

Comparing health facility location data available for Saint Louis, Senegal

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This is a data-driven document [open-source code here](#)

Funded by COVIDaction Vaccine Data Co-Lab - [Healthsites.io](#) Emergency health data validation.

Initial comparison of data provided by COUS [Centre des Opérations d'Urgence Sanitaire](#) & DPRS [Direction de la Planification, de la Recherche et des Statistiques](#) for Saint Louis with OSM Senegal survey conducted in February 2022.

Summary The aim is to see if we can develop re-useable code to help with the process of improving health facility location data by comparing and combining data from different sources.

Prior to an in person workshop COUS and DPRS provided data.

COUS provided data for 9 facilities in Saint Louis in a table with **9 rows** and **130 columns** including coordinates and attributes such as the numbers of beds and staff.

DPRS provided the names of facilities and regions for Saint Louis in a file with **374 rows and 1 column**. Due to the format of the data, it is not straightforward automatically to compare these with the COUS data.

OSM Senegal surveyed facilities in person in Saint Louis, providing a file with **394 rows** and recording attribute data in **289 columns**.

source	num facilities	columns of info	coords?
1. COUS	9	130	coords
3. DPRS	<374	1	no
2. OSM-Senegal survey	394	289	coords

Agreement on a strict naming convention for facilities would make it much easier to compare and combine these data.

COUS data

COUS provided an Excel file with two sheets.

COUS Sheet2 for Saint Louis has nine facilities **9 rows** and **130 columns** including coordinates and attributes such as the numbers of beds and staff.

Names of facilities.

cous_names
EPS1 de Richard Toll
Centre de Sante de Dagana
Centre de Sante de Saint Louis
Centre de Sante Amadou Malick Gaye
Centre de Sante de Pete
Centre de santé de Richard Toll
HOPITAL REGIONAL DE SAINT LOUIS
CHR NDioum
Centre de santé de Ross Bethio

DPRS data

DPRS provided the names of facilities and regions for the whole country in a file with **374 rows and 1 column**.

Looking at the first 9 rows of the DPRS data.

dprs_names
[-] RM Saint-Louis
[-] Dagana
CS Dagana
DPC de Dagana
PM MAC Dagana
PS 4e Et 5e Secteur
[-] PS Bokhol
Case de Geum Yalla
PS Bouteyni

We can see that sometimes rows indicate regions, e.g. [-] **RM Saint-Louis** and [-] **Dagana**. Also sometimes a row with a [-] indicates a facility that has control over others e.g. [-] **PS Bokhol**. Seems that if a row has a [-] and does not have PS, CS or Case then it is a region instead of a facility - this could be extracted automatically.

We can compare the COUS & DPRS tables above to check whether the facility names in the COUS data appear exactly the same as in the DPRS data. We would need to be able to write code to find matching names to be able to write a reproducible pipeline for comparing data.

An initial search by eye shows the mismatches between naming in the two datasets. There is at least one facility in the COUS data that seems not present in the DPRS list (Centre de Sante Amadou Malick Gaye).

See section below for Comparison of facility naming between DPRS and the new OSM-Senegal survey.

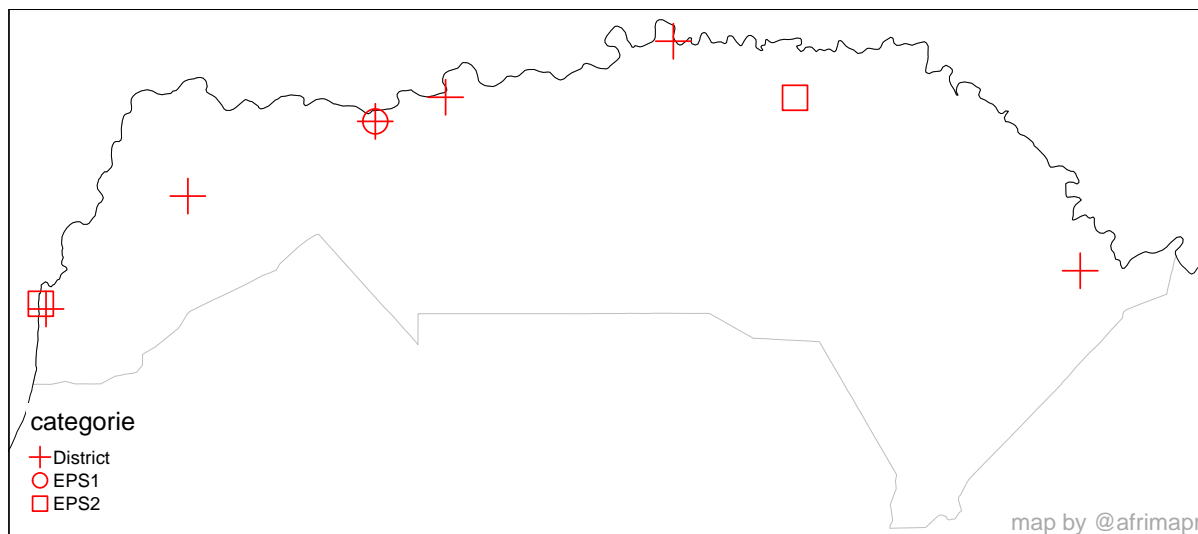
cous_names	dprs_names
EPS1 de Richard Toll	EPS 1 Richard Toll
Centre de Sante de Dagana	CS Dagana
Centre de Sante de Saint Louis	CS Saint - Louis
Centre de Sante Amadou Malick Gaye	?
Centre de Sante de Pete	[-] CS Pete
Centre de santé de Richard Toll	CS Richard Toll
HOPITAL REGIONAL DE SAINT LOUIS	EPS2 de Saint Louis
CHR NDioum	?Antenne de Ndioum

