Swiss TPH

Swiss Tropical and Public Health Institute
Schweizerisches Tropen- und Public Health-Institut
Institut Tropical et de Santé Publique Suisse

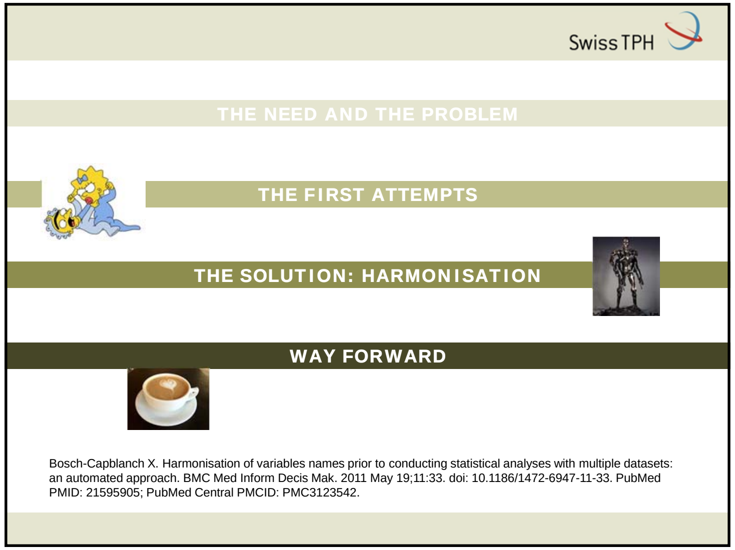
Associated Institute of the University of Basel

2014 Spanish Stata Users Group meeting

# Automated harmonisation of variables names and values from several datasets prior to conducting batch statistical analyses

Barcelona, 23rd October 2014

Xavier Bosch-Capblanch
Swiss TPH, Basel (Switzerland)



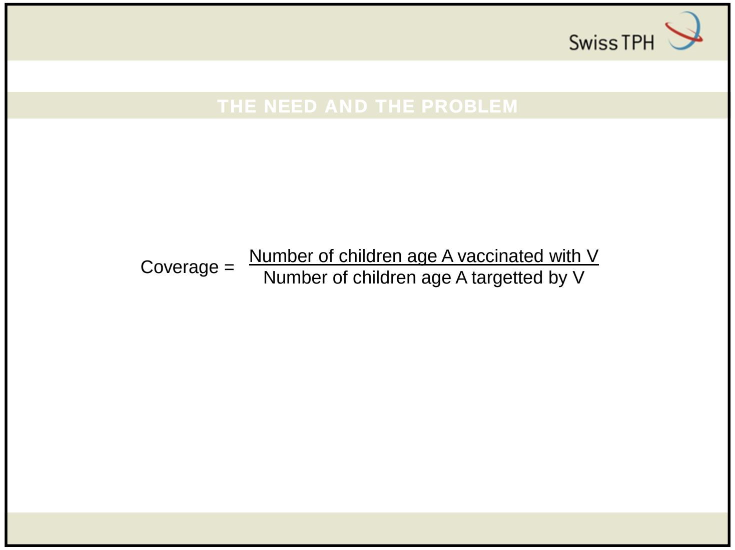
THE NEED AND THE PROBLEM

THE FIRST ATTEMPTS

THE SOLUTION: HARMONISATION

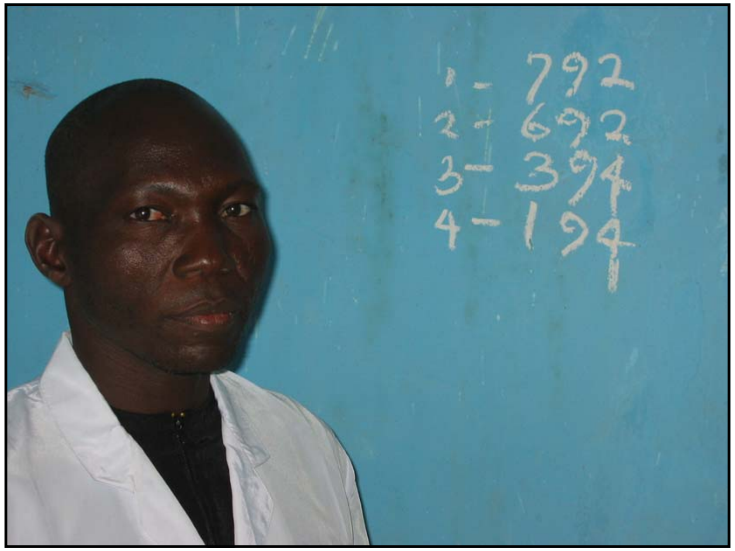
WAY FORWARD

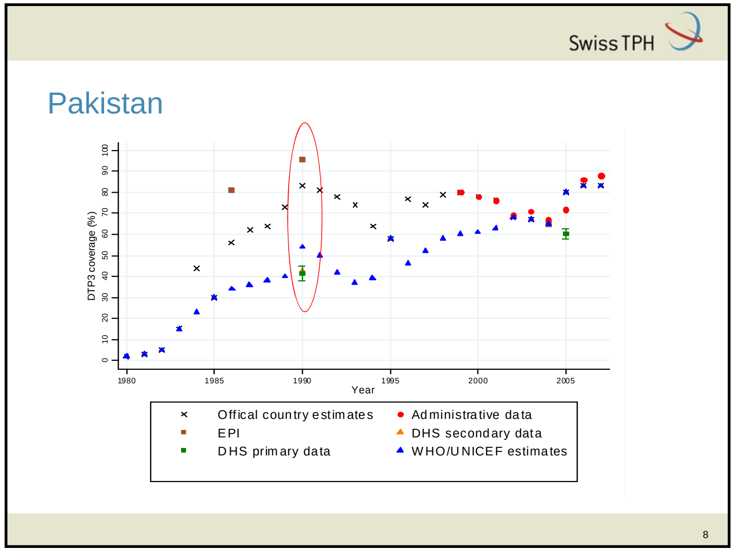
Bosch-Capblanch X. Harmonisation of variables names prior to conducting statistical analyses with multiple datasets: an automated approach. BMC Med Inform Decis Mak. 2011 May 19;11:33. doi: 10.1186/1472-6947-11-33. PubMed PMID: 21595905; PubMed Central PMCID: PMC3123542.



THE NEED AND THE PROBLEM

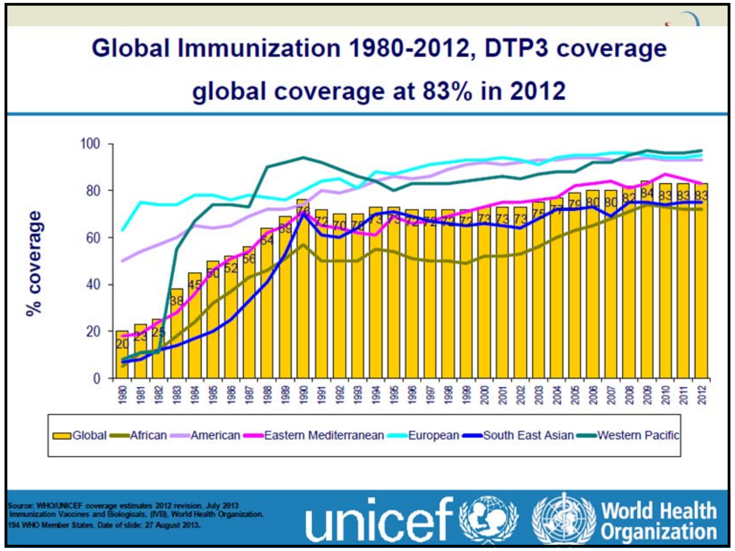
$$\text{Coverage} = \frac{\text{Number of children age A vaccinated with V}}{\text{Number of children age A targetted by V}}$$





## Pakistan

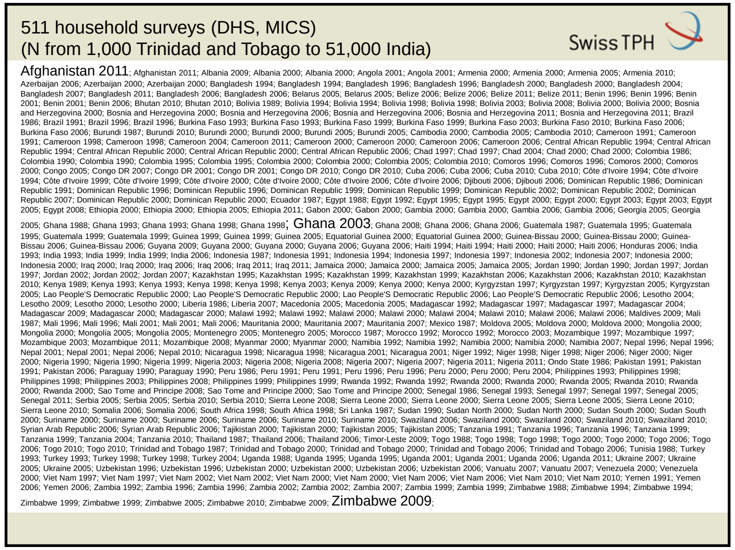
8



## Global Immunization 1980-2012, DTP3 coverage

## global coverage at 83% in 2012

Source: WHO/UNICEF coverage estimates 2012 revision. July 2013 Immunization Vaccines and Biologicals, (IVB), World Health Organization. 194 WHO Member States. Date of slide: 27 August 2013.



