S. Census Bureau

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# **Imagery of Cluster 1 (Block 2006)**



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Repeat the procedure until all 30 selected cluster (block) maps are saved or printed

# **ArcGIS 10 CASPER Toolkit**

#### Any sampling frame

- not just county or groups of counties
- Zip codes, landmarks, disaster track, etc.

#### Faster, less time-consuming

ArcGIS°
ArcMap <sup>™</sup> 10
Initializing Application Copyright © 2010 ESRI. All Rights Reserved.

# Selected Sampling Frame: Lincoln Park (60614)



# **Run CASPER Toolkit**



### **Clusters Selected**



# **Analyzing CASPER Data & Interpreting Results**



Health Studies Branch, National Center for Environmental Health

Division of Environmental Hazards and Health Effects

# **Analysis Considerations**

- How will the electronic format and the data entry be handled?
- Have you prepared table shells?
- How will data analysis be conducted?
  - All variables
  - Selected variables
  - 95% confidence intervals
- How will analyses be adjusted to reflect the complex sampling design?
  - Weighted frequencies

**Analyzing Data: Sampling Weight** 

(Total number of housing units in sampling frame)

(number of housing units interviewed within cluster) (number of clusters surveyed)

Numerator will be the same for every housing unit (HU) within the assessment area

Denominator will differ (potentially) between clusters

- Ideally 210 (i.e. 7 [HUs] x 30 [clusters])
- Obtain from tracking form

# Sample Weight Value

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2	6/24/2013	60614	1	1	compiet	5	283.76	In this ex	ample	e, there	were	e 42,56	54 2	
3	6/24/2013	60614	1	2		5	283.76	totalbou	icina l	inite in	tho	ampli	$\mathbf{n}\mathbf{a}^{-1}$	
4	6/25/2013	60614	1	. 3		5	283.76				uie :	sampii	ng 1	
5	6/25/2013	60614	1	4	-	5	283.76	frame (Li	ncoln	Park) a	nd 3	0 clust	ers 1	
6	6/25/2013	60614	1	5		5	283.76	single family		0	0	<b>6</b> 0		
7	6/24/2013	60614	2	1		7	202.69	surveyed		the equ	latio	n for c	ellez	
8	6/24/2013	60614	2	2		7	202.69	at the to	n of th	ne nade	) NC	)TF · th	e 0	
9	6/24/2013	60614	2	3		7	202.69	multiple unit		ie page	0	1	0	1
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13	6/25/2013	60614	2	7	-	7	202.69	interviev	vs was	s compl	eted	in bot	th 1	
14	6/24/2013	60614	3	1		6	236.47	single family	1	C	0	0	1	
15	6/24/2013	60614	3	2		6	236.47	clusters.						
16	6/24/2013	60614	3	3		6	236.47	single family	1	0	0	1	0	
17	6/24/2013	60614	3	4	•	6	236.47	single family	1	0	0	1	0	
18	6/25/2013	60614	3	5		6	236.47	multiple unit	1	0	0	1	0	
19	6/25/2013	60614	3	6		6	236.47	multiple unit	2	0	0	2	0	
20	6/24/2013	60614	4	1		3	472.93	single family	2	0	0	2	0	
21	6/24/2013	60614	4	2		3	472.93	single family	2	0	0	2	1	
22	6/24/2013	60614	4	3		5	472.93	single family	2	0	0	1	1	
23	6/24/2013	60614	5	1		0	230.47	single family	2	U	0	2	0	

# **Example Table**

Supplies	Frequency (n=192)	% of HH	Projected HH	Weighted %	95% CI						
Not enough water (3 days)	69	35.9	15,147	35.6	28.1-43.1						
No way to cook food	46	24.0	10,101	23.7	16.1-31.3						
Not enough non- perishable food (3 days)	29	15.1	6,262	14.7	9.2-20.3						
No 7-day supply of medications	17	8.8	3,810	9.0	5.0-12.9						
No 7-day supply if taking daily meds*	3	2.5	608	2.3	0.0-4.9						
Not enough food/water for pets (3 days)	11	5.8	2,331	5.5	1.1-9.9						
Of pet owners**	11	12.5	2,331	12.2	2.6-21.8						
*Of households requiring	*Of households requiring daily medication , n=120 ** Of households with pets, n=88										

# **Analyzing Data: Tracking form**

- Calculation of these response rates provides an indication of the representativeness of the sample to the population
  - Contact Rates
  - Cooperation Rates
  - Completion Rates

# **Analyzing Data: Tracking form**

- Enter tracking form data into Excel
- Calculate totals for each row on tracking form for each cluster
  - If discrepancies will arise, use best judgment to rectify
- Calculate totals across clusters

# **Tabulate tracking form data in excel**

🔀		- Insert Page Layout	Formulas	Data	Review	tra View	acking form Capturx	Compati Acroba	bility Mode] It	- Microsof	ft Excel		50	5		-
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1 2 3 4 5 6		County Cluster Interviwer Date of Interview	Cook 19 6/25/2013	Cook 20 6/25/2013	Cook 21 6/25/2013	Cook 22 6/25/2013	Cook 23 6/25/2013	Cook 24 6/25/2013	Cook 25 6/25/2013	Cook 26 6/25/2013	Cook 27 6/24/2013	Cook 28 6/25/2013	Cook 29 6/25/2013	Cook 30 6/25/2013		County Cluster Interviwer Date of Interview
7 8 9 10	No Access	House Accessible House Inaccessible	20 0	13 0	22 2	17 0	16 1	9 1	16 0	30 0	12 0	18 0	17 0	34 0	512 5	House Accessible House Inaccessible
11 12 13 14 15 16	ype of Dwelling	No Housing Mobile Home Single Family Home Apartment or Condo Other	0 0 20 0	0 0 13 0 0	0 0 24 0	0 1 0 16 0	0 0 6 10 0	0 0 10 0 0	0 0 16 0 0	0 0 30 0 0	0 0 12 0 0	0 0 18 0 0	0 0 17 0 0	0 0 34 0 0	0 2 369 145 0	No Housing Mobile Home Single Family Home Apartment or Condo Other
17 18 19 20 21 22	No Answer	Door was answered Home but no answer Appears Vacant Nobody Home	14 0 0 6	11 0 0 2	19 0 0 3	9 0 1 7	11 0 0 5	8 0 0 1	11 0 3 2	12 2 0 16	8 0 0 4	12 0 2 4	10 1 0 6	11 0 0 23	340 5 21 160	Door was answered Appears Vacant Nobody Home after 3rd Visit
23 24 25 26 27 28 29	Interview	Language Barrier Refused to Participate Non-resident No adult over 18 yrs old Interview begun, not finished Interview Completed	0 4 1 0 2 7	1 3 0 0 0 7	0 12 0 0 0 7	0 2 0 0 0 7	0 1 0 0 3 7	0 2 0 0 0	0 4 0 0 0 7	0 6 0 0 0	0 1 0 0 0 7	1 4 1 0 0	0 5 0 0 0	3 2 0 0 0	12 110 8 4 14	Language Barrier Refused to Participate Non-resident, < 30 days No adult over 18 yrs old Interview begun, not finished
30 31 32 r 33 34 35	of Houses Sample	d/Attempted	7 20	7 13	7 24	7 17	7 17	6 10	7 16	6 30	7 12	6 18	5	6 34	0 517 37.14% 91.43%	Contact Rate Completion Rate
36 37 38															56.47%	Cooperation Rate

#### **Contact Rate**

# The percentage of households that complete a survey after contact is attempted

Number of completed interviews

All HUs where contact was attempted

### **Cooperation Rate**

# The percentage of households that complete a survey after contact has been made

Number of completed interviews

All HUs where contact was made

## **Completion Rate**

Number of completed interviews compared to the ideal number of completed interviews

Denominator usually = 210

Number of completed interviews

Number of interviews intended to complete

# **Example Response Rates**

Questionnaire response (n=192)	Percent	Rate	Description
Completion	91.4%	192/210	Total completed/ 210
Cooperation	56.5%	192/340	Total completed/ total contact made
Contact	37.1%	192/517	Total completed/ total selected

### **CASPER** Phases

#### Prepare for the CASPER

- Determine objectives
- Determine assessment area
- Develop forms and questionnaire
- Select first stage of sample

#### Conduct the CASPER in the field

- Select second stage sample
- Organize and train assessment teams
- Conduct household interviews

#### Analyze the data

- Determine sampling weight
- Calculate weighted frequencies and percentages
- Write the report and share results

# **Report Writing**

#### Preliminary Report/Exit Interview

- Start EARLY
- Conducted within 36 hours of data collection
- Includes tables, summary points, recommendation discussion
- Key stakeholders

#### Final Report

- Full report structure
- Additional content (qualitative and/or open-ended data)
- More accurate and detailed information
- Widely distributed

#### Considerations

- How will you report the data?
- Who will draft the written report?
- To whom should the results be submitted?
- What action will be taken based upon the results?
- Who should implement the recommendations?

# **Sharing Results**

#### Who is your audience?

- Emergency managers
- Epidemiologists
- Politicians
- Media

#### **Timing – when are your deadlines?**

Within 36 hours of completion of data collection for initial results

#### Data presentation

- Simple
- Easy-to-read format
- Tables or graphically (pie charts, line graphs)
- Link to original objectives

## **Things to Remember**

#### Get started EARLY!

- Most of the report can be drafted prior to data collection
- Write clear objectives
- **Tailor to your audience**

#### Explain what your results say

- HOUSEHOLD-level data
- Know your limitations

#### Work with your partners when writing recommendations

- Are they tangible?
- How will you implement them?