cous_names	dprs_names
Centre de santé de Ross Bethio	[-] CS Ross Bethio

Categories of COUS health facilities Saint Louis

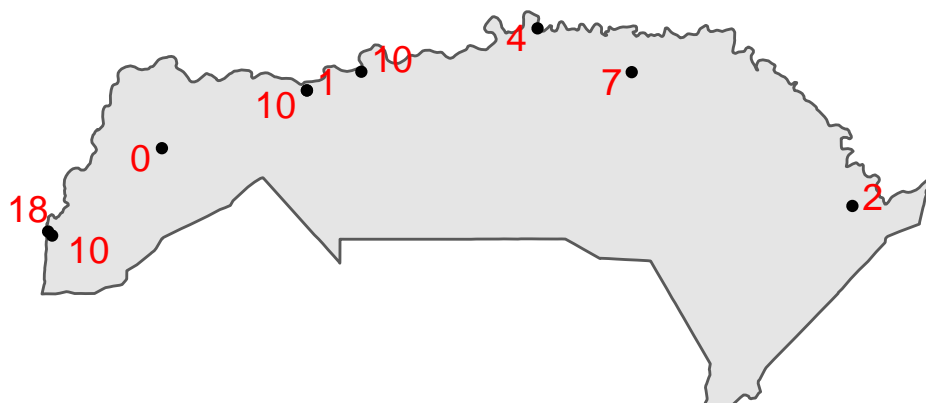
The coordinates provided in the COUS data allow these to be plotted on maps. (Note that one coordinate was missing a negative sign that incorrectly placed it in Chad, it was corrected for the maps here).