## 511 household surveys (DHS, MICS)
## (N from 1,000 Trinidad and Tobago to 51,000 India)

Afghanistan 2011; Afghanistan 2011; Albania 2009; Albania 2000; Albania 2000; Angola 2001; Angola 2001; Armenia 2000; Armenia 2000; Armenia 2005; Armenia 2010; Azerbaijan 2006; Azerbaijan 2000; Azerbaijan 2000; Bangladesh 1994; Bangladesh 1994; Bangladesh 1996; Bangladesh 1996; Bangladesh 2000; Bangladesh 2000; Bangladesh 2004; Bangladesh 2007; Bangladesh 2011; Bangladesh 2006; Bangladesh 2006; Belarus 2005; Belarus 2005; Belize 2006; Belize 2006; Belize 2011; Belize 2011; Benin 1996; Benin 1996; Benin 2001; Benin 2001; Benin 2006; Bhutan 2010; Bhutan 2010; Bolivia 1989; Bolivia 1994; Bolivia 1994; Bolivia 1998; Bolivia 1998; Bolivia 2003; Bolivia 2008; Bolivia 2000; Bolivia 2000; Bosnia and Herzegovina 2000; Bosnia and Herzegovina 2000; Bosnia and Herzegovina 2006; Bosnia and Herzegovina 2006; Bosnia and Herzegovina 2011; Bosnia and Herzegovina 2011; Brazil 1986; Brazil 1991; Brazil 1996; Brazil 1996; Burkina Faso 1993; Burkina Faso 1993; Burkina Faso 1999; Burkina Faso 1999; Burkina Faso 2003; Burkina Faso 2010; Burkina Faso 2006; Burkina Faso 2006; Burundi 1987; Burundi 2010; Burundi 2000; Burundi 2000; Burundi 2005; Burundi 2005; Cambodia 2000; Cambodia 2005; Cambodia 2010; Cameroon 1991; Cameroon 1991; Cameroon 1998; Cameroon 1998; Cameroon 2004; Cameroon 2011; Cameroon 2000; Cameroon 2000; Cameroon 2006; Cameroon 2006; Central African Republic 1994; Central African Republic 1994; Central African Republic 2000; Central African Republic 2000; Central African Republic 2006; Chad 1997; Chad 1997; Chad 2004; Chad 2000; Chad 2000; Colombia 1986; Colombia 1990; Colombia 1990; Colombia 1995; Colombia 1995; Colombia 2000; Colombia 2000; Colombia 2005; Colombia 2010; Comoros 1996; Comoros 1996; Comoros 2000; Comoros 2000; Congo 2005; Congo DR 2007; Congo DR 2001; Congo DR 2001; Congo DR 2010; Congo DR 2010; Cuba 2006; Cuba 2006; Cuba 2010; Cuba 2010; Côte d'Ivoire 1994; Côte d'Ivoire 1994; Côte d'Ivoire 1999; Côte d'Ivoire 1999; Côte d'Ivoire 2000; Côte d'Ivoire 2000; Côte d'Ivoire 2006; 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Sri Lanka 1987; Sudan 1990; Sudan North 2000; Sudan North 2000; Sudan South 2000; Sudan South 2000; Suriname 2000; Suriname 2000; Suriname 2006; Suriname 2006; Suriname 2010; Suriname 2010; Swaziland 2006; Swaziland 2000; Swaziland 2000; Swaziland 2010; Swaziland 2010; Syrian Arab Republic 2006; Syrian Arab Republic 2006; Tajikistan 2000; Tajikistan 2000; Tajikistan 2005; Tajikistan 2005; Tanzania 1991; Tanzania 1996; Tanzania 1996; Tanzania 1999; Tanzania 1999; Tanzania 2004; Tanzania 2010; Thailand 1987; Thailand 2006; Thailand 2006; Timor-Leste 2009; Togo 1988; Togo 1998; Togo 1998; Togo 2000; Togo 2000; Togo 2006; Togo 2006; Togo 2010; Togo 2010; Trinidad and Tobago 1987; Trinidad and Tobago 2000; Trinidad and Tobago 2000; Trinidad and Tobago 2006; Trinidad and Tobago 2006; Tunisia 1988; Turkey 1993; Turkey 1993; Turkey 1998; Turkey 1998; Turkey 2004; Uganda 1988; Uganda 1995; Uganda 1995; Uganda 2001; Uganda 2001; Uganda 2006; Uganda 2011; Ukraine 2007; Ukraine 2005; Ukraine 2005; 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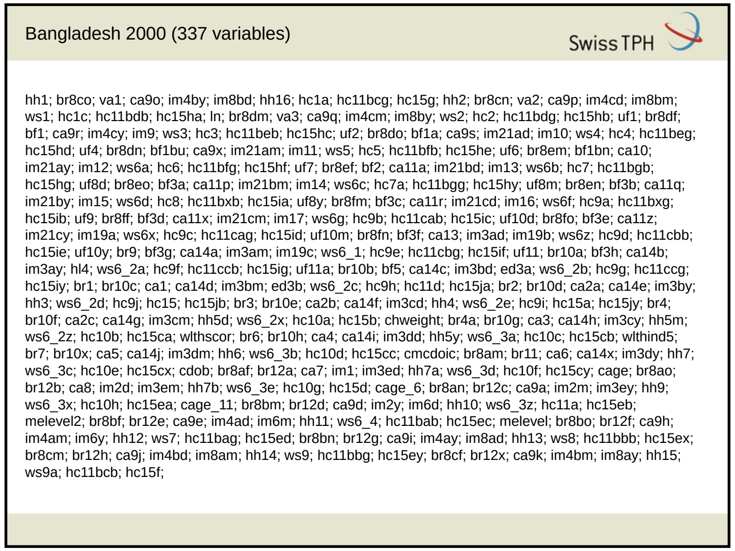
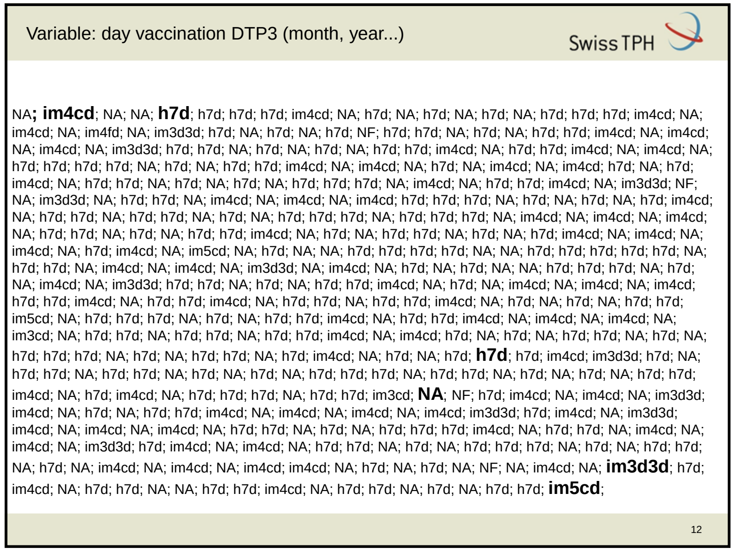


## Bangladesh 2000 (337 variables)

hh1; br8co; va1; ca9o; im4by; im8bd; hh16; hc1a; hc11bcg; hc15g; hh2; br8cn; va2; ca9p; im4cd; im8bm; ws1; hc1c; hc11bdb; hc15ha; ln; br8dm; va3; ca9q; im4cm; im8by; ws2; hc2; hc11bdg; hc15hb; uf1; br8df; bf1; ca9r; im4cy; im9; ws3; hc3; hc11beb; hc15hc; uf2; br8do; bf1a; ca9s; im21ad; im10; ws4; hc4; hc11beg; hc15hd; uf4; br8dn; bf1bu; ca9x; im21am; im11; ws5; hc5; hc11bfb; hc15he; uf6; br8em; bf1bn; ca10; im21ay; im12; ws6a; hc6; hc11bfg; hc15hf; uf7; br8ef; bf2; ca11a; im21bd; im13; ws6b; hc7; hc11bgb; hc15hg; uf8d; br8eo; bf3a; ca11p; im21bm; im14; ws6c; hc7a; hc11bgg; hc15hy; uf8m; br8en; bf3b; ca11q; im21by; im15; ws6d; hc8; hc11bxb; hc15ia; uf8y; br8fm; bf3c; ca11r; im21cd; im16; ws6f; hc9a; hc11bxg; hc15ib; uf9; br8ff; bf3d; ca11x; im21cm; im17; ws6g; hc9b; hc11cab; hc15ic; uf10d; br8fo; bf3e; ca11z; im21cy; im19a; ws6x; hc9c; hc11cag; hc15id; uf10m; br8fn; bf3f; ca13; im3ad; im19b; ws6z; hc9d; hc11cbb; hc15ie; uf10y; br9; bf3g; ca14a; im3am; im19c; ws6_1; hc9e; hc11cbg; hc15if; uf11; br10a; bf3h; ca14b; im3ay; hl4; ws6_2a; hc9f; hc11ccb; hc15ig; uf11a; br10b; bf5; ca14c; im3bd; ed3a; ws6_2b; hc9g; hc11ccg; hc15iy; br1; br10c; ca1; ca14d; im3bm; ed3b; ws6_2c; hc9h; hc11d; hc15ja; br2; br10d; ca2a; ca14e; im3by; hh3; ws6_2d; hc9j; hc15; hc15jb; br3; br10e; ca2b; ca14f; im3cd; hh4; ws6_2e; hc9i; hc15a; hc15jy; br4; br10f; ca2c; ca14g; im3cm; hh5d; ws6_2x; hc10a; hc15b; chweight; br4a; br10g; ca3; ca14h; im3cy; hh5m; ws6_2z; hc10b; hc15ca; wlthscor; br6; br10h; ca4; ca14i; im3dd; hh5y; ws6_3a; hc10c; hc15cb; wlthind5; br7; br10x; ca5; ca14j; im3dm; hh6; ws6_3b; hc10d; hc15cc; cmcdoic; br8am; br11; ca6; ca14x; im3dy; hh7; ws6_3c; hc10e; hc15cx; cdob; br8af; br12a; ca7; im1; im3ed; hh7a; ws6_3d; hc10f; hc15cy; cage; br8ao; br12b; ca8; im2d; im3em; hh7b; ws6_3e; hc10g; hc15d; cage_6; br8an; br12c; ca9a; im2m; im3ey; hh9; ws6_3x; hc10h; hc15ea; cage_11; br8bm; br12d; ca9d; im2y; im6d; hh10; ws6_3z; hc11a; hc15eb; melevel2; br8bf; br12e; ca9e; im4ad; im6m; hh11; ws6_4; hc11bab; hc15ec; melevel; br8bo; br12f; ca9h; im4am; im6y; hh12; ws7; hc11bag; hc15ed; br8bn; br12g; ca9i; im4ay; im8ad; hh13; ws8; hc11bbb; hc15ex; br8cm; br12h; ca9j; im4bd; im8am; hh14; ws9; hc11bbg; hc15ey; br8cf; br12x; ca9k; im4bm; im8ay; hh15; ws9a; hc11bcb; hc15f;



