Madrid_Pain_Graphs

August 24, 2020

1 Informes de la comunidad de Madrid

Actualizado diariamente, este documento se visualiza mejor aquí.

Datos de la situación de la infección por coronavirus en la Comunidad de Madrid.

Nos descargamos los datos, agrupamos, y calculamos :

- Gráfico de seguimiento.
- Muertes medias diarias, últimos 7 días.
- Muertes medias diarias desde que la comunidad de Madrid publica datos.

[1]:
```
# Miramos si hay nuevos datos a descargar.

!# cd ../data/; FILELIST=" 200509 200508 200507 200506 200505 200504 200503␣
↪200502 200501 200430 200429 200428 200427 200426 200425 200424 200423 200422␣
↪200510 200511 200512 200513 200514 200515 200516 200517 200518 200519 200520␣
↪200521 200522 200523 200524 200525 200526 200527 200528 200529 200530 200609␣
↪200608 200607 200606 200605 200604 200603 200602 200601 200610 200611 200612␣
↪200613 200614 200615 200616 200617 200618 200619 200620 200621 200622 200623␣
↪200624 200625 200626 200627 200628 200629 200630 " ; for fecha in `echo␣
↪$FILELIST`  ; do  FILE=${fecha}_cam_covid19.pdf ;  [ ! -f ../data/${FILE} ]␣
↪&& echo $FILE::::: && wget https://www.comunidad.madrid/sites/default/
↪files/doc/sanidad/$FILE 1>/dev/null  2>/dev/null && ls -altr $FILE ; done

# Miramos solo hoy y los ultimos diez dias
! cd ../data/; FILELIST=`seq -w 0 10 | while read i ; do date +%y%m%d -d "$i␣
↪day ago" ; done` ; for fecha in `echo $FILELIST`  ; do ␣
↪FILE=${fecha}_cam_covid19.pdf ;  [ ! -f ../data/${FILE} ] && echo $FILE:::::␣
↪   && wget https://www.comunidad.madrid/sites/default/files/doc/sanidad/
↪$FILE 1>/dev/null  2>/dev/null && ls -altr $FILE ; done
! cd ../data/; FILELIST=`seq -w 0 10 | while read i ; do date +%y%m%d -d "$i␣
↪day ago" ; done` ; for fecha in `echo $FILELIST`  ; do ␣
↪FILE=${fecha}cam_covid19.pdf ;  [ ! -f ../data/${FILE} ] && echo $FILE::::: ␣
↪  && wget https://www.comunidad.madrid/sites/default/files/doc/sanidad/$FILE␣
↪1>/dev/null  2>/dev/null && ls -altr $FILE ; done
```

```
! cd ../data/; FILELIST=`seq -w 0 10 | while read i ; do date +%Y%m%d -d "$i␣
↪day ago" ; done` ; for fecha in `echo $FILELIST`  ; do ␣
↪FILE=${fecha}_cam_covid19.pdf ;  [ ! -f ../data/${FILE} ] && echo $FILE:::::␣
↪   && wget https://www.comunidad.madrid/sites/default/files/doc/sanidad/
↪$FILE 1>/dev/null  2>/dev/null && ls -altr $FILE ; done
```

```
200824_cam_covid19.pdf:::::
-rw-r--r-- 1 root root 1003553 ago 24 16:46 200824_cam_covid19.pdf
200823_cam_covid19.pdf:::::
200822_cam_covid19.pdf:::::
200816_cam_covid19.pdf:::::
200815_cam_covid19.pdf:::::
200814_cam_covid19.pdf:::::
200824cam_covid19.pdf:::::
200823cam_covid19.pdf:::::
200822cam_covid19.pdf:::::
200821cam_covid19.pdf:::::
200820cam_covid19.pdf:::::
200819cam_covid19.pdf:::::
200818cam_covid19.pdf:::::
200817cam_covid19.pdf:::::
200816cam_covid19.pdf:::::
200815cam_covid19.pdf:::::
200814cam_covid19.pdf:::::
20200824_cam_covid19.pdf:::::
20200823_cam_covid19.pdf:::::
20200822_cam_covid19.pdf:::::
20200821_cam_covid19.pdf:::::
20200820_cam_covid19.pdf:::::
20200819_cam_covid19.pdf:::::
20200818_cam_covid19.pdf:::::
20200817_cam_covid19.pdf:::::
20200816_cam_covid19.pdf:::::
20200815_cam_covid19.pdf:::::
```