COUS health facilities Saint Louis 2022

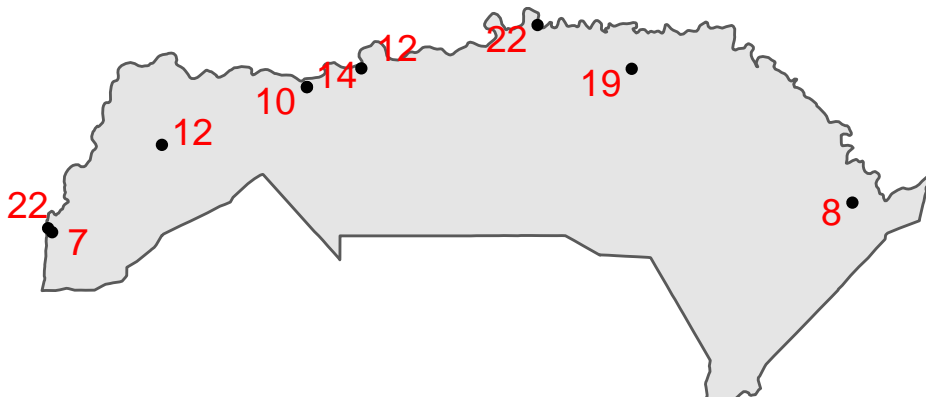


Numbers of beds (lits) in different wards from COUS data

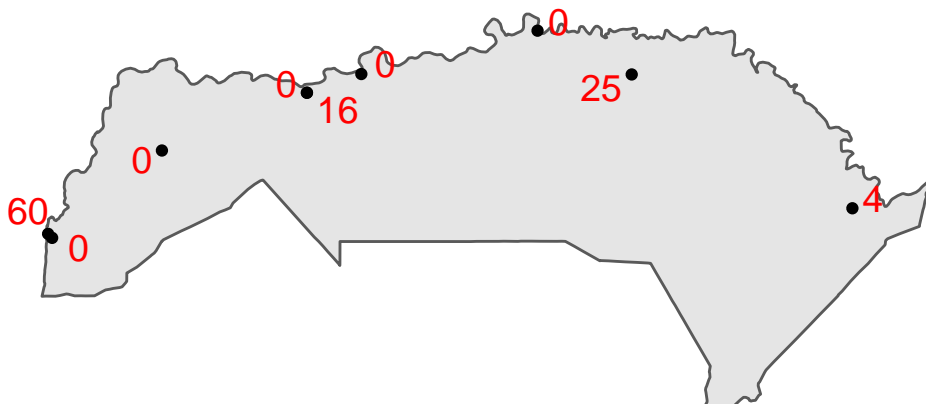
COUS lits_en_sau



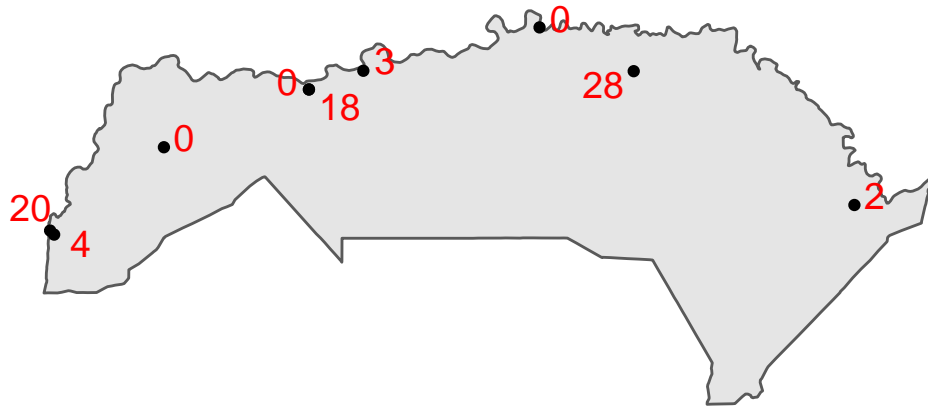
COUS lits_en_medecine



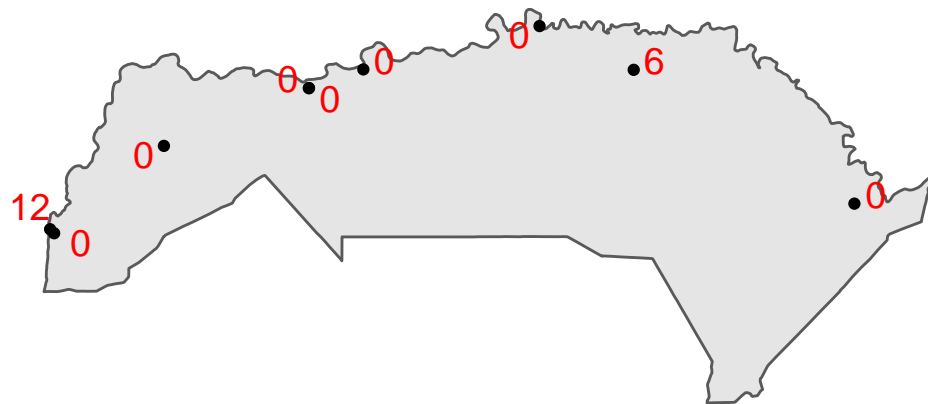
COUS lits_en_chirurgie



COUS lits_en_pediatrie



COUS lits_en_reanimation



OSM-Senegal survey

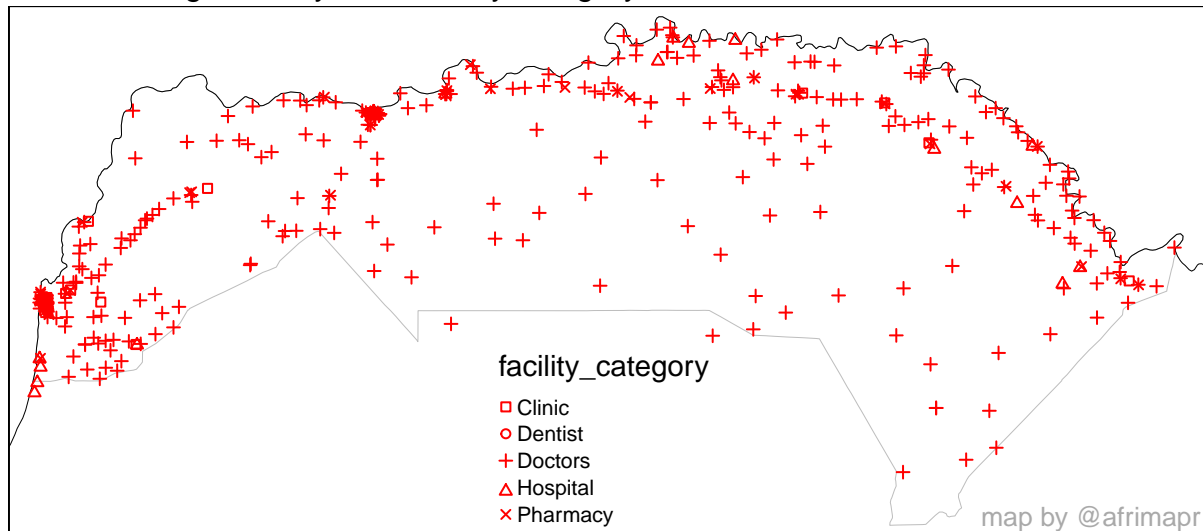
OSM-Senegal surveyed facilities in person in Saint Louis in February 2022, providing a file with 394 rows and recording attribute data in 289 columns. Here are some maps summarising the facilities surveyed.

