**Supplementary Table 1.** Summary of global reports on CR-hvKP from June 2015 to April 2022

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Country | Number of strains a | carbapenem resistance genes b | Virulence genes c  | Virulence plasmid | Serotype | Sequence type | Year of report/year of the strain collection | References |
| Asia | China | 6 | *blaKPC-2* | *repA, fimH, uge, wabG, ureA, entB, ybtS, iroN, mrkD, ycfM* | - | K2/ non-typeable | ST11, ST25, ST65 | 2015/ 2010-2014 | (Yao et al., 2015) |
| China | 3 | *blaIMP-4*, *blaKPC-2*  | *rmpA, entB, ybtS, fimH, mrkD*, *aerobactin* | - | K2/ non-typeable | ST11, ST1700 | 2015/ 2012-2013 | (Zhang et al., 2015) |
| China | 1 | *blaNDM-5* | *kfuABC*, *mrkABCDFHIJ*, *rmpA* | - | K2 | ST14 | 2016/ 2015 | (Liu et al., 2016) |
| China | 5 | *blaKPC-2*  | *magA,, rmpA, wcaG* | A 200-kb plasmid | K1 | ST23, ST1797 | 2016/ 2013 | (Zhang et al., 2016) |
| China | 7 | *blaKPC-2*  | *fimH-1*, *mrkD*, *magA*, *rmpA*, *rmpA2*, *iroN*, *allS*, *aerobactin*, *traT*, *iutA* | - | K1, K2, K8, K37, K47, K64 | ST11, ST15, ST23, ST65, ST147, ST1456 | 2017 /2012-2015 | (Liu et al., 2017) |
| China | 21 | *blaKPC-2*  | *ureA, wabG, fimH, entB, ycf, ybtS, iutA, rmpA, iroNB, kfu, wcaG* | - | K2, K20/ non-typeable | ST11, ST65, ST268, ST595, ST692 | 2017 /2013-2015 | (Zhan et al., 2017) |
| China | 1 | *blaKPC-2* | *rmpA2* | pKP70-2（Integrated plasmid carrying *blaKPC-2* and *rmpA2*） | K1 | ST23 | 2018/ 2013 | (Dong et al., 2018) |
| China | 1 | *blaKPC-2* | *rmpA, rmpA2*, *iucABCD-iutA, clbA-R, iroBCDN, fyuA, irp2, ybtAEPQTUX, mrkABCDFHIJ* | pVir-KP13F2 | K62 | ST36 | 2018/2015 | (Feng et al., 2018) |
| China | 5 | *blaKPC-2*  | *entB, fimABCDEFGHIK, iroE, irp1/2, iucABCD-iutA, kpn, mrkABCDFHIJ, rmpA2, ycfM*  | pVir-CR-HvKP4 | - | ST11 | 2018/ 2016 | (Gu et al., 2018a) |
| China | 2 | *blaKPC-2* |  *rmpA, iucABCD, iroBCDN* | p227035-3 | - | ST11 | 2018/ 2017 | (Gu et al., 2018b) |
| China | 1 | *blaKPC-2* | *iroBCDN**, iucABCD-iutA, rmpA, rmpA2* | TVGHCRE225 pVir  | K47 | ST11 | 2018/ 2012-2014 | (Huang et al., 2018) |
| China | 1 | *blaKPC-2*, *blaNDM-1* | *rmpA, rmpA2, iroN, aerobactin, mrkD* | - | K2 | ST86 | 2018/ 2016 | (Wei et al., 2018) |
| China | 1 | *blaVIM-1* | *mrkABCDFJIH*, *clbABCDEFGHIJKLMNOPQR*, *fyuA*, *irp1/2*, *ybtSXQPA*, *mceABCDEJIHG*, *kfuABC*, *arcC*, *allABCDRS*, *glxKR*, *iutA-iucABCD*, *iroBCDN*, *rmpA*, *rmpA2* | pR210-2-vir | K1 | ST23 | 2019/ 2018 | (Dong et al., 2019) |
| China | 14 | *blaKPC-2, blaNDM-1*  | *rmpA*, *iucB*, *iroB*, *uge*, *wabG*, *ureA*, *allS*, *ybtS*, *fimH*, *entB* | - | K2/ non-typeable | ST25, ST11 | 2019/ 2014-2017 | (Li et al., 2019) |
| China | 1 | *blaNDM-1*, *blaOXA-1* | *rmpA*, *rmpA2*, *iucABCD-iutA*, *iroBCDN* | pVIR\_3214 | K1 | ST23 | 2019/ - | (Liu and Su, 2019) |
| China | 13 | *blaKPC-2*, *blaNDM-1* | *allS*, *rmpA*, *aerobactin*, *iroB*, *entB*, *iucA*, *kfuBC*, *mrkD*, *rmpA2*, *ureA*, *wabG*, *ybtS*, *ycfM* | - | K47, K64 | ST11, ST1764 | 2019/2013-2017 | (Liu et al., 2019) |
| China | 1 | *blaNDM-5* | *iucABCD-iutA*, *iroBCDN*, *rmpA*, *fimACDGH*, *entABCEF* | - | K108 | ST35 | 2019/ 2016-2018 | (Shen et al., 2019) |