## Variable: day vaccination DTP3 (month, year...)

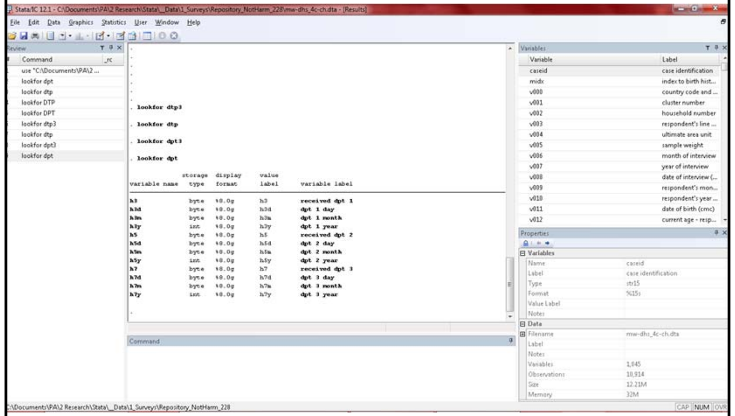
NA**; im4cd**; NA; NA; **h7d**; h7d; h7d; h7d; im4cd; NA; h7d; NA; h7d; NA; h7d; NA; h7d; h7d; h7d; im4cd; NA; im4cd; NA; im4fd; NA; im3d3d; h7d; NA; h7d; NA; h7d; NF; h7d; h7d; NA; h7d; NA; h7d; h7d; im4cd; NA; im4cd; NA; im4cd; NA; im3d3d; h7d; h7d; NA; h7d; NA; h7d; NA; h7d; h7d; im4cd; NA; h7d; h7d; im4cd; NA; im4cd; NA; h7d; h7d; h7d; h7d; NA; h7d; NA; h7d; h7d; im4cd; NA; im4cd; NA; h7d; NA; im4cd; NA; im4cd; h7d; NA; h7d; im4cd; NA; h7d; h7d; NA; h7d; NA; h7d; NA; h7d; h7d; h7d; NA; im4cd; NA; h7d; h7d; im4cd; NA; im3d3d; NF; NA; im3d3d; NA; h7d; h7d; NA; im4cd; NA; im4cd; NA; im4cd; h7d; h7d; h7d; NA; h7d; NA; h7d; NA; h7d; im4cd; NA; h7d; h7d; NA; h7d; h7d; NA; h7d; NA; h7d; h7d; h7d; NA; h7d; h7d; h7d; NA; im4cd; NA; im4cd; NA; im4cd; NA; h7d; h7d; NA; h7d; NA; h7d; h7d; im4cd; NA; h7d; NA; h7d; h7d; NA; h7d; NA; h7d; im4cd; NA; im4cd; NA; im4cd; NA; h7d; im4cd; NA; im5cd; NA; h7d; NA; NA; h7d; h7d; h7d; h7d; NA; NA; h7d; h7d; h7d; h7d; h7d; NA; h7d; h7d; NA; im4cd; NA; im4cd; NA; im3d3d; NA; im4cd; NA; h7d; NA; h7d; NA; NA; h7d; h7d; h7d; NA; h7d; NA; im4cd; NA; im3d3d; h7d; h7d; NA; h7d; NA; h7d; h7d; im4cd; NA; h7d; NA; im4cd; NA; im4cd; NA; im4cd; h7d; h7d; im4cd; NA; h7d; h7d; im4cd; NA; h7d; h7d; NA; h7d; h7d; im4cd; NA; h7d; NA; h7d; NA; h7d; h7d; im5cd; NA; h7d; h7d; h7d; NA; h7d; NA; h7d; h7d; im4cd; NA; h7d; h7d; im4cd; NA; im4cd; NA; im4cd; NA; im3cd; NA; h7d; h7d; NA; h7d; h7d; NA; h7d; h7d; im4cd; NA; im4cd; h7d; NA; h7d; NA; h7d; h7d; NA; h7d; NA; h7d; h7d; h7d; NA; h7d; NA; h7d; h7d; NA; h7d; im4cd; NA; h7d; NA; h7d; **h7d**; h7d; im4cd; im3d3d; h7d; NA; h7d; h7d; NA; h7d; h7d; NA; h7d; NA; h7d; NA; h7d; h7d; h7d; NA; h7d; h7d; NA; h7d; NA; h7d; NA; h7d; h7d; im4cd; NA; h7d; im4cd; NA; h7d; h7d; h7d; NA; h7d; h7d; im3cd; **NA**; NF; h7d; im4cd; NA; im4cd; NA; im3d3d; im4cd; NA; h7d; NA; h7d; h7d; im4cd; NA; im4cd; NA; im4cd; NA; im4cd; im3d3d; h7d; im4cd; NA; im3d3d; im4cd; NA; im4cd; NA; im4cd; NA; h7d; h7d; NA; h7d; NA; h7d; h7d; h7d; im4cd; NA; h7d; h7d; NA; im4cd; NA; im4cd; NA; im3d3d; h7d; im4cd; NA; im4cd; NA; h7d; h7d; NA; h7d; NA; h7d; h7d; h7d; NA; h7d; NA; h7d; h7d; NA; h7d; NA; im4cd; NA; im4cd; NA; im4cd; im4cd; NA; h7d; NA; h7d; NA; NF; NA; im4cd; NA; **im3d3d**; h7d; im4cd; NA; h7d; h7d; NA; NA; h7d; h7d; im4cd; NA; h7d; h7d; NA; h7d; NA; h7d; h7d; **im5cd**;

## Value = 3 for variable DTP3 vaccination

**not vaccinated**; vacc marked on card; vacc marked on card; not vaccinated; vacc marked on card; not vaccinated; vacc marked on card; vacc marked on card; vacc marked on card; vacc marked on card; vacc marked on card; vacc marked on card; vacc marked on card; vacc marked on card; not vaccinated; vacc marked on card; vacc marked on card; vacc marked on card; vacc marked on card; vacc marked on card; vacc marked on card; not vaccinated; vacc marked on card; not vaccinated; pas vaccine; vacc marked on card; vacc marked on card; vacc marked on card; not vaccinated; vacc marked on card; vacc marked on card; non vaccine; vacc marked on card; vacc marked on card; vacc marked on card; vacc marked on card; vacc marked on card; vacc marked on card; vacc marked on card; pas carnet; no vacunado; not vaccinated; vacc marked on card; vacc marked on card; vacc marked on card; vacc marked on card; vacc marked on card; no vacunado; vacc marked on card; vacc marked on card; vacc marked on card; vacc marked on card; **vacc marked on card**; not vaccinated; vacc marked on card; vacc marked on card; vacc marked on card; not vaccinated; not vaccinated; vacc marked on card; vacc marked on card; vacc marked on card; vacc marked on card; vacc marked on card; vacc marked on card; vacc marked on card; not vaccinated; vacc marked on card; vacc marked on card; vacc marked on card; vacc marked on card; vacc marked on card; vacc marked on card; vacc marked on card; vacc marked on card; vacc marked on card; vacc marked on card; vacc marked on card; vacc marked on card; not vaccinated; vacc marked on card; vacc marked on card; vacc marked on card; vacc marked on card; vacc marked on card; vacc marked on card; vacc marked on card; not vaccinated; vacc marked on card; vacc marked on card; vacc marked on card; vacc marked on card; vacc marked on card; not vaccinated; not vaccinated; vacc marked on card; vacc marked on card; vacc marked on card; not vaccinated; vacc marked on card; vacc marked on card; vacc marked on card; vacc marked on card; not vaccinated; vacc marked on card; vacc marked on card; vacc marked on card; not vaccinated; vacc marked on card; vacc marked on card; vacc marked on card; vacc marked on card; vacc marked on card; vacc marked on card; vacc marked on card; vacc marked on card; vacc marked on card; vacc marked on card; vacc marked on card; vacc marked on card; vacc marked on card; vacc marked on card; not vaccinated; vacc marked on card; vacc marked on card; vacc marked on card; vacc marked on card; vacc marked on card; vacc marked on card; vacc marked on card; vacc marked on card; vacc marked on card; vacc marked on card; vacc marked on card; vacc marked on card; vacc marked on card; vacc marked on card; vacc marked on card; vacc marked on card; vacc marked on card; pas vaccine; vacc marked on card; vacc marked on card; vacc marked on card; pas vaccinnee; not vaccinated; vacc marked on card; vacc marked on card; not vaccinated; not vaccinated; nao vacinada; not vaccinated; not vaccinated; vacc marked on card; not vaccinated; vacc marked on card; vacc marked on card; vacc marked on card; pas vaccine; vacc marked on card; vacc marked on card; vacc marked on card; not vaccinated; vacc marked on card; vacc marked on card; vacc marked on card; vacc marked on card; vacc marked on card; vacc marked on card; vacc marked on card; vacc marked on card; not vaccinated; not vaccinated; not vaccinated; vacc marked on card; vacc marked on card; vacc marked on card; vaccination marked on card; not vaccinated; vacc marked on card; vacc marked on card; vacc marked on card; vacc marked on card; vacc marked on card; vacc marked on card; vacc marked on card; vacc marked on card; vacc marked on card; vaccination marked on card; vaccination marked on card; vacc marked on card; vaccination marked on card; non vaccine; vaccination marked on card; vacc marked on card; vacc marked on card; vaccination marked on card; vaccination marked on card; vacc marked on card; vacc marked on card; vacc marked on card; vaccination marked on card; vacc marked on card; not vaccinated; vacc marked on card; vacc marked on card; not vaccinated; vacc marked on card; vacc marked on card; vacc marked on card; vaccination marked on card; vacc marked on card; vaccination marked on card; vaccination marked on card; vaccination marked on card; vacc marked on card; vaccination marked on card; vacc marked on card; vacc marked on card; vacc marked on card; vaccination marked on card; vaccination marked on card;

## FIRST ATTEMPTS

$$\text{Coverage} = \frac{\underline{\text{Number of children age A vaccinated with V}}}{\text{Number of children age A targetted by V}}$$



Stata/IC 12.1 - C:\Documents\PA\2 Research\Stata\__Data\1_Surveys\Repository_NotHarm_228\mw-dhs_4c-ch.dta - [Results]

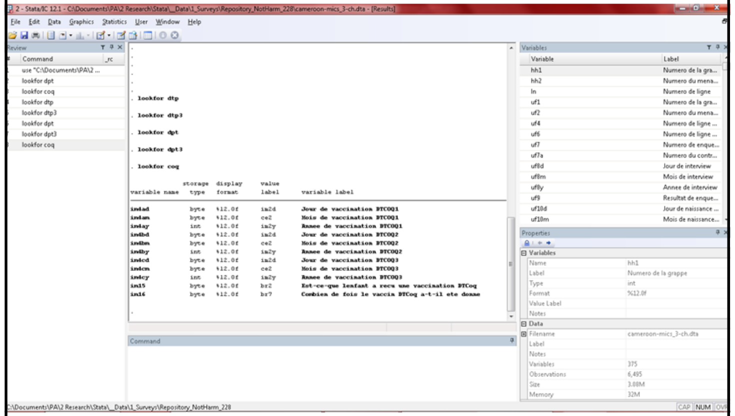
```
use "C:\Documents\PA\2 ...
lookfor dpt
lookfor dtp
lookfor DTP
lookfor DPT
lookfor dtp3
lookfor dtp
lookfor dpt3
lookfor dpt
```

```
. lookfor dtp3

. lookfor dtp

. lookfor dpt3

. lookfor dpt

              storage  display    value
variable name   type   format     label      variable label
------------------------------------------------------------------
h3              byte   %8.0g      h3         received dpt 1
h3d             byte   %8.0g      h3d        dpt 1 day
h3m             byte   %8.0g      h3m        dpt 1 month
h3y             int    %8.0g      h3y        dpt 1 year
h5              byte   %8.0g      h5         received dpt 2
h5d             byte   %8.0g      h5d        dpt 2 day
h5m             byte   %8.0g      h5m        dpt 2 month
h5y             int    %8.0g      h5y        dpt 2 year
h7              byte   %8.0g      h7         received dpt 3
h7d             byte   %8.0g      h7d        dpt 3 day
h7m             byte   %8.0g      h7m        dpt 3 month
h7y             int    %8.0g      h7y        dpt 3 year

.
```

| Variable | Label |
|---|---|
| caseid | case identification |
| midx | index to birth hist... |
| v000 | country code and ... |
| v001 | cluster number |
| v002 | household number |
| v003 | respondent's line ... |
| v004 | ultimate area unit |
| v005 | sample weight |
| v006 | month of interview |
| v007 | year of interview |
| v008 | date of interview (... |
| v009 | respondent's mon... |
| v010 | respondent's year ... |
| v011 | date of birth (cmc) |
| v012 | current age - resp... |

| | |
|---|---|
| Variables | |
| Name | caseid |
| Label | case identification |
| Type | str15 |
| Format | %15s |
| Value Label | |
| Notes | |
| Data | |
| Filename | mw-dhs_4c-ch.dta |
| Label | |
| Notes | |
| Variables | 1,045 |
| Observations | 10,914 |
| Size | 12.21M |
| Memory | 32M |

C:\Documents\PA\2 Research\Stata\__Data\1_Surveys\Repository_NotHarm_228



2 - Stata/IC 12.1 - C:\Documents\PA\2 Research\Stata\__Data\1_Surveys\Repository_NotHarm_228\cameroon-mics_3-ch.dta - [Results]

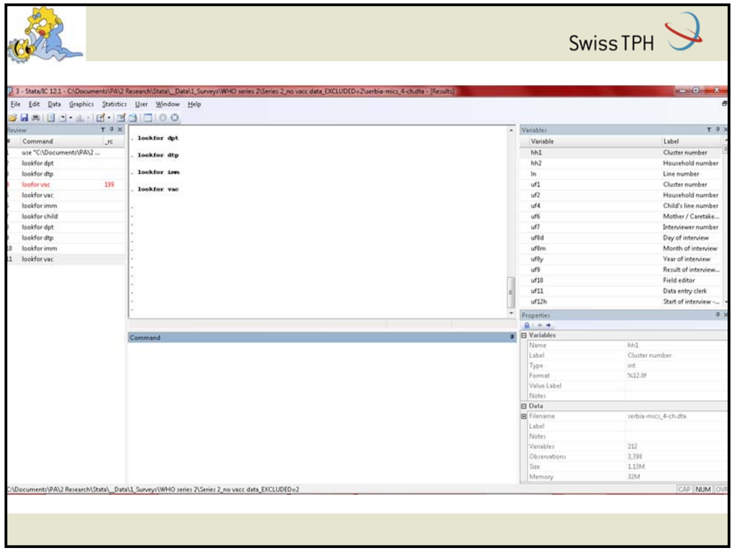
```
use "C:\Documents\PA\2 ...
lookfor dpt
lookfor coq
lookfor dtp
lookfor dtp3
lookfor dpt
lookfor dpt3
lookfor coq
```

```
. lookfor dtp

. lookfor dtp3

. lookfor dpt

. lookfor dpt3

. lookfor coq

              storage  display    value
variable name   type   format     label      variable label
------------------------------------------------------------------------------
im4ad           byte   %12.0f     im2d       Jour de vaccination DTCOQ1
im4am           byte   %12.0f     ce2        Mois de vaccination DTCOQ1
im4ay           int    %12.0f     im2y       Annee de vaccination DTCOQ1
im4bd           byte   %12.0f     im2d       Jour de vaccination DTCOQ2
im4bm           byte   %12.0f     ce2        Mois de vaccination DTCOQ2
im4by           int    %12.0f     im2y       Annee de vaccination DTCOQ2
im4cd           byte   %12.0f     im2d       Jour de vaccination DTCOQ3
im4cm           byte   %12.0f     ce2        Mois de vaccination DTCOQ3
im4cy           int    %12.0f     im2y       Annee de vaccination DTCOQ3
im15            byte   %12.0f     br2        Est-ce-que lenfant a recu une vaccination DTCoq
im16            byte   %12.0f     br7        Combien de fois le vaccin DTCoq a-t-il ete donne

.
```

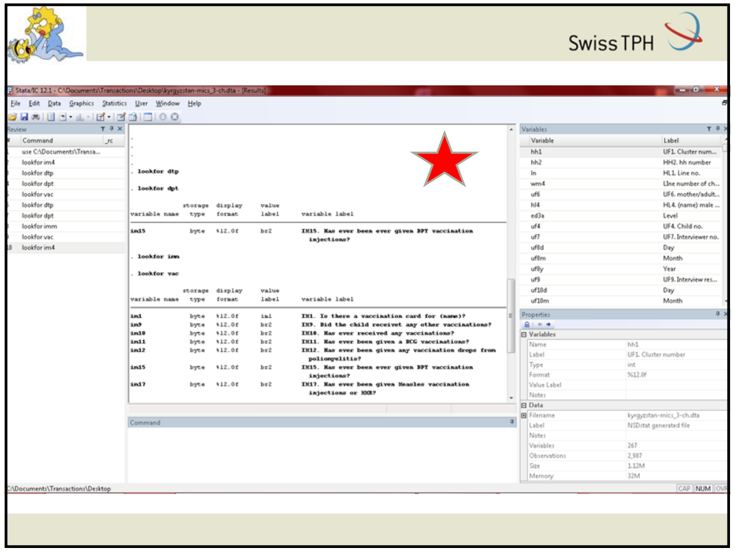
| Variable | Label |
|---|---|
| hh1 | Numero de la gra... |
| hh2 | Numero du mena... |
| ln | Numero de ligne |
| uf1 | Numero de la gra... |
| uf2 | Numero du mena... |
| uf4 | Numero de ligne ... |
| uf6 | Numero de ligne ... |
| uf7 | Numero de enque... |
| uf7a | Numero du contr... |
| uf8d | Jour de interview |
| uf8m | Mois de interview |
| uf8y | Annee de interview |
| uf9 | Resultat de enque... |
| uf10d | Jour de naissance ... |
| uf10m | Mois de naissance... |

| | |
|---|---|
| Variables | |
| Name | hh1 |
| Label | Numero de la grappe |
| Type | int |
| Format | %12.0f |
| Value Label | |
| Notes | |
| Data | |
| Filename | cameroon-mics_3-ch.dta |
| Label | |
| Notes | |
| Variables | 375 |
| Observations | 6,495 |
| Size | 3.08M |
| Memory | 32M |

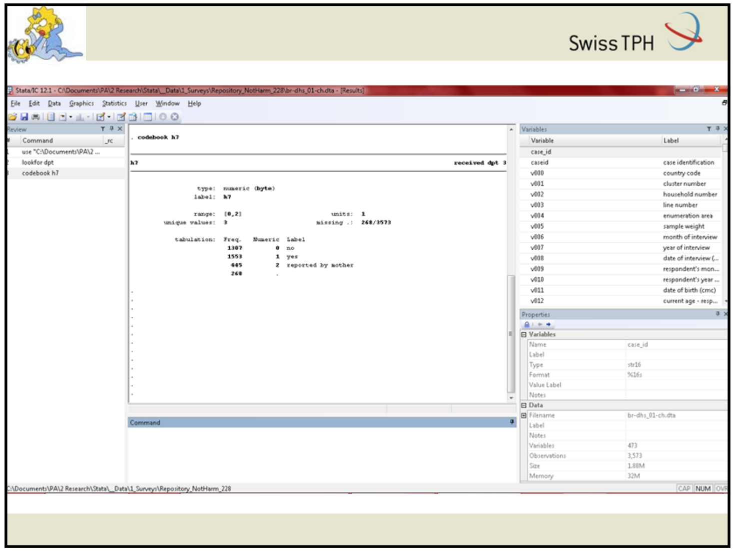
C:\Documents\PA\2 Research\Stata\__Data\1_Surveys\Repository_NotHarm_228


Swiss TPH
3 - Stata/IC 12.1 - C:\Documents\PA\2 Research\Stata_Data\1_Surveys\WHO series 2\Series 2_no vacc data_EXCLUDED=2\serbia-mics_4-ch.dta - [Results]

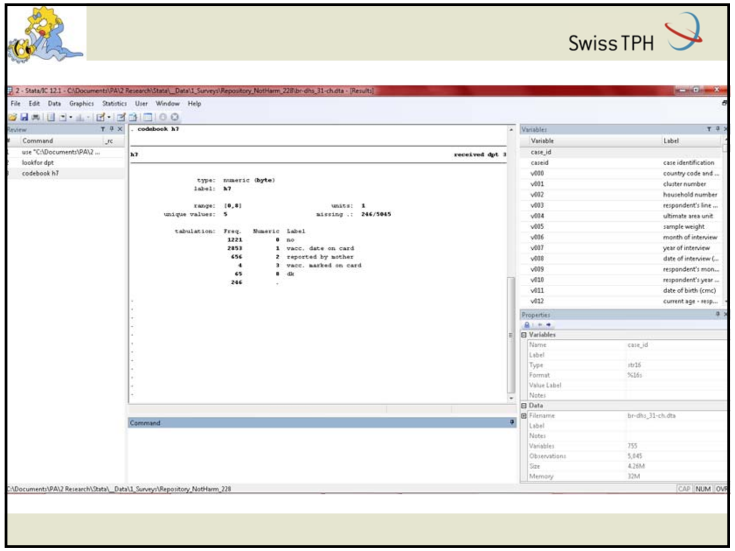
```
. lookfor dpt

. lookfor dtp

. lookfor imm

. lookfor vac
```


Swiss TPH
Stata/IC 12.1 - C:\Documents\Transactions\Desktop\kyrgyzstan-mics_3-ch.dta - [Results]

```
. lookfor dtp

. lookfor dpt

              storage  display     value
variable name   type   format      label      variable label
---------------------------------------------------------------------------
im15            byte   %12.0f      br2        IM15. Has ever been ever given DPT vaccination
                                                injections?

. lookfor imm

. lookfor vac

              storage  display     value
variable name   type   format      label      variable label
---------------------------------------------------------------------------
im1             byte   %12.0f      im1        IM1. Is there a vaccination card for (name)?
im9             byte   %12.0f      br2        IM9. Did the child receivet any other vaccinations?
im10            byte   %12.0f      br2        IM10. Has ever received any vaccinations?
im11            byte   %12.0f      br2        IM11. Has ever been given a BCG vaccinations?
im12            byte   %12.0f      br2        IM12. Has ever been given any vaccination drops from
                                                poliomyelitis?
im15            byte   %12.0f      br2        IM15. Has ever been ever given DPT vaccination
                                                injections?
im17            byte   %12.0f      br2        IM17. Has ever been given Measles vaccination
                                                injections or MMR?
```


Swiss TPH
Stata/IC 12.1 - C:\Documents\PA\2 Research\Stata_Data\1_Surveys\Repository_NotHarm_228\br-dhs_01-ch.dta - [Results]

```
. codebook h7

---------------------------------------------------------------------------
h7                                                          received dpt 3
---------------------------------------------------------------------------

                  type:  numeric (byte)
                 label:  h7

                 range:  [0,2]                        units:  1
         unique values:  3                        missing .:  268/3573

            tabulation:  Freq.   Numeric  Label
                          1307         0  no
                          1553         1  yes
                           445         2  reported by mother
                           268         .
```


Swiss TPH
2 - Stata/IC 12.1 - C:\Documents\PA\2 Research\Stata_Data\1_Surveys\Repository_NotHarm_228\br-dhs_31-ch.dta - [Results]

```
. codebook h7

---------------------------------------------------------------------------
h7                                                          received dpt 3
---------------------------------------------------------------------------

                  type:  numeric (byte)
                 label:  h7

                 range:  [0,8]                        units:  1
         unique values:  5                        missing .:  246/5045

            tabulation:  Freq.   Numeric  Label
                          1221         0  no
                          2853         1  vacc. date on card
                           656         2  reported by mother
                             4         3  vacc. marked on card
                            65         8  dk
                           246         .
```

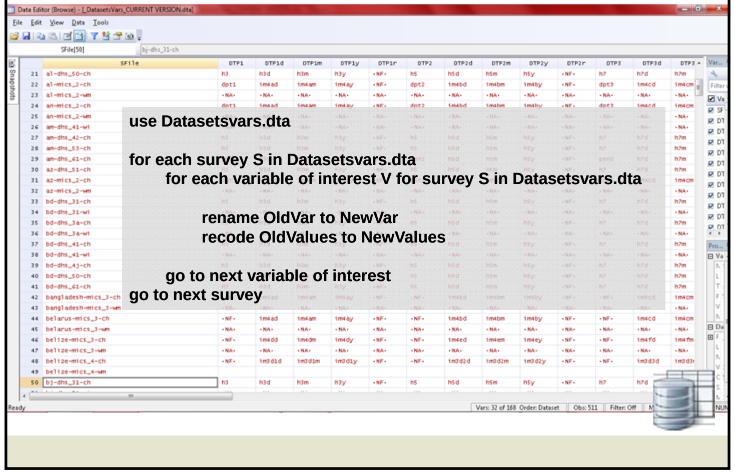
## INCONVENIENCES

- Errors
- Code with hundreds of lines:
  - surveys x variables + surveys x variables x values

```
If survey = Afghanistan 2000 AND OldVar = h7

        rename h7 to DPT3
        recode DTP3 1=2, 2=3, 3=0
...
```

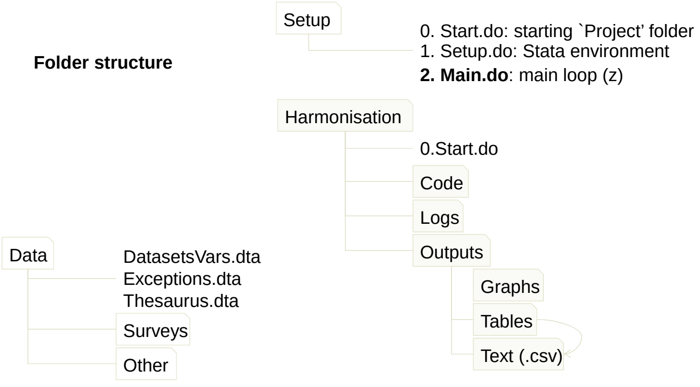
- At survey 68: complains from collaborators
- At survey 174: nonsense, who am I? what is life?
- At survey 362: addictions

## THE SOLUTION: HARMONISATION



```
use Datasetsvars.dta

for each survey S in Datasetsvars.dta
    for each variable of interest V for survey S in Datasetsvars.dta

        rename OldVar to NewVar
        recode OldValues to NewValues

    go to next variable of interest
go to next survey
```

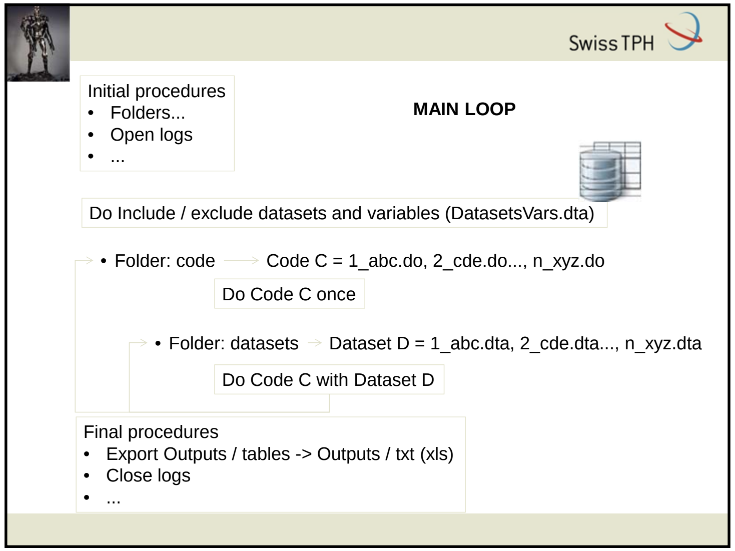
**Folder structure**



Setup
- 0. Start.do: starting `Project' folder
- 1. Setup.do: Stata environment
- **2. Main.do**: main loop (z)

Harmonisation
- 0.Start.do
- Code
- Logs
- Outputs
  - Graphs
  - Tables
  - Text (.csv)

Data
- DatasetsVars.dta
- Exceptions.dta
- Thesaurus.dta
- Surveys
- Other



Initial procedures
- Folders...
- Open logs
- ...

**MAIN LOOP**

Do Include / exclude datasets and variables (DatasetsVars.dta)

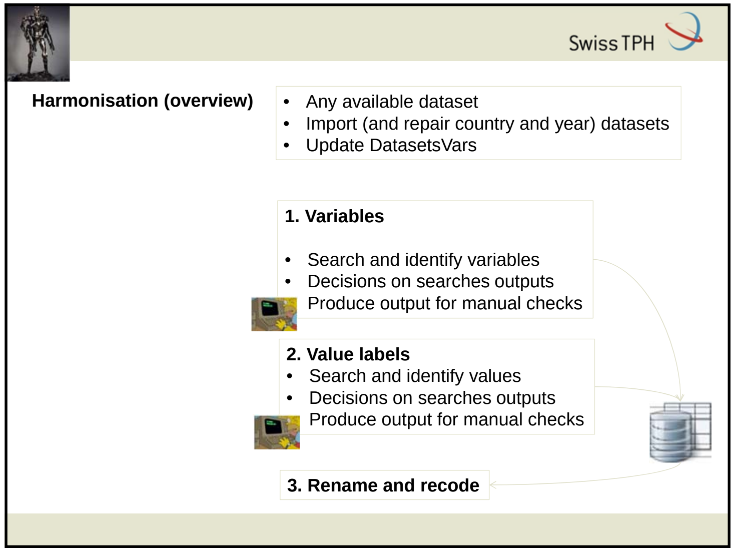
- Folder: code → Code C = 1_abc.do, 2_cde.do..., n_xyz.do

Do Code C once

- Folder: datasets → Dataset D = 1_abc.dta, 2_cde.dta..., n_xyz.dta

Do Code C with Dataset D

Final procedures
- Export Outputs / tables -> Outputs / txt (xls)
- Close logs
- ...



**Harmonisation (overview)**

- Any available dataset
- Import (and repair country and year) datasets
- Update DatasetsVars

**1. Variables**

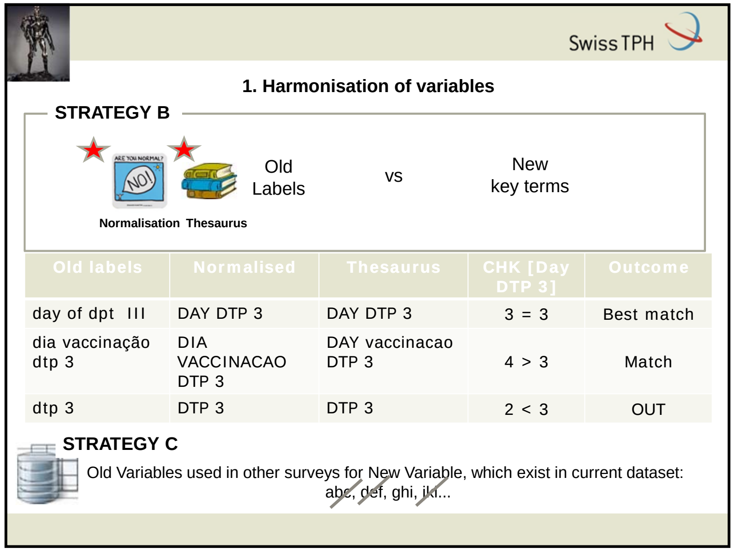
- Search and identify variables
- Decisions on searches outputs

Produce output for manual checks

**2. Value labels**
- Search and identify values
- Decisions on searches outputs

Produce output for manual checks

**3. Rename and recode**



**1. Harmonisation of variables**

**STRATEGY B**

ARE YOU NORMAL?
NO!

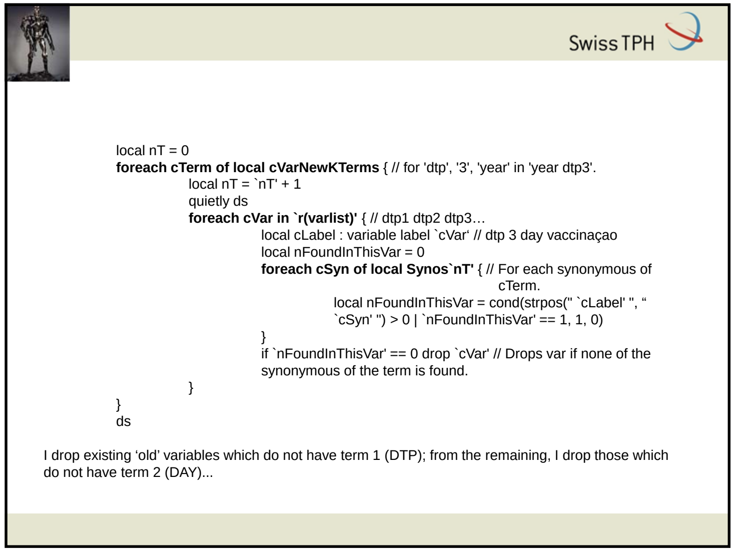
Old Labels vs New key terms

**Normalisation Thesaurus**

| Old labels | Normalised | Thesaurus | CHK [Day DTP 3] | Outcome |
|---|---|---|---|---|
| day of dpt III | DAY DTP 3 | DAY DTP 3 | 3 = 3 | Best match |
| dia vaccinação dtp 3 | DIA VACCINACAO DTP 3 | DAY vaccinacao DTP 3 | 4 > 3 | Match |
| dtp 3 | DTP 3 | DTP 3 | 2 < 3 | OUT |

**STRATEGY C**

Old Variables used in other surveys for New Variable, which exist in current dataset: ~~abc~~, ~~def~~, ghi, ~~ikl~~...



```
local nT = 0
foreach cTerm of local cVarNewKTerms { // for 'dtp', '3', 'year' in 'year dtp3'.
        local nT = `nT' + 1
        quietly ds
        foreach cVar in `r(varlist)' { // dtp1 dtp2 dtp3…
                local cLabel : variable label `cVar‘ // dtp 3 day vaccinaçao
                local nFoundInThisVar = 0
                foreach cSyn of local Synos`nT' { // For each synonymous of
                                                   cTerm.
                        local nFoundInThisVar = cond(strpos(" `cLabel' ", “
                        `cSyn' ") > 0 | `nFoundInThisVar' == 1, 1, 0)
                }
                if `nFoundInThisVar' == 0 drop `cVar' // Drops var if none of the
                synonymous of the term is found.
        }
}
ds
```

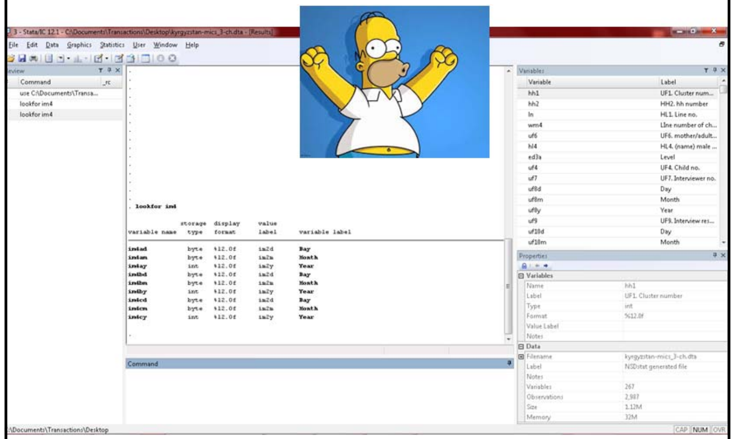
I drop existing ‘old’ variables which do not have term 1 (DTP); from the remaining, I drop those which do not have term 2 (DAY)...

| Search | Type | SData | SVarNew | SLabelNew | SKeyTerms | Clear | SVarOld | SLabelOld |
|---|---|---|---|---|---|---|---|---|
| B* | mics | afghanistan-mi | BCGbm | BCG month | bcg month | 1 | im3bm | month bcg immunization |
| B* | mics | centralafricanre | BCGby | BCG year | bcg year | 0 | im2y | annee vaccination bcg |
| B* | mics | cuba-mics_4-ch | BCGby | BCG year | bcg year | 0 | im3by | ano inmunizacion bcg al nacer |
| B* | dhs | am-dhs_61-ch | BCGby | BCG year | bcg year | 0 | h2y | bcg year |
| B- | dhs | gy-dhs_5i-ch | BCGby | BCG year | bcg year | 0 | h2y | bcg year combined vacc cards |
| B- | dhs | gy-dhs_5i-ch | BCGby | BCG year | bcg year | 0 | s2bcgy | bcg year health facility vacc card |
| B- | dhs | gy-dhs_5i-ch | BCGby | BCG year | bcg year | 0 | s1bcgy | bcg year home vacc card |
| B* | mics | afghanistan-mi | BCGby | BCG year | bcg year | 0 | im3by | year bcg immunization |
| C70 | mics | mozambique-m | BCGd | BCG day | bcg day | 1 | im2d | bcg |

NO DUPLICATES: N = 2,898

| Search | Type | SData | SVarNew | SLabelNew | SKeyTerms | Clear | SVarOld | SLabelOld | Case | Rationale |
|---|---|---|---|---|---|---|---|---|---|---|
| B- | mics | mozambique-mics_3-ch | BCG | BCG | bcg | 1 | im2d | bcg | A.1 | bcg(); im2d(bcg); im2m(bcg); im2y(bcg); incomplete label, Var name consistent with other surveys |
| B- | mics | mozambique-mics_3-ch | BCG | BCG | bcg | 1 | im2m | bcg | A.1 | bcg(); im2d(bcg); im2m(bcg); im2y(bcg); incomplete label, Var name consistent with other surveys |
| B- | mics | mozambique-mics_3-ch | BCG | BCG | bcg | 1 | im2y | bcg | A.1 | bcg(); im2d(bcg); im2m(bcg); im2y(bcg); incomplete label, Var name consistent with other surveys |

ALL RECORDS: N = 15,153



3 - Stata/IC 12.1 - C:\Documents\Transactions\Desktop\kyrgyzstan-mics_3-ch.dta - [Results]
File Edit Data Graphics Statistics User Window Help
Review
Command
_rc
Variables
Variable
Label
Properties
Command
CAP NUM OVR

Review:
- use C:\Documents\Transa...
- lookfor im4
- lookfor im4

```
. lookfor im4

                storage  display    value
variable name    type    format     label      variable label
-------------------------------------------------------------------
im4ad            byte    %12.0f     im2d       Day
im4am            byte    %12.0f     im2m       Month
im4ay            int     %12.0f     im2y       Year
im4bd            byte    %12.0f     im2d       Day
im4bm            byte    %12.0f     im2m       Month
im4by            int     %12.0f     im2y       Year
im4cd            byte    %12.0f     im2d       Day
im4cm            byte    %12.0f     im2m       Month
im4cy            int     %12.0f     im2y       Year

.
```

| Variable | Label |
|---|---|
| hh1 | UF1. Cluster num... |
| hh2 | HH2. hh number |
| ln | HL1. Line no. |
| wm4 | LIne number of ch... |
| uf6 | UF6. mother/adult... |
| hl4 | HL4. (name) male ... |
| ed3a | Level |
| uf4 | UF4. Child no. |
| uf7 | UF7. Interviewer no. |
| uf8d | Day |
| uf8m | Month |
| uf8y | Year |
| uf9 | UF9. Interview res... |
| uf10d | Day |
| uf10m | Month |

Properties:

| | |
|---|---|
| Variables | |
| Name | hh1 |
| Label | UF1. Cluster number |
| Type | int |
| Format | %12.0f |
| Value Label | |
| Notes | |
| Data | |
| Filename | kyrgyzstan-mics_3-ch.dta |
| Label | NSDstat generated file |
| Notes | |
| Variables | 267 |
| Observations | 2,987 |
| Size | 1.12M |
| Memory | 32M |

:\Documents\Transactions\Desktop

## 2. Harmonisation of values labels

Normalisation Thesaurus

0 = old value label for 0
1 = old value label for 1
...
N = old value label for N

vs

0 = abc
1 = def
...
N = xyz
-6 = no label
-7 = inconsistent
-8 = don't know
-9 = missing

| Old value labels | New value label | Outcome |
|---|---|---|
| 2 = history | 4 = recall | Match: 2 -> 4 |
| - | 1 = yes | No match; empty 1 = yes |
| 44 = in health centre | - | No match: manual review |

Swiss TPH

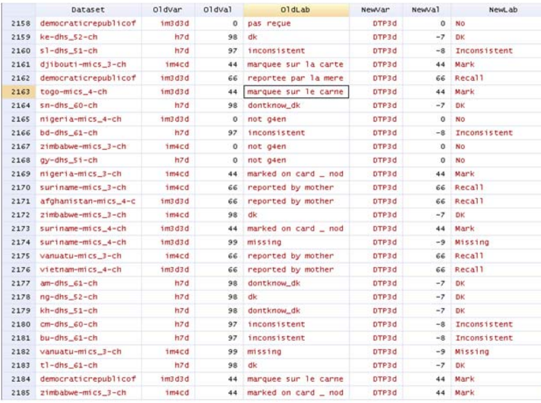
```
// MATCHING VALUE LABELS. For each Value label (old), check whether there is an equivalent in any of the Value label (new).
foreach cValLblOld_i of local lValLblOld { // Test each value label old... e.g. 'caretaker recall'
        // Each one of the Value label (new) to be tested against the old one above.
        foreach cValLblNew_i of local lValLblNew {
                if !missing(mValLblNew[rownumb(mValLblNew,"`cValLblNew_i'"),2]) continue // Has already been
                                                                                          found.
                local cValLblNew_i2 = subinstr("`r(xR)'", "_", " ", .)

                // E.g. 'mother' against 'caregiver', then 'recall'; and 'recall' against 'caregiver', then 'recall').
                fNormTxt "`cValLblNew_i'"

                local cValLblNew_i2 = subinstr("`r(xR)'", "_", " ", .)

                local nTermsFound = 0
                foreach cValLblNew_i_t of local cValLblNew_i2 { // All terms of value label new i have to be in an old
                                                                      one; e.g. 'mother'
                        do "`cDoSynonymous'" "`cValLblNew_i_t'"
                        local cValLblNew_i_ts = "`r(xR)'"
                        local cValLblOld_i2 = subinstr("`cValLblOld_i'", "_", " ", .)

                        local nIsTermFound = 0
                        foreach cValLblOld_i_t of local cValLblOld_i2 { // e.g. 'mother' 'recall'

                                if strpos(" `cValLblNew_i_ts' ", " `cValLblOld_i_t' ") > 0 {
                                        local nIsTermFound = `nIsTermFound' + 1
                                        continue, break
                                }
                        }
                        local nTermsFound = `nTermsFound' + `nIsTermFound'
                }
} // If this point is reached, there are value labels to handle (cValLbl is not missing)
```

Swiss TPH

| NewVal | NewLab | OldVal | OldLab | Dataset | OldVar | NewVar |
|---|---|---|---|---|---|---|
| 1 | Female | 2 | feminino | mozambique-mics_3-ch | hl4 | Sex |
| 1 | Female | 2 | female | afghanistan-mics_4-ch | hl4 | Sex |
| 1 | Female | 2 | femenino | cuba-mics_4-ch | hl4 | Sex |
| 1 | Female | 2 | feminin | centralafricanrepublic-mics_3-ch | hl4 | Sex |

NO DUPLICATES: N = 1,101

Swiss TPH

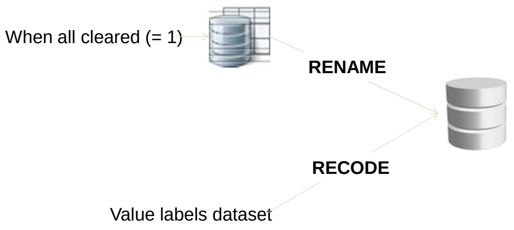


|  | Dataset | Oldvar | Oldval | OldLab | NewVar | NewVal | NewLab |
|---|---|---|---|---|---|---|---|
| 2158 | democraticrepublicof | im3d3d | 0 | pas reçue | DTP3d | 0 | No |
| 2159 | ke-dhs_52-ch | h7d | 98 | dk | DTP3d | -7 | DK |
| 2160 | sl-dhs_51-ch | h7d | 97 | inconsistent | DTP3d | -8 | Inconsistent |
| 2161 | djibouti-mics_3-ch | im4cd | 44 | marquee sur la carte | DTP3d | 44 | Mark |
| 2162 | democraticrepublicof | im3d3d | 66 | reportee par la mere | DTP3d | 66 | Recall |
| 2163 | togo-mics_4-ch | im3d3d | 44 | marquee sur le carne | DTP3d | 44 | Mark |
| 2164 | sn-dhs_60-ch | h7d | 98 | dontknow_dk | DTP3d | -7 | DK |
| 2165 | nigeria-mics_4-ch | im3d3d | 0 | not g4en | DTP3d | 0 | No |
| 2166 | bd-dhs_61-ch | h7d | 97 | inconsistent | DTP3d | -8 | Inconsistent |
| 2167 | zimbabwe-mics_3-ch | im4cd | 0 | not g4en | DTP3d | 0 | No |
| 2168 | gy-dhs_51-ch | h7d | 0 | not g4en | DTP3d | 0 | No |
| 2169 | nigeria-mics_3-ch | im4cd | 44 | marked on card _ nod | DTP3d | 44 | Mark |
| 2170 | suriname-mics_3-ch | im4cd | 66 | reported by mother | DTP3d | 66 | Recall |
| 2171 | afghanistan-mics_4-c | im3d3d | 66 | reported by mother | DTP3d | 66 | Recall |
| 2172 | zimbabwe-mics_3-ch | im4cd | 98 | dk | DTP3d | -7 | DK |
| 2173 | suriname-mics_4-ch | im3d3d | 44 | marked on card _ nod | DTP3d | 44 | Mark |
| 2174 | suriname-mics_4-ch | im3d3d | 99 | missing | DTP3d | -9 | Missing |
| 2175 | vanuatu-mics_3-ch | im4cd | 66 | reported by mother | DTP3d | 66 | Recall |
| 2176 | vietnam-mics_4-ch | im3d3d | 66 | reported by mother | DTP3d | 66 | Recall |
| 2177 | am-dhs_61-ch | h7d | 98 | dontknow_dk | DTP3d | -7 | DK |
| 2178 | ng-dhs_52-ch | h7d | 98 | dk | DTP3d | -7 | DK |
| 2179 | kh-dhs_51-ch | h7d | 98 | dontknow_dk | DTP3d | -7 | DK |
| 2180 | cm-dhs_60-ch | h7d | 97 | inconsistent | DTP3d | -8 | Inconsistent |
| 2181 | bu-dhs_61-ch | h7d | 97 | inconsistent | DTP3d | -8 | Inconsistent |
| 2182 | vanuatu-mics_3-ch | im4cd | 99 | missing | DTP3d | -9 | Missing |
| 2183 | tl-dhs_61-ch | h7d | 98 | dk | DTP3d | -7 | DK |
| 2184 | democraticrepublicof | im3d3d | 44 | marquee sur le carne | DTP3d | 44 | Mark |
| 2185 | zimbabwe-mics_3-ch | im4cd | 44 | marked on card _ nod | DTP3d | 44 | Mark |

ALL RECORDS: N = 7,891

Swiss TPH

**3. Rename and recode**

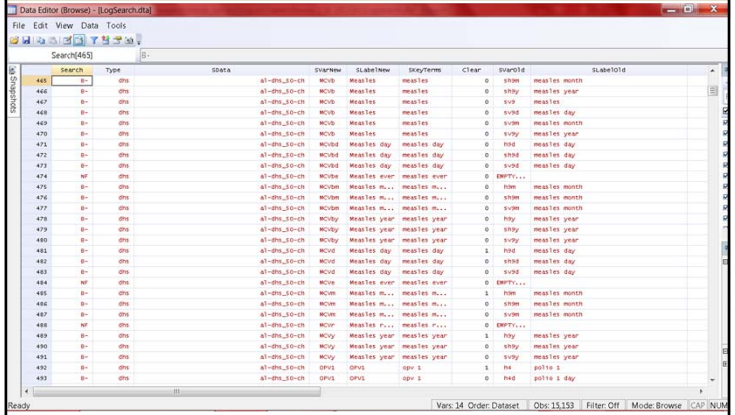


When all cleared (= 1)

**RENAME**

**RECODE**

Value labels dataset

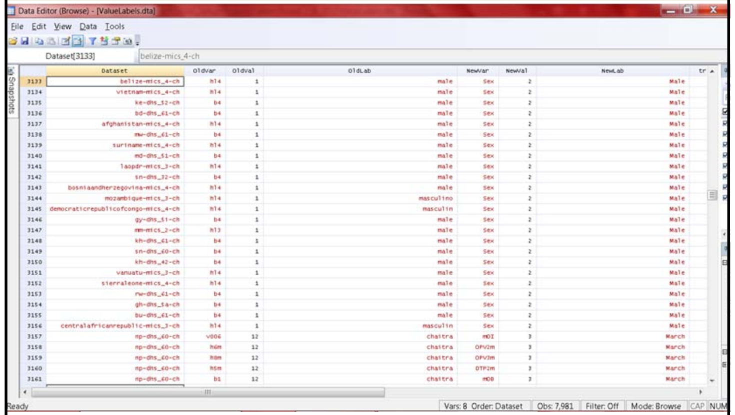


Data Editor (Browse) - [LogSearch.dta]

Search[465] B-

| | Search | Type | SData | SVarNew | SLabelNew | SKeyTerms | Clear | SVarOld | SLabelOld |
|---|---|---|---|---|---|---|---|---|---|
| 465 | B- | dhs | al-dhs_50-ch | MCVb | Measles | measles | 0 | sh9m | measles month |
| 466 | B- | dhs | al-dhs_50-ch | MCVb | Measles | measles | 0 | sh9y | measles year |
| 467 | B- | dhs | al-dhs_50-ch | MCVb | Measles | measles | 0 | sv9 | measles |
| 468 | B- | dhs | al-dhs_50-ch | MCVb | Measles | measles | 0 | sv9d | measles day |
| 469 | B- | dhs | al-dhs_50-ch | MCVb | Measles | measles | 0 | sv9m | measles month |
| 470 | B- | dhs | al-dhs_50-ch | MCVb | Measles | measles | 0 | sv9y | measles year |
| 471 | B- | dhs | al-dhs_50-ch | MCVbd | Measles day | measles day | 0 | h9d | measles day |
| 472 | B- | dhs | al-dhs_50-ch | MCVbd | Measles day | measles day | 0 | sh9d | measles day |
| 473 | B- | dhs | al-dhs_50-ch | MCVbd | Measles day | measles day | 0 | sv9d | measles day |
| 474 | NF | dhs | al-dhs_50-ch | MCVbe | Measles ever | measles ever | 0 | EMPTY... | |
| 475 | B- | dhs | al-dhs_50-ch | MCVbm | Measles m... | measles m... | 0 | h9m | measles month |
| 476 | B- | dhs | al-dhs_50-ch | MCVbm | Measles m... | measles m... | 0 | sh9m | measles month |
| 477 | B- | dhs | al-dhs_50-ch | MCVbm | Measles m... | measles m... | 0 | sv9m | measles month |
| 478 | B- | dhs | al-dhs_50-ch | MCVby | Measles year | measles year | 0 | h9y | measles year |
| 479 | B- | dhs | al-dhs_50-ch | MCVby | Measles year | measles year | 0 | sh9y | measles year |
| 480 | B- | dhs | al-dhs_50-ch | MCVby | Measles year | measles year | 0 | sv9y | measles year |
| 481 | B- | dhs | al-dhs_50-ch | MCVd | Measles day | measles day | 1 | h9d | measles day |
| 482 | B- | dhs | al-dhs_50-ch | MCVd | Measles day | measles day | 0 | sh9d | measles day |
| 483 | B- | dhs | al-dhs_50-ch | MCVd | Measles day | measles day | 0 | sv9d | measles day |
| 484 | NF | dhs | al-dhs_50-ch | MCVe | Measles ever | measles ever | 0 | EMPTY... | |
| 485 | B- | dhs | al-dhs_50-ch | MCVm | Measles m... | measles m... | 1 | h9m | measles month |
| 486 | B- | dhs | al-dhs_50-ch | MCVm | Measles m... | measles m... | 0 | sh9m | measles month |
| 487 | B- | dhs | al-dhs_50-ch | MCVm | Measles m... | measles m... | 0 | sv9m | measles month |
| 488 | NF | dhs | al-dhs_50-ch | MCVr | Measles r... | measles r... | 0 | EMPTY... | |
| 489 | B- | dhs | al-dhs_50-ch | MCVy | Measles year | measles year | 1 | h9y | measles year |
| 490 | B- | dhs | al-dhs_50-ch | MCVy | Measles year | measles year | 0 | sh9y | measles year |
| 491 | B- | dhs | al-dhs_50-ch | MCVy | Measles year | measles year | 0 | sv9y | measles year |
| 492 | B- | dhs | al-dhs_50-ch | OPV1 | OPV1 | opv 1 | 1 | h4 | polio 1 |
| 493 | B- | dhs | al-dhs_50-ch | OPV1 | OPV1 | opv 1 | 0 | h4d | polio 1 day |

Ready | Vars: 14 Order: Dataset | Obs: 15,153 | Filter: Off | Mode: Browse | CAP | NUM



Data Editor (Browse) - [ValueLabels.dta]

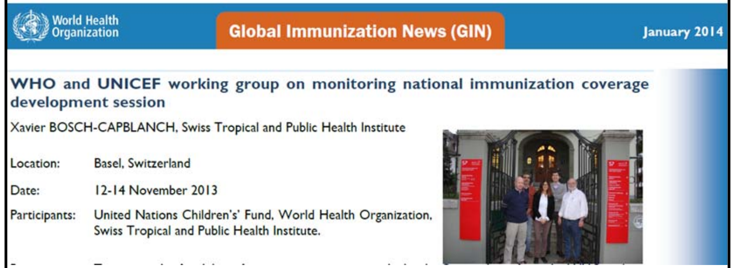
Dataset[3133] belize-mics_4-ch

| | Dataset | OldVar | OldVal | OldLab | NewVar | NewVal | NewLab | tr |
|---|---|---|---|---|---|---|---|---|
| 3133 | belize-mics_4-ch | hl4 | 1 | male | Sex | 2 | Male | |
| 3134 | vietnam-mics_4-ch | hl4 | 1 | male | Sex | 2 | Male | |
| 3135 | ke-dhs_52-ch | b4 | 1 | male | Sex | 2 | Male | |
| 3136 | bd-dhs_61-ch | b4 | 1 | male | Sex | 2 | Male | |
| 3137 | afghanistan-mics_4-ch | hl4 | 1 | male | Sex | 2 | Male | |
| 3138 | mw-dhs_61-ch | b4 | 1 | male | Sex | 2 | Male | |
| 3139 | suriname-mics_4-ch | hl4 | 1 | male | Sex | 2 | Male | |
| 3140 | md-dhs_51-ch | b4 | 1 | male | Sex | 2 | Male | |
| 3141 | laopdr-mics_3-ch | hl4 | 1 | male | Sex | 2 | Male | |
| 3142 | sn-dhs_32-ch | b4 | 1 | male | Sex | 2 | Male | |
| 3143 | bosniaandherzegovina-mics_4-ch | hl4 | 1 | male | Sex | 2 | Male | |
| 3144 | mozambique-mics_3-ch | hl4 | 1 | masculino | Sex | 2 | Male | |
| 3145 | democraticrepublicofcongo-mics_4-ch | hl4 | 1 | masculin | Sex | 2 | Male | |
| 3146 | gy-dhs_51-ch | b4 | 1 | male | Sex | 2 | Male | |
| 3147 | mm-mics_2-ch | hl3 | 1 | male | Sex | 2 | Male | |
| 3148 | kh-dhs_61-ch | b4 | 1 | male | Sex | 2 | Male | |
| 3149 | sn-dhs_60-ch | b4 | 1 | male | Sex | 2 | Male | |
| 3150 | kh-dhs_42-ch | b4 | 1 | male | Sex | 2 | Male | |
| 3151 | vanuatu-mics_3-ch | hl4 | 1 | male | Sex | 2 | Male | |
| 3152 | sierraleone-mics_4-ch | hl4 | 1 | male | Sex | 2 | Male | |
| 3153 | rw-dhs_61-ch | b4 | 1 | male | Sex | 2 | Male | |
| 3154 | gh-dhs_5a-ch | b4 | 1 | male | Sex | 2 | Male | |
| 3155 | bu-dhs_61-ch | b4 | 1 | male | Sex | 2 | Male | |
| 3156 | centralafricanrepublic-mics_3-ch | hl4 | 1 | masculin | Sex | 2 | Male | |
| 3157 | np-dhs_60-ch | v006 | 12 | chaitra | mDI | 3 | March | |
| 3158 | np-dhs_60-ch | h6m | 12 | chaitra | OPV2m | 3 | March | |
| 3159 | np-dhs_60-ch | h8m | 12 | chaitra | OPV3m | 3 | March | |
| 3160 | np-dhs_60-ch | h5m | 12 | chaitra | DTP2m | 3 | March | |
| 3161 | np-dhs_60-ch | b1 | 12 | chaitra | mDB | 3 | March | |

Ready | Vars: 8 Order: Dataset | Obs: 7,981 | Filter: Off | Mode: Browse | CAP | NUM

## WAY FORWARD

1. Database of surveys
2. Database of coverage from survey reports and web-based estimates
3. Harmonisation platform integrated into WUEIC engine
4. Use variables distribution
5. Availability to third parties / cross-platforms



World Health Organization

Global Immunization News (GIN)

January 2014

**WHO and UNICEF working group on monitoring national immunization coverage development session**

Xavier BOSCH-CAPBLANCH, Swiss Tropical and Public Health Institute

| | |
|---|---|
| Location: | Basel, Switzerland |
| Date: | 12-14 November 2013 |
| Participants: | United Nations Children's' Fund, World Health Organization, Swiss Tropical and Public Health Institute. |

**Thanks for your infinite patience!**