Categories of facilities in OSM-Senegal survey

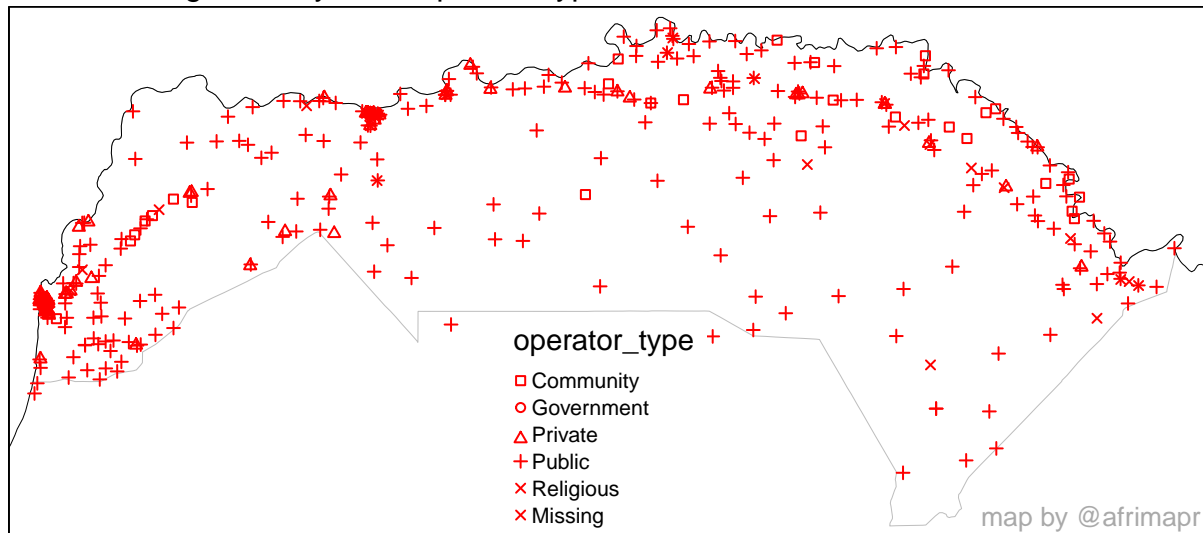
Senegal health facility levels are converted into OSM categories of Hospital, Clinic, Doctor as follows :

Senegal level	Senegal type	Senegal abbreviation	OSM category
1	Hopital	HP	Hospital
1	Etablissement public de Santé 1 (départementale)	EPS 1	Hospital
1	Etablissement public de Santé 2 (régionale)	EPS 2	Hospital
1	Etablissement public de Santé 3 (nationale)	EPS 3	Hospital
2	Centre de Santé	CS	Clinic
2	District de Sanitaire	DS	Clinic
3	Poste de Santé	PS	Doctors
3	Case de Santé	Case de	Doctors