| China | 9 | *blaOXA-232*  | *iucABCD-iutA*, *rmpA2*, *ybtAEPQSTUX*, *fyuA*, *irp1*/*2*, *mrkABCDFHIJ*, *kfuABC* | pE109-1-vir | KL112 | ST15 | 2019/ 2018 | (Shu et al., 2019) |
| China | 15 | *blaKPC-2*  | *magA, allS*, *kfu*, *fimH*, *wabG*, *ybts*, *mrkD*, *uge*, *entB*, *iutA*, *rmpA*, *rmpA2*, *iucA*, *iroN* | - | K1, K16, K47, K64,  | ST11, ST23, ST660, ST1660 | 2019/ 2011-2017 | (Xu et al., 2019) |
| China | 1 | *blaNDM-5* | *iucABCD-iutA*, *iroBCDEN*, *rmpA*, *entABCDEFS*, *fepABCDG*, *fyuA*, *irp1/2*, *ybtAEPQSTUX*, *mrkABCDFHIJ* | pVir-SCNJ1 | K54 | ST29 | 2019/ 2018 | (Yuan et al., 2019) |
| China | 1 | *blaKPC-2* | *iucABCD*, *rmpA2*, *iroBCD* | - | - | ST11 | 2019/ 2016 | (Zhou et al., 2019) |
| China | 31 | *blaKPC-2*, *blaOXA-1*  | *peg-344*, *iucA*, *rmpA*, *rmpA2* | - | KL64, KL47 | ST11 | 2020/ 2017-2018 | (Liu et al., 2020) |
| China | 1 | *blaKPC-2* | *mrkA-K*, *clbA-Q*, *fyuA*, *ybtAEPQSTUX*, *irp1/2*, *kfuABC, hisl, cysS, cobW, dskA, folE, queF, sitABCD, thrS, pyrC, hemB, znuAC, mceBCDJHG, arc, ylbFE, fdrA, allDC, glxK, ybbWY, allABRS, KP1, glxR, hyi, gcl*  | p11420-vir | K1 | ST1265 | 2020/ 2014 | (Li et al., 2020a) |
| China | 43 | *blaKPC-2*, *blaNDM* , *blaIMP-4* | *uge*, *mrkD*, *fimH*, *kpn*, *aerobactin*, *rmpA, allS* | tig00000014 | K2/ non-typeable | ST11, ST76, ST375, ST323, ST530, ST896, ST2964 ST3335 | 2020/ 2015-2017 | (Su et al., 2020) |
| China | 8 | *blaKPC-2*, *blaKPC-5*  | *iucABCD-iutA,* *ybtAEPQSTUX,* *iroBCDN*, *mrkABCDFHIJ*, *kfu*, *irp1/2*, *fyuA* | - | K47, K64 | ST11 | 2020/ 2012-2016 | (Yang et al., 2020) |
| China | 55 | *blaKPC-2*, *blaNDM-1* | *iucA*, *iroN*, *rmpA*, *rmpA2* | pVir-CRhvKP-C789, pVir-CR-hvKP-C1398 | K2, K57, K64 | ST11 | 2020/ 2015-2017 | (Zhang et al., 2020) |
| China | 152 | *blaKPC*-2, *blaOXA-1* | *ybtAEPQSTUX*, *irp1/2*, *fyuA*, *rmpA*, *rmpA2*, *iucABCD-iutA*, *peg-344*, *iroBCDN* | pVir-KP16932, pVir-KP47434 | KL47, KL64, KL103, KL105, KL31 | ST11 | 2020/ 2013-2017 | (Zhou et al., 2020) |
| China | 1 | *blaKPC-2* | *rmpA2*, enterobactin, yersiniabactin, salmochelin | - | K64 | ST11 | 2020/ 2017 | (Jin et al., 2020) |
| China | 19 | *blaKPC-2*   | *rmpA*, *rmpA2*, *irp1/2*, *iucABCD-iutA*, *mrkABCDFHIJ*, *ybtAEPQTUX*, *fyuA* | IncHI1B plasmid | KL47, K64 | ST11 | 2020/ 2016-2017 | (Zheng et al., 2020) |
| China | 9 | *blaKPC-2*, *blaNDM-1* , *blaNDM-5*  | rmpA2, *terW*, *iutA*, *silS* | pLVPK-like plasmid | K1, K2, K64 | ST11, ST23, ST86 | 2020/ 2016-2018 | (Li et al., 2020b) |
| China | 84 | *blaKPC-2*  | *iutA,* *rmpA*, *rmpA2* | - | KL47, K64 | ST11, ST65, ST268, ST412, ST595 | 2020/ 2014-2019 | (Hao et al., 2020) |
| China | 1 | *blaKPC-*2 | *entABCDEFS*, *fepABCDG*, *fimABCDEFHIK*, *iroEN*, *iutA*, *mrkABCDFHIJ*, *iroBCDN*, *pagO*, *rmpA* | pK55602\_1 | K2 | ST86 | 2021/ 2017 | (Liu et al., 2021) |
| China | 1 | *blaKPC-*2 | *iucABCD-iutA*, *iroBCDEN*, *rmpA*, *rmpA2*, *ybt9* , *mrkABCDFHIJ* | p17ZR-91-Vir | K2 | ST86 | 2021/ 2017 | (Xie et al., 2021) |
| China | 1 | *blaKPC-2* | *allABCRS*, *clbABCDEFGHIJKLMNOPQR*, *fyuA*, *irp1*/*2*, *ybtAEPQSTUX*, *mrkABCDFHIJ*, *kfuABC*, *arc*, *fdrA*, *gcl*, *glxKR*, *ylbEF* | - | K1 | ST23 | 2021/ 2017 | (Yan et al., 2021) |
| China | 1 | *blaKPC-2* | *rmpA2*, *iroBCDN*, *iucABCD-iutA* | pCRHV-C2244(Integrated plasmid carrying *blaKPC-2* and *rmpA2*, *iroBCDN*, