

# Package ‘svyVGAM’

June 14, 2022

**Title** Design-Based Inference in Vector Generalised Linear Models

**Version** 1.1

**Author** Thomas Lumley

**Description** Provides inference based on the survey package for the wide range of parametric models in the 'VGAM' package.

**Imports** stats, methods

**Depends** VGAM, survey, R (>= 3.5.0)

**Suggests** pscl, knitr, markdown, rmarkdown

**VignetteBuilder** knitr

**Encoding** UTF-8

**License** GPL-3

**Maintainer** Thomas Lumley <t.lumley@auckland.ac.nz>

**NeedsCompilation** no

**Repository** CRAN

**Date/Publication** 2022-06-14 02:50:02 UTC

## R topics documented:

nhanes_sxq	1
svy_vglm	2
<b>Index</b>	<b>5</b>

---

nhanes_sxq	<i>Data from NHANES: number of sex partners</i>
------------	---

---

## Description

These data are from the NHANES 2003-2004 survey in the US. They provide an example of overdispersed count data that motivates a two-component zero-inflation model

**Usage**

```
data("nhanes_sxq")
```

**Format**

A data frame with 2992 observations on the following 7 variables.

SDMVPSU Primary Sampling Unit

SDMVSTRA stratum

WTINT2YR weights

malepartners lifetime number of male sexual partners

RIDAGEYR age in years

DMDEDUC level of education: 1=less than high school, 2=high school, 3=more than high school, 7=refused

RIDRETH1 Race/ethnicity: 1=Mexican American, 2=Other Hispanic, 4=non-Hispanic White, 5=non-Hispanic Black, 5=Other

**Source**

NHANES files demo\_c.xpt and sxq\_c.xpt

**See Also**

Construction of the data set is described by <https://notstatschat.rbind.io/2015/05/26/zero-inflated-poisson-f>

**Examples**

```
data(nhanes_sxq)
nhdes = svydesign(id=~SDMVPSU, strat=~SDMVSTRA, weights=~WTINT2YR, nest=TRUE, data=nhanes_sxq)
svy_vglm(malepartners~RIDAGEYR+factor(RIDRETH1)+DMDEDUC, zipoisson(), design=nhdes, crit = "coef")
```

---

 svy\_vglm

---

*Design-based inference for vector generalised linear models*


---

**Description**

This function provides design-based (survey) inference for Thomas Yee's vector generalised linear models. It works by calling `vglm` with sampling weights, and then either using resampling (replicate weights) or extracting the influence functions and using a Horvitz-Thompson-type sandwich estimator.

**Usage**

```
svy_vglm(formula, family, design, ...)
```

**Arguments**

formula	Model formula, as for <a href="#">vglm</a>
family	Model family, as for <a href="#">vglm</a>
design	Survey design object
...	Other arguments to pass to <a href="#">vglm</a>

**Value**

An S3 object of class `svy_glm` with `print`, `coef` and `vcov` methods, containing the design in the `design` component and a fitted `vglm` object in the `fit` component.

**See Also**

[nhanes\\_sxq](#)  
[vglm](#)  
[svydesign svrepdesign](#)

**Examples**

```
data(api)
dclus2<-svydesign(id=~dnum+snum, fpc=~fpc1+fpc2, data=apiclus2)

## Ordinary Gaussian regression
m1<-svyglm(api00~api99+mobility+ell, design=dclus2,family=gaussian)
## same model, but with the variance as a second parameter
m2<-svy_vglm(api00~api99+mobility+ell, design=dclus2,family=uninormal())
m1
m2
SE(m1)
SE(m2)

summary(m1)
summary(m2)

## Proportional odds model
dclus2<-update(dclus2, mealcat=as.ordered(cut(meals,c(0,25,50,75,100))))
a<-svyolr(mealcat~avg.ed+mobility+stype, design=dclus2)
b<-svy_vglm(mealcat~avg.ed+mobility+stype, design=dclus2, family=propodds())
a
b
SE(a)
SE(b) #not identical, because svyolr() uses approximate Hessian

## Zero-inflated Poisson
data(nhanes_sxq)
nhdes = svydesign(id=~SDMVPSU, strat=~SDMVSTRA, weights=~WTINT2YR,
  nest=TRUE, data=nhanes_sxq)

sv1<-svy_vglm(malepartners~RIDAGEYR+factor(RIDRETH1)+DMDEDUC,
```

```
      zipoisson(), design=nhdes, crit = "coef")
sv1
summary(sv1)

## Multinomial
## Reference group (non-Hispanic White) average older and more educated
## so coefficients are negative
mult_eth<- svy_vglm(RIDRETH1~RIDAGEYR+DMDEDUC,
  family=multinomial(refLevel=3), design=nhdes)

## separate logistic regressions are close but not identical
two_eth<-svyglm(I(RIDRETH1==1)~RIDAGEYR+DMDEDUC, family=quasibinomial,
  design=subset(nhdes, RIDRETH1 %in% c(1,3)))

summary(mult_eth)
summary(two_eth)
```

# Index

- \* **datasets**
  - nhanes\_sxq, 1
- \* **survey**
  - svy\_vglm, 2
- nhanes\_sxq, 1, 3
- svrepdesign, 3
- svy\_vglm, 2
- svydesign, 3
- vglm, 3