[2]:
```
from tabula import read_pdf
from IPython.display import display, HTML
import os
import pandas as pd
import glob
import re
from tqdm.notebook import tqdm
import warnings
import os.path

warnings.filterwarnings('ignore')
```

```
os.environ["JAVA_HOME"] = "/usr/lib/jvm/java-1.8.0-openjdk-1.8.0.141-1.b16.
 ↪el7_3.x86_64/jre"

# Auxiliary functions
from datetime import datetime, date, time, timedelta

""" Rellenar dias vacios con interpolacion"""
def interpolate_dataframe(df,freq):
    if freq == 'H':
        rng = pd.date_range(df.index.min(), df.index.max() + pd.Timedelta(23,␣
 ↪'H'), freq='H')
    elif freq == 'D' :
        rng = pd.date_range(
                        datetime.strptime(str(df.index.min())[:10]+' 00:00:00',␣
 ↪"%Y-%m-%d %H:%M:%S") ,
                        datetime.strptime(str(df.index.max())[:10]+' 00:00:00',␣
 ↪"%Y-%m-%d %H:%M:%S"),
                        freq='D')
        df.index = pd.to_datetime(df.index)
    df2 = df.reindex(rng)
    df = df2
    for column in df.columns :
        s = pd.Series(df[column])
        s.interpolate(method="quadratic", inplace =True)
        df[column] = pd.DataFrame([s]).T
    return df

def get_daily_date_new_format(fecha):

    file_path = '../data/'+fecha+'_cam_covid19.pdf'
    if not os.path.isfile(file_path):
        file_path = '../data/'+fecha+'cam_covid19.pdf'
    #print("Analizando:" + file_path)
    df_pdf =  read_pdf(file_path,area=(000, 600, 400, 800) , pages='1')

    #print("1 get_daily_date_new_format")

    df = df_pdf[0]
    df = df['Unnamed: 0'].astype(str).str.replace(r".", '').replace("(", ' ')
    df = df.T
    df.columns = df.iloc[0]
    df = df.iloc[1:]

    #print("2 get_daily_date_new_format")

    df = pd.DataFrame(data=df)
```

```
    df

    dict = {}
    dict['HOSPITALES'] = df[df['Unnamed: 0'].str.contains('Hospitales')].
↪iloc[0]['Unnamed: 0'].split(' ')[0]
    dict['DOMICILIOS'] = df[df['Unnamed: 0'].str.contains('Domicilios')].
↪iloc[0]['Unnamed: 0'].split(' ')[0]
    dict['CENTROS SOCIOSANITARIOS'] = df[df['Unnamed: 0'].str.
↪contains('Centros')].iloc[0]['Unnamed: 0'].split(' ')[0]
    dict['OTROS LUGARES'] = df[df['Unnamed: 0'].str.contains('otros')].
↪iloc[0]['Unnamed: 0'].split(' ')[0]
    #print("3 get_daily_date_new_format")

    cadena_a_parsear = df[df['Unnamed: 0'].str.contains('otal')].
↪iloc[0]['Unnamed: 0']

    dict['FALLECIDOS TOTALES'] = re.search(r'(\d+)', cadena_a_parsear)[0]

    #print("4 get_daily_date_new_format")

    df = pd.DataFrame.from_dict(dict, orient='index').T
    #print("4.5 get_daily_date_new_format")

    try:
        df['Fecha'] =  pd.to_datetime(fecha, format='%y%m%d')
    except :
        df['Fecha'] =  pd.to_datetime(fecha, format='%Y%m%d')

    #print("5 get_daily_date_new_format")

    df.set_index('Fecha', inplace=True, drop=True)
    return df


def get_daily_data(fecha):
    #print(f"""get_daily_data: {fecha}""")
    #print(f"""../data/{fecha}_cam_covid19.pdf""")

    if fecha > '200512' :
        return get_daily_date_new_format(fecha)

    col2str = {'dtype': str}
    kwargs = {'output_format': 'dataframe',
              'pandas_options': col2str,
              'stream': True}
```

```
    df_pdf =  read_pdf('../data/'+fecha+'_cam_covid19.
↪pdf',pages='1',multiple_tables = True,**kwargs)


    df = df_pdf[0]

    df = df[df['Unnamed: 0'].notna()]
    df = df[(df['Unnamed: 0']=='HOSPITALES') | (df['Unnamed: 0'] ==␣
↪'DOMICILIOS') | (df['Unnamed: 0'] == 'CENTROS SOCIOSANITARIOS') |␣
↪(df['Unnamed: 0'] == 'OTROS LUGARES') | (df['Unnamed: 0'] == 'FALLECIDOS␣
↪TOTALES')]
    df = df[['Unnamed: 0','Unnamed: 2']]
    df['Unnamed: 2'] = df['Unnamed: 2'].astype(str).str.replace(r".", '')
    df = df.T
    df.columns = df.iloc[0]
    df = df.iloc[1:]

    df['Fecha'] =  pd.to_datetime(fecha, format='%y%m%d')
    df = df.rename_axis(None)

    df.set_index('Fecha', inplace=True, drop=True)
    df.index
    df.dropna()
    #df = df.T
    return df

def get_all_data( ):
    #BLACKLIST = ["200429","200422"]
    #BLACKLIST = ["200514",]
    BLACKLIST = []
    df = pd.DataFrame()
    list_df = []

    pdf_list= sorted(glob.glob('../data/*_covid19.pdf'),
                     key=os.path.getmtime,
                     reverse=True )


    for pdf_file in tqdm(pdf_list,
                         desc="Procesando pdfs diarios"):
        # extract fecha from username , eg : ../data/2200422_cam_covid19.pdf
        fecha = pdf_file.split('/')[2].split('_')[0].replace('cam_','').
↪replace('_cam_','').replace('cam','')
        if fecha not in BLACKLIST:
            #print("processing", fecha)
            df = get_daily_data(fecha)
        list_df.append(df)
```

```
    df = pd.concat(list_df)
    df = df.astype(int)
    df = df.drop_duplicates()

    df = df.sort_values(by=['Fecha'], ascending=True)
    ###jaime
    #df = interpolate_dataframe(df,'D')
    #df.index.name = 'Fecha'

    df['HOSPITALES hoy'] = df['HOSPITALES'] - df['HOSPITALES'].shift(1)
    df['CENTROS SOCIOSANITARIOS hoy'] = df['CENTROS SOCIOSANITARIOS'] -␣
↪df['CENTROS SOCIOSANITARIOS'].shift(1)
    df['FALLECIDOS TOTALES hoy'] = df['FALLECIDOS TOTALES'] - df['FALLECIDOS␣
↪TOTALES'].shift(1)

    df = df.sort_values(by=['Fecha'], ascending=False)

    return df

total =  get_all_data()
total.to_csv('/root/kaggle/covid19-madrid/madrid_results.csv')
```

```
HBox(children=(FloatProgress(value=0.0, description='Procesando pdfs diarios', max=109.0, style
```

```
Got stderr: ago 24, 2020 5:07:49 PM
org.apache.pdfbox.pdmodel.font.PDCIDFontType2 <init>
INFORMACIÓN: OpenType Layout tables used in font CIDFont+F1 are not implemented
in PDFBox and will be ignored
ago 24, 2020 5:07:49 PM org.apache.pdfbox.pdmodel.font.PDCIDFontType2 <init>
INFORMACIÓN: OpenType Layout tables used in font CIDFont+F2 are not implemented
in PDFBox and will be ignored
ago 24, 2020 5:07:49 PM org.apache.pdfbox.pdmodel.font.PDCIDFontType2 <init>
INFORMACIÓN: OpenType Layout tables used in font CIDFont+F3 are not implemented
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INFORMACIÓN: OpenType Layout tables used in font CIDFont+F1 are not implemented
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ago 24, 2020 5:07:50 PM org.apache.pdfbox.pdmodel.font.PDCIDFontType2 <init>
INFORMACIÓN: OpenType Layout tables used in font CIDFont+F2 are not implemented
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ago 24, 2020 5:07:50 PM org.apache.pdfbox.pdmodel.font.PDCIDFontType2 <init>
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ago 24, 2020 5:07:50 PM org.apache.pdfbox.pdmodel.font.PDCIDFontType2 <init>
INFORMACIÓN: OpenType Layout tables used in font CIDFont+F1 are not implemented
in PDFBox and will be ignored
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```
ago 24, 2020 5:07:50 PM org.apache.pdfbox.pdmodel.font.PDCIDFontType2 <init>
INFORMACIÓN: OpenType Layout tables used in font CIDFont+F2 are not implemented
in PDFBox and will be ignored
ago 24, 2020 5:07:50 PM org.apache.pdfbox.pdmodel.font.PDCIDFontType2 <init>
INFORMACIÓN: OpenType Layout tables used in font CIDFont+F3 are not implemented
in PDFBox and will be ignored
```

[3]:
```
interpolate_dataframe(total,'D')
```

[3]:

Unnamed: 0	HOSPITALES	DOMICILIOS	CENTROS SOCIOSANITARIOS	OTROS LUGARES	\
2020-04-22	7144.000000	761.000000	3932.000000	15.0	
2020-04-23	7271.000000	769.000000	3996.000000	20.0	
2020-04-24	7388.000000	775.000000	4068.000000	21.0	
2020-04-25	7633.000000	788.000000	4170.000000	21.0	
2020-04-26	7800.000000	798.000000	4236.000000	21.0	
…	…	…	…	…	
2020-08-20	9506.000000	942.000000	4827.000000	29.0	
2020-08-21	9527.000000	947.000000	4827.000000	29.0	
2020-08-22	9540.246175	950.082142	4826.965716	29.0	
2020-08-23	9543.912842	950.415476	4826.965716	29.0	
2020-08-24	9538.000000	948.000000	4827.000000	29.0	

Unnamed: 0	FALLECIDOS TOTALES	HOSPITALES hoy	CENTROS SOCIOSANITARIOS hoy	\
2020-04-22	11852.000000	NaN	NaN	
2020-04-23	12056.000000	127.000000	64.000000	
2020-04-24	12252.000000	117.000000	72.000000	
2020-04-25	12612.000000	245.000000	102.000000	
2020-04-26	12855.000000	167.000000	66.000000	
…	…	…	…	
2020-08-20	15304.000000	30.000000	1.000000	
2020-08-21	15330.000000	21.000000	0.000000	
2020-08-22	15346.294033	13.423431	-0.633006	
2020-08-23	15350.294033	10.090098	-0.633006	
2020-08-24	15342.000000	11.000000	0.000000	

Unnamed: 0	FALLECIDOS TOTALES hoy
2020-04-22	NaN
2020-04-23	204.000000
2020-04-24	196.000000
2020-04-25	360.000000
2020-04-26	243.000000
…	…
2020-08-20	33.000000
2020-08-21	26.000000
2020-08-22	18.947022

```
2020-08-23              14.280355
2020-08-24              12.000000

[125 rows x 8 columns]
```

[4]:
```
total
```

[4]:
```
Unnamed: 0  HOSPITALES  DOMICILIOS  CENTROS SOCIOSANITARIOS  OTROS LUGARES  \
Fecha
2020-08-24        9538         948                     4827             29
2020-08-21        9527         947                     4827             29
2020-08-20        9506         942                     4827             29
2020-08-18        9476         940                     4826             29
2020-08-14        9465         939                     4826             29
2020-08-13        9455         939                     4826             29
2020-08-11        9444         935                     4826             29
2020-08-07        9442         935                     4826             29
2020-08-06        9439         935                     4826             29
2020-08-04        9423         929                     4829             28
2020-07-31        9420         925                     4829             28
2020-07-30        9420         922                     4829             28
2020-07-28        9420         922                     4828             28
2020-07-24        9415         922                     4828             28
2020-07-23        9411         921                     4828             28
2020-07-21        9409         921                     4828             28
2020-07-17        9403         920                     4827             28
2020-07-16        9401         920                     4827             28
2020-07-14        9394         918                     4825             28
2020-07-10        9390         917                     4825             28
2020-07-09        9384         916                     4823             28
2020-07-07        9382         916                     4823             28
2020-07-03        9378         913                     4823             28
2020-07-02        9369         913                     4819             28
2020-07-01        9367         911                     4816             28
2020-06-30        9357         911                     4815             28
2020-06-28        9351         910                     4815             28
2020-06-25        9349         910                     4815             28
2020-06-23        9337         906                     4813             28
2020-06-21        9319         905                     4808             28
2020-06-18        9297         905                     4804             28
2020-06-16        9270         902                     4801             28
2020-06-14        9249         900                     4795             28
2020-06-11        9240         898                     4789             28
2020-06-09        9205         897                     4781             27
2020-06-07        9184         892                     4775             27
2020-06-04        9165         888                     4768             27
2020-06-02        9098         881                     4747             27
```

2020-05-31	9074	878	4739	27
2020-05-28	9044	876	4724	27
2020-05-26	8988	870	4696	27
2020-05-24	8907	860	4623	27
2020-05-21	8820	848	4554	24
2020-05-19	8748	847	4525	24
2020-05-17	8640	844	4510	24
2020-05-14	8573	843	4491	24
2020-05-12	8521	840	4472	24
2020-05-11	8404	838	4438	24
2020-05-08	8321	835	4405	24
2020-05-06	8266	834	4377	24
2020-05-04	8203	827	4355	24
2020-04-30	8136	823	4338	24
2020-04-29	7958	806	4295	21
2020-04-27	7881	801	4273	21
2020-04-26	7800	798	4236	21
2020-04-25	7633	788	4170	21
2020-04-24	7388	775	4068	21
2020-04-23	7271	769	3996	20
2020-04-22	7144	761	3932	15

Unnamed: 0	FALLECIDOS TOTALES	HOSPITALES hoy	CENTROS SOCIOSANITARIOS hoy	\
Fecha				
2020-08-24	15342	11.0	0.0	
2020-08-21	15330	21.0	0.0	
2020-08-20	15304	30.0	1.0	
2020-08-18	15271	11.0	0.0	
2020-08-14	15259	10.0	0.0	
2020-08-13	15249	11.0	0.0	
2020-08-11	15234	2.0	0.0	
2020-08-07	15232	3.0	0.0	
2020-08-06	15229	16.0	-3.0	
2020-08-04	15209	3.0	0.0	
2020-07-31	15202	0.0	0.0	
2020-07-30	15199	0.0	1.0	
2020-07-28	15198	5.0	0.0	
2020-07-24	15193	4.0	0.0	
2020-07-23	15188	2.0	0.0	
2020-07-21	15186	6.0	1.0	
2020-07-17	15178	2.0	0.0	
2020-07-16	15176	7.0	2.0	
2020-07-14	15165	4.0	0.0	
2020-07-10	15160	6.0	2.0	
2020-07-09	15151	2.0	0.0	
2020-07-07	15149	4.0	0.0	
2020-07-03	15142	9.0	4.0	

2020-07-02	15129	2.0	3.0
2020-07-01	15122	10.0	1.0
2020-06-30	15111	6.0	0.0
2020-06-28	15104	2.0	0.0
2020-06-25	15102	12.0	2.0
2020-06-23	15084	18.0	5.0
2020-06-21	15060	22.0	4.0
2020-06-18	15034	27.0	3.0
2020-06-16	15001	21.0	6.0
2020-06-14	14972	9.0	6.0
2020-06-11	14955	35.0	8.0
2020-06-09	14910	21.0	6.0
2020-06-07	14878	19.0	7.0
2020-06-04	14848	67.0	21.0
2020-06-02	14753	24.0	8.0
2020-05-31	14718	30.0	15.0
2020-05-28	14671	56.0	28.0
2020-05-26	14581	81.0	73.0
2020-05-24	14417	87.0	69.0
2020-05-21	14246	72.0	29.0
2020-05-19	14144	108.0	15.0
2020-05-17	14018	67.0	19.0
2020-05-14	13931	52.0	19.0
2020-05-12	13857	117.0	34.0
2020-05-11	13704	83.0	33.0
2020-05-08	13585	55.0	28.0
2020-05-06	13501	63.0	22.0
2020-05-04	13409	67.0	17.0
2020-04-30	13321	178.0	43.0
2020-04-29	13080	77.0	22.0
2020-04-27	12976	81.0	37.0
2020-04-26	12855	167.0	66.0
2020-04-25	12612	245.0	102.0
2020-04-24	12252	117.0	72.0
2020-04-23	12056	127.0	64.0
2020-04-22	11852	NaN	NaN

Unnamed: 0	FALLECIDOS TOTALES hoy
Fecha	
2020-08-24	12.0
2020-08-21	26.0
2020-08-20	33.0
2020-08-18	12.0
2020-08-14	10.0
2020-08-13	15.0
2020-08-11	2.0
2020-08-07	3.0

2020-08-06	20.0
2020-08-04	7.0
2020-07-31	3.0
2020-07-30	1.0
2020-07-28	5.0
2020-07-24	5.0
2020-07-23	2.0
2020-07-21	8.0
2020-07-17	2.0
2020-07-16	11.0
2020-07-14	5.0
2020-07-10	9.0
2020-07-09	2.0
2020-07-07	7.0
2020-07-03	13.0
2020-07-02	7.0
2020-07-01	11.0
2020-06-30	7.0
2020-06-28	2.0
2020-06-25	18.0
2020-06-23	24.0
2020-06-21	26.0
2020-06-18	33.0
2020-06-16	29.0
2020-06-14	17.0
2020-06-11	45.0
2020-06-09	32.0
2020-06-07	30.0
2020-06-04	95.0
2020-06-02	35.0
2020-05-31	47.0
2020-05-28	90.0
2020-05-26	164.0
2020-05-24	171.0
2020-05-21	102.0
2020-05-19	126.0
2020-05-17	87.0
2020-05-14	74.0
2020-05-12	153.0
2020-05-11	119.0
2020-05-08	84.0
2020-05-06	92.0
2020-05-04	88.0
2020-04-30	241.0
2020-04-29	104.0
2020-04-27	121.0
2020-04-26	243.0

```
2020-04-25                   360.0
2020-04-24                   196.0
2020-04-23                   204.0
2020-04-22                     NaN
```

[5]:
```
total
VENTANA_MEDIA_MOVIL=7
df = interpolate_dataframe(total,'D')
df.index.name = 'Fecha'
df = df.sort_values(by=['Fecha'], ascending=True)
df['HOSPITALES hoy'] = df['HOSPITALES'] - df['HOSPITALES'].shift(1)
df['CENTROS SOCIOSANITARIOS hoy'] = df['CENTROS SOCIOSANITARIOS'] - df['CENTROS␣
↪SOCIOSANITARIOS'].shift(1)
df['FALLECIDOS TOTALES hoy'] = df['FALLECIDOS TOTALES'] - df['FALLECIDOS␣
↪TOTALES'].shift(1)


df['MA CENTROS SOCIOSANITARIOS hoy'] = df['CENTROS SOCIOSANITARIOS hoy'].
↪rolling(window=VENTANA_MEDIA_MOVIL).mean()
df['MA HOSPITALES hoy'] = df['HOSPITALES hoy'].
↪rolling(window=VENTANA_MEDIA_MOVIL).mean()
df['MA FALLECIDOS TOTALES hoy'] = df['FALLECIDOS TOTALES hoy'].
↪rolling(window=VENTANA_MEDIA_MOVIL).mean()

df = df.sort_index(ascending=False)
df_master = df.copy()
```

[6]:
```
total.head()
```

[6]:
```
Unnamed: 0  HOSPITALES  DOMICILIOS  CENTROS SOCIOSANITARIOS  OTROS LUGARES  \
Fecha
2020-08-24        9538         948                     4827             29
2020-08-21        9527         947                     4827             29
2020-08-20        9506         942                     4827             29
2020-08-18        9476         940                     4826             29
2020-08-14        9465         939                     4826             29

Unnamed: 0  FALLECIDOS TOTALES  HOSPITALES hoy  CENTROS SOCIOSANITARIOS hoy  \
Fecha
2020-08-24               15342            11.0                          0.0
2020-08-21               15330            21.0                          0.0
2020-08-20               15304            30.0                          1.0
2020-08-18               15271            11.0                          0.0
2020-08-14               15259            10.0                          0.0

Unnamed: 0  FALLECIDOS TOTALES hoy
Fecha
```

```
2020-08-24                    12.0
2020-08-21                    26.0
2020-08-20                    33.0
2020-08-18                    12.0
2020-08-14                    10.0
```

[7]:
```
# Hacemos lo contrario
# En lugar de sacar el nº de muertos dado el nº de infectados, como lo primero␣
 ↪lo sabemos (en madrid), sacamos lo segundo y extrapolamos al conjunto de␣
 ↪españa
df = df_master

R0_estimada = df['FALLECIDOS TOTALES hoy'].values[0:7].sum()  / df['FALLECIDOS␣
 ↪TOTALES hoy'].values[7:14].sum()
print(df['FALLECIDOS TOTALES hoy'].values[0:7].sum(), df['FALLECIDOS TOTALES␣
 ↪hoy'].values[7:14].sum() )
print(f"""R0_estimada = {R0_estimada}""")
PROPORCION_ENFERMOS_MUERTOS=750000/15000 # Esta es la proporcion enfermos␣
 ↪muertos (15.000 muertos para 750.000 afectados)
RATIO_NO_HEMOS_COLAPSADO=2 # La mitad de los muertos se ha calculado del␣
 ↪colapso. Como ahora no hemos colapsado
PESO_MADRID_MUERTES_TOTALES=1/3
casos_españa_estimados =  df['FALLECIDOS TOTALES hoy'].values[0:5].sum() *␣
 ↪PROPORCION_ENFERMOS_MUERTOS * RATIO_NO_HEMOS_COLAPSADO /␣
 ↪PESO_MADRID_MUERTES_TOTALES
print(f"""casos_españa_estimados = {casos_españa_estimados}""")
```

```
77.52264769660542 33.37360458866169
R0_estimada = 2.322873080450617
casos_españa_estimados = 17453.270924790922
```

1.1 Gráfico estimacion R0

Considerando solo los datos de Madrid, estimamos el R0 a partir del nº de muertos (considerando que el nº de muertos es una combinacion lineal del nº de enfermos), por lo que es posible calcular el ratio igual.

Para calcular el R0, sacamos la suma de muertos de la última semana, entre la suma de muertos de la semana anterior.

[8]:
```
from datetime import datetime, timedelta
import seaborn as sns
from matplotlib import pyplot as plt
import matplotlib.dates as mdates

df = df_master

def calcular_estimaciones_R0(df):
```

```
    def calcular_R0_dia(dia,df):
        dia_semana_anterior = dia - timedelta(days=7)
        return dia,df.loc[dia:dia - timedelta(days=6)]['FALLECIDOS TOTALES␣
↪hoy'].sum() / df.loc[dia- timedelta(days=7):dia -␣
↪timedelta(days=13)]['FALLECIDOS TOTALES hoy'].sum()

    VENTANA_MEDIA_MOVIL=7

    df_R0_estimada = pd.DataFrame([calcular_R0_dia(dia,df) for dia in df.
↪index[0:50]],columns=['Fecha','R0_estimada'])

    df_R0_estimada = df_R0_estimada.sort_values(by=['Fecha'], ascending=True)
    df_R0_estimada['MA R0_estimada'] = df_R0_estimada['R0_estimada'].
↪rolling(window=VENTANA_MEDIA_MOVIL).mean()
    df_R0_estimada = df_R0_estimada.sort_values(by=['Fecha'], ascending=False)
    df_R0_estimada.set_index('Fecha', inplace=True, drop=True)
    return df_R0_estimada

df= calcular_estimaciones_R0(df_master)
#df=df[['R0_estimada']]
df

chart_df=df[df.columns[-3:]]
chart_df.plot(legend=True,figsize=(13.5,9), marker='o')

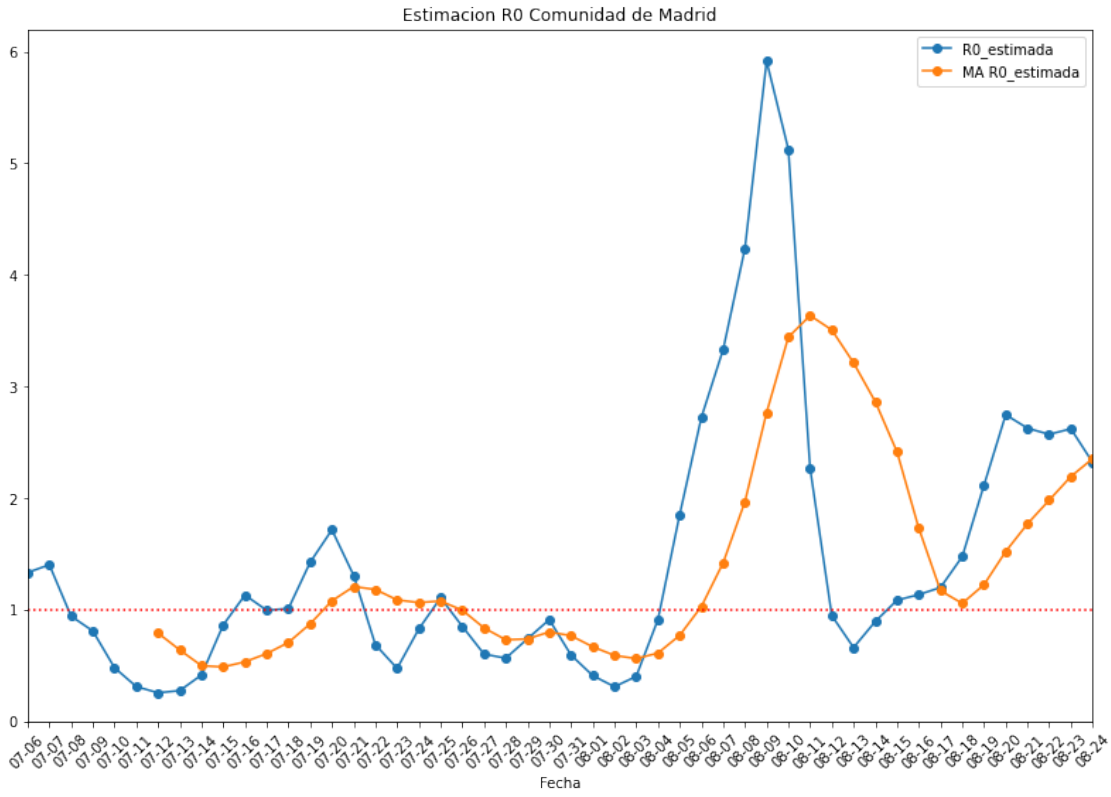
plt.gca().xaxis.set_major_formatter(mdates.DateFormatter('%m-%d'))
plt.gca().xaxis.set_major_locator(mdates.DayLocator(interval=1))
plt.xticks(rotation=45)

ax = plt.gca()
ax.axhline(1, color='r',linestyle =  ':' )


ax.set_title("Estimacion R0 Comunidad de Madrid")
ax.set_ylim(ymin=0)

plt.show()

df.style.format ({ c : "{:20,.3f}" for c in df.columns }).
↪background_gradient(cmap='Wistia', )
```