OSM–Senegal survey 2022 facility category

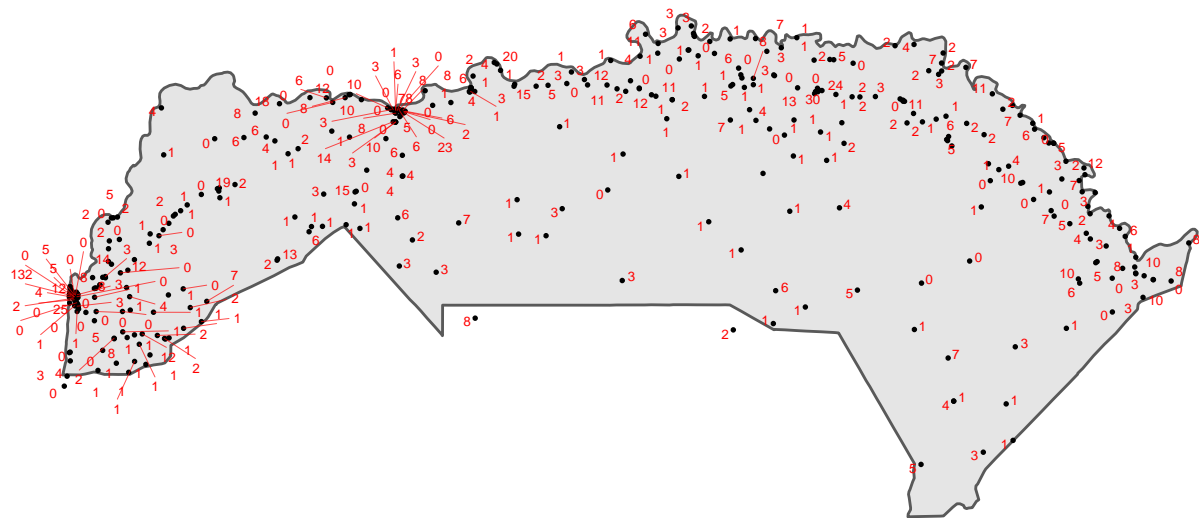


OSM–Senegal survey 2022 operator type

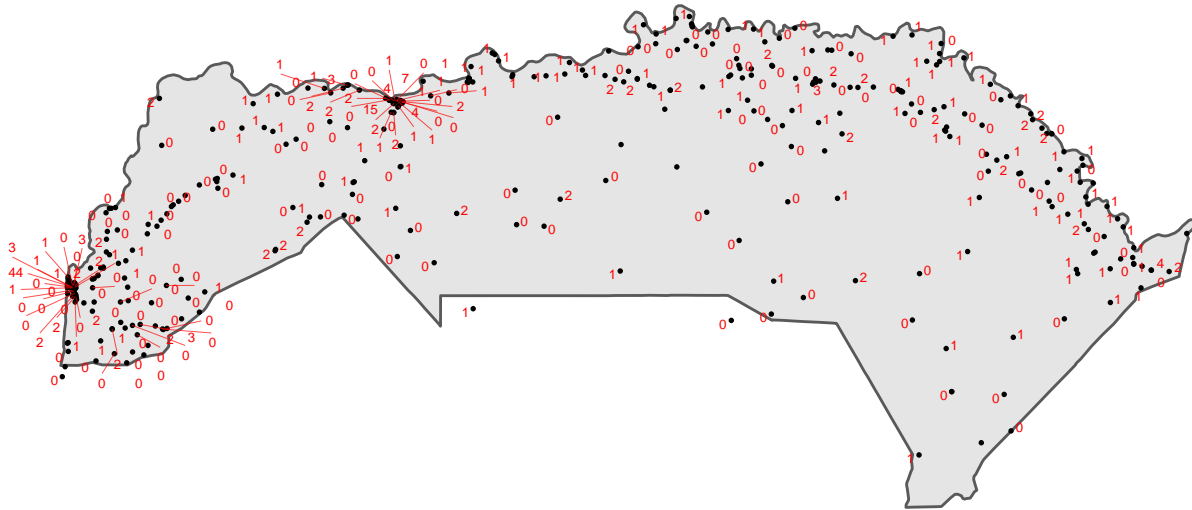


Numbers of beds, doctors and nurses from OSM-Senegal survey

OSM number_of_beds



OSM number_of_nurses



Using the new OSM-survey data to inform a specific user story

User story: As a Pregnant women I want to know the availability of a specialist in the event of a complication so that I can plan for my pregnancy.

To identify such specialist facilities we can start to build a data query like this.

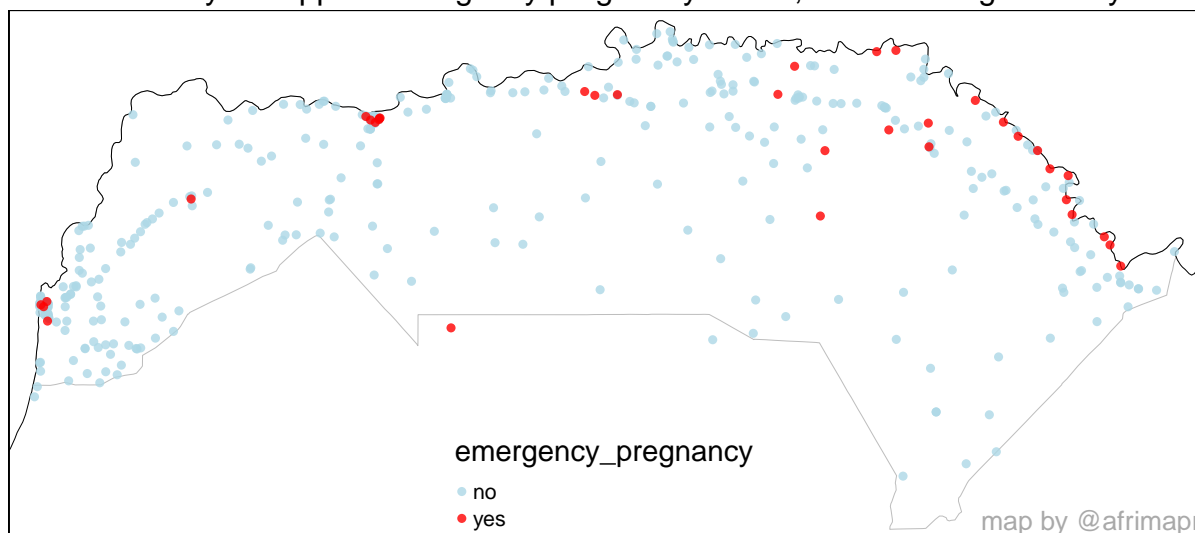
```
amenity = clinic or doctors or hospital
or
healthcare = doctor or hospital or clinic
and
beds >= 1
emergency = yes
contact:phone = phone number
```

With the collected survey data we can express this as :

```
facility_category = Clinic or Doctors or Hospital
operational_status = operational
emergency_services = Yes
number_of_beds > 0
phone_number = present
```

Facility.likely.to.support.emergency.pregnancy	Freq
no	359
yes	35

Facilities likely to support emergency pregnancy needs, OSM–Senegal survey 2022



name_of_facility	city	operator	beds	doctors	nurses
Case de santé de Abdallah	Abdallah/Pété	Community	3	0	1
Cabinet de santé Seydina Mouhamed (PSL) de la Vallée du Fleuve	Aéré Lao/Pété	Private	5	0	1
Case de santé Aéré poste	Aéré poste/ bodé	Public	1	NA	1
Posté de santé Alwar	Alwar / ndioum	Public	2	NA	1
Case de santé Athie baly	Athie baly/Dodel	Public	4	NA	1
Poste de santé de Borobé	Barobé/Pété	Public	4	0	1
Poste de santé de Bouteyni	Bouteyni	Public	8	0	1
Posté de santé Cas Cas	Cas cas/ pété	Public	5	NA	2
Case de santé cogga diéry	Cogga diéry/ bodélawo	Public	2	NA	1
Poste de santé de Dara Halaybe	Dara Halaybe/podor	Public	4	0	1
Poste de santé Diagnoum	Diagnoum/Podor	Public	11	NA	2
Poste de santé Dioudé diabé	Dioudé diabé / pété	Public	12	NA	1
Poste de santé de Dounguel	Dounguel/pété	Public	3	NA	1
Poste de santé de Gamadji Saré	Gamadji Saré/Podor	Public	13	0	1
Posté de santé de Pathé galo	Pathé galo/ podor	Public	2	NA	1
Poste de santé Gallo Malick	Richard Toll	Public	6	0	2
Poste de santé Thiabax	Richard Toll	Public	5	NA	1
Poste de santé taouey	Richard Toll	Public	8	NA	2
Service médical CSS Richard Toll	Richard Toll	Private	3	5	15
Cabinet médical Thierno souleymani Baal	Richard Toll	Private	2	1	0
Centre de santé de Ross béthio	Ross béthio	Public	19	1	0

name_of_facility	city	operator	beds	doctors	nurses
Centre de Santé Richard Toll	Saint louis	Public	23	10	4
Clinique El hadji Adama Wade	Saint Louis	Private	8	4	3
Hôpital régional de Saint-Louis	Saint Louis	Public	132	108	44
Ministère de la santé	Saint Louis	Public	1	NA	1
Suma urgences	Saint Louis	Private	4	1	1
Poste de santé de Saldé	Saldé/Pété	Public	6	0	1
Case de santé sambawté	Sambawté/ pété	Public	10	NA	1
Poste de santé de Siwré	Siwré/Pété	Public	7	0	1
Case de santé de tchila	Tchila/pété	Public	6	NA	2
Poste de santé de Thiangaye	Thiangaye/Podor	Public	12	0	1
Posté de santé de Thioubolel	Thioubolel/ pété	Public	7	NA	1
Posté de santé de Walaldé	Walaldé/ pété	Public	11	NA	1
Centre de santé Thielé Boubacar	NA	Public	12	1	1
Case Mboubi NDIyam	NA	Public	2	NA	2

Comparison of facility naming between DPRS and the new OSM-Senegal survey

Can we automatically match facility names in the OSM-Senegal survey data with their equivalent names used by DPRS ?

In short, not with the raw data. Trying to match the exact names results in zero matches between DPRS & OSM. This can be addressed.

The DPRS data mostly uses abbreviations for facility categories.

Senegal level	OSM naming	DPRS abbreviation
1	Hopital	HP
1	Établissement public de santé	EPS
2	Centre de Santé	CS
2	District de Sanitaire	DS
3	Poste de Santé	PS
3	Case de Santé	Case de

Other DPRS abbreviations DPC (3), PM (9 of them).

There are also differences in upper/lower case, accents, use of ‘de’ & spaces.

We can try the following to match the names

1. expanding the abbreviations from DPRS
2. remove accents
3. convert to lower case
4. ensure just single spaces
5. remove ‘de’
6. remove ‘[-]’ which indicates hierarchy in DPRS

We can apply these approaches to both datasets, then we get simplified names. **137** of these simplified names from the OSM-survey data match with the DPRS list. Here are the first few as an example.

x
case sante grand mpal
case sante mbaye mbaye sarr
case sante khelcom diop
case sante merina sall
case sante ndialakhar peulh
case sante mbathiass
case sante semel
case sante touba guene
case sante gantour

This leaves **301** facilities in the OSM survey data that do not match names in the DPRS data. This can be because :

1. facility is not present in DPRS (note the survey included 61 pharmacies and 2 dentists not present in DPRS)
2. the simplified name still differs from how the same facility is named within the OSM data.

Removing pharmacies & dentists leaves **238** un-matched names shown in the table below.

Var1	Freq
Clinic	14
Dentist	2
Doctors	206
Hospital	18
Pharmacy	61

unmatched_osm_names	x2	x3
case sante chifatoul askham	service medical css richard	case sante gawdi goti
boubacar medina baye	toll	
case sante teud biti ndogal	plateau medical seydina alioune	poste sante bo lao
centre sante mpal	cabinet medical le walo	case sante doubangue
case sante takh mbeut	cabinet medical thierno souleymani baal	case sante doumga
case sante maka toube	cabinet paramedical sokhna mame diarra bousso	poste sante madina diathmbe
poste sante rao la maternite	poste sante rosso 1	poste diongui
case sante pelour	poste sante rosso 2	centre sante pete
case sante ngui nguelakh	service medical ipres	cabinet sante seydina mouhamed (psl) la vallee du fleuve
poste sante gandon	poste sante ndiatene	poste sante aere lao
poste sante fass ngom	poste sante ronkh	poste sante merry
case sante tall bakhle	poste sante kassak sud	boubba geriatrie ndioum
case sante ndakhare	poste sante kassak nord	case sante kadione 2
clinique le sine	case sante ndiak fall	poste sante belel kele
case sante bidiam	poste sante diawar	case sante thiakli
case sante ndioubé nane	case sante diadiam	case boki ndoulo
case sante gonio	infirmierie casl	case sante kodielel
case sante ndiebene toube	case sante nadiel	wendou diani

unmatched_osm_names	x2	x3
poste sante rao	case sante guiladou	poste sante base
case sante ndiakhip	poste sante guidakhar	case sante seno bowol
poste sante mbarigo	poste sante mbilor	case sante mawdou thiaski
poste sante__ pmi ngaye	poste sante deggu-niaye	case sante banteu croisement
case sante lampsar	case sante gneling mbao	ministere la sante
case sante ndiougou	infirmierie mac	centre sante saint_louis
case sante	poste sante secteurs lv-v	suma urgences
centre sante ross bethio	case sante darou salam	pharmacie mame yacine bop
poste sante	dispensaire mission	case sante ngouy
	catholique dagana	
	cabinet ntaire	poste sante yare lao
centre medico-social la croix rouge		
clinique medicale la corniche	poste sante santhiaba	case maham
clinique el hadji adama wa	poste sante gae	case sante safalbe
poste sante pmi sor	poste sante bokhol	poste sante guay kadar
poste sante tassinere	poste sante tatqui	poste sante yawal irlabe
poste sante diama	case sante bakaho	poste sante bokke dialoube
infirmierie cadre omvs	ndia	poste sante karawendou
case sante	poste sante diagnoum	case sante yawal
case sante taba hametou	case sante darou salam	poste sante poute
case sante mboumbene	centre sante thiele boubacar	case sante thiane thille
infirmierie scl	poste sante diamath	case sante guirwass
case sante djiouthi	poste sante thiangaye	poste sante
etablissement public sante richard toll	clinique ntaire macha allah	case sante sambawte
case sante saneinte		
infirmierie gds	poste sante sandjiry	poste sante thioubolel
	centre sante amadou malick guaye	case sante bito
case sante miguene boye	case sante sal fanaye	poste sante diou diabe
case sante ndiol	case sante	poste sante cas cas
poste sante savoigne	case belal bocar	case sante tchila
case ndiougou mberesse	poste sante et maternite ndiayene pendao	case se sante sare souki
case sante ndiagabal	croix rouge thiawle	poste sante walal
poste sante niassene	croix rouge woure dieri	poste sante sal
case sante leybar boye	infirmierie camp militaire	poste sante borobe
poste sante ndombo	case korkadie	case sante souraye
poste sante thiago	poste sante mboyo	case sante fon ali
case sante temey lewa	case sante	centre sante cas-cas
poste sante mbane	poste sante diatar	poste sante siwre
case sante ndiokhor ile	case sante fo ass	case sante thyli
infirmierie d'entreprise s	poste sante doue	poste sante mbolo birane
poste sante gnith	poste sante niandane	poste sante galoya
infirmierie d'entreprise west africa farms	case sante ouro madiw	thilambol
poste sante yam		
case sante ndilim	poste sante diambo	poste sante thioulouki
	case sante feu moustapha ba mbanetou	poste sante boguel bely edy
	poste sante	
pharmacie alsayegh		poste sante sinthiou amadou mayram
		poste sante gue chantier
centre medical garnison nord	poste sante alwar	case sante nghaole
poste sante goxu mbaaj	poste sante pathe galo	

unmatched_osm_names	x2	x3
poste sante ndar toute	arifounda	poste sante loumboudou doue
poste sante hydrobase	case sante ndormboss	case sante wouro kelle
maternite poste sante guet ndar	poste sante sinthiou dang	poste sante niassante
poste sante bango	poste sante demette	case belelel agabe
direction la la mecine du travail	poste sante gamadji sare	case sante athie baly
laress	poste sante ndioum	case sante cogga diery
cm crous	poste sante namarel	case sante waw waw
cerpad	case sante wourou maham	case sante ouro maley
poste sante ngallele	case mboubi ndiyam	case sante diayinga
centre sanitaire secondaire richard toll	poste sante taredji	case sante thiaborle
poste sante el hadji malick sy	hiwirgo	case sante toufn gan
poste sante richard toll escale croix rouge	poste sante ndombo- alarba	poste sante boke mbaybe
poste sante ndiaw ndiangué	ipress podor	case sante thioka
poste sante thiabax	case sante aba	case sante dogui domby
etablissement public sante richard toll	hopital regional saint-louis	case sante aram sarre
infirmierie seneindia	maison d'arret et correction	case sante olol diaobe
case sante belinamary	poste sante toul galle	case sante dounguel da
case sante sante lamo	clinique dr sall	NA
poste sante diagle	poste sante dol	NA