[8]:
```
<pandas.io.formats.style.Styler at 0x7f087e8d3160>
```

[9]:
```
R0_estimada * 1.2
```

[9]:
```
2.78744769654074
```

[10]:
```
HTML("<h2>Gráfico muertes diarias en Madrid, según Comunidad de Madrid </h2>")
```

[10]:
```
<IPython.core.display.HTML object>
```

[11]:
```
import pandas as pd
import io
import matplotlib.dates as mdates
from matplotlib import pyplot as plt

df = df_master
chart_df=df[df.columns[-3:]].head(60)
chart_df.plot(legend=True,figsize=(13.5,9), marker='o')

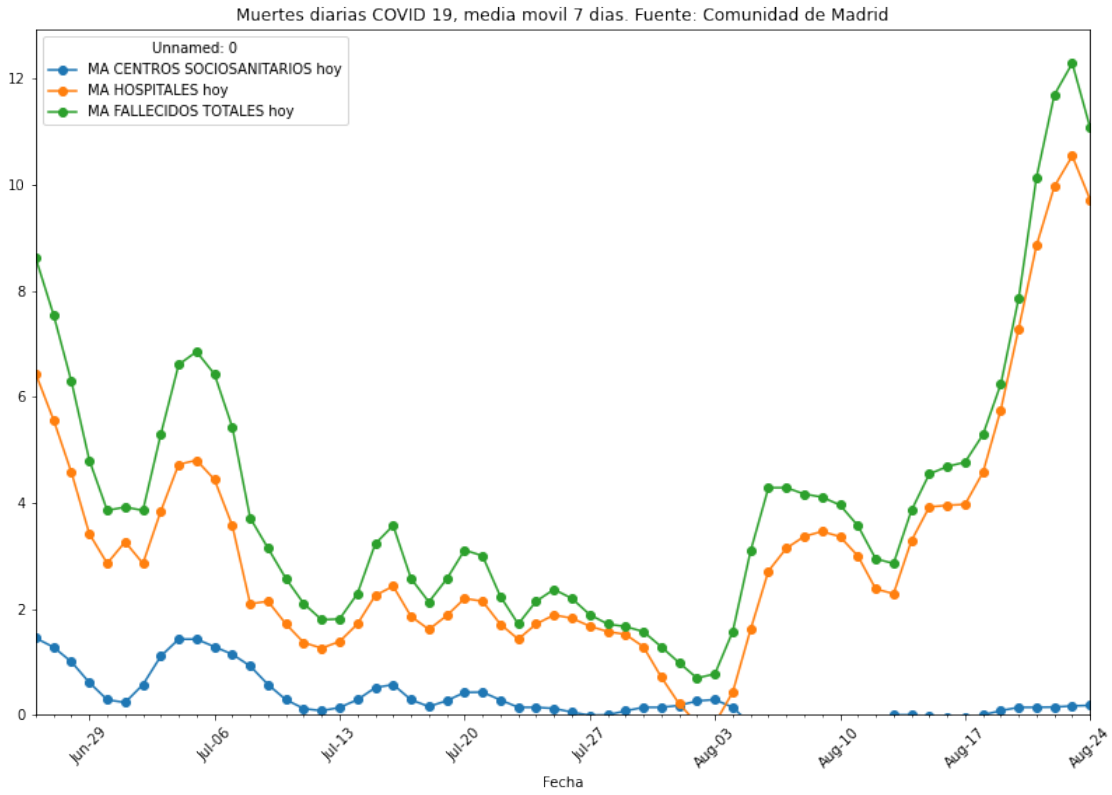

plt.gca().xaxis.set_major_formatter(mdates.DateFormatter('%b-%d'))
plt.gca().xaxis.set_major_locator(mdates.DayLocator(interval=7))
```

```
plt.xticks(rotation=45)

ax = plt.gca()
plt.setp(ax.get_xminorticklabels(), visible=False)

ax.set_title("Muertes diarias COVID 19, media movil␣
 ↪"+str(VENTANA_MEDIA_MOVIL)+" dias. Fuente: Comunidad de Madrid")
ax.set_ylim(ymin=0)

plt.show()
```



[12]:
```
 from IPython.display import display, HTML
HTML("<h2>Comparamos los datos de hoy, de hace una semana y de un mes </h2>")
```

[12]: <IPython.core.display.HTML object>

[13]:
```
from matplotlib import colors

def background_gradient(s, m, M, cmap='PuBu', low=0, high=0):
    rng = M - m
    norm = colors.Normalize(m - (rng * low),
                            M + (rng * high))
```

```
    normed = norm(s.values)
    c = [colors.rgb2hex(x) for x in plt.cm.get_cmap(cmap)(normed)]
    return ['background-color: %s' % color for color in c]

df = df_master

df.style.format ({ c : "{:20,.0f}" for c in df.columns }).
 ↪background_gradient(cmap='Wistia', subset= df.columns[-3:] )
```

[13]:
```
<pandas.io.formats.style.Styler at 0x7f08c1d54fd0>
```

[14]:
```
df = df_master
pd.concat([df.head(1).tail(1) , df.head(8).tail(1) , df.head(30).tail(1)]).
 ↪astype(int)[['MA HOSPITALES hoy','MA CENTROS SOCIOSANITARIOS hoy','MA␣
 ↪FALLECIDOS TOTALES hoy']].style.format ({ c : "{:20,.0f}" for c in df.
 ↪columns }).background_gradient(cmap='Wistia', subset= df.columns[-3:] )
```

[14]:
```
<pandas.io.formats.style.Styler at 0x7f0884c447b8>
```

[15]:
```
from IPython.display import display, HTML
HTML("<h2>Muertes medias diarias, últimos 7 días, con datos</h2>")
```

[15]:
```
<IPython.core.display.HTML object>
```

[16]:
```
from datetime import date

df = df_master
inicio_crisis = df.head(7).index[6]
df=df.head(7)
dia_mas_reciente = df.index[0]
dias_transcurridos_inicio_crisis = dia_mas_reciente - inicio_crisis
df = pd.DataFrame((df.head(1).max(axis=0) - df.tail(1).max(axis=0) ) / ␣
 ↪dias_transcurridos_inicio_crisis.days  ).
 ↪T[['HOSPITALES','DOMICILIOS','CENTROS SOCIOSANITARIOS','OTROS␣
 ↪LUGARES','FALLECIDOS TOTALES']]
df.style.format ({ c : "{:20,.0f}" for c in df.columns }).
 ↪background_gradient(cmap='Wistia'  )
```

[16]:
```
<pandas.io.formats.style.Styler at 0x7f0876d61358>
```

[17]:
```
HTML("<h2>Muertes medias diarias desde que la comunidad de Madrid publica␣
 ↪datos</h2>")
```

[17]:
```
<IPython.core.display.HTML object>
```

[18]:
```
# Calculamos los incrementos medios, desde que tenemos fechas
df = df_master
df = pd.DataFrame((df.head(1).max(axis=0) - df.tail(1).max(axis=0) ) / df.
 ↪shape[0] ).T[['HOSPITALES','DOMICILIOS','CENTROS SOCIOSANITARIOS','OTROS␣
 ↪LUGARES','FALLECIDOS TOTALES']]
df.style.format ({ c : "{:20,.0f}" for c in df.columns }).
 ↪background_gradient(cmap='Wistia'  )
```

[18]:
```
<pandas.io.formats.style.Styler at 0x7f0884c60a20>
```

[ ]:

[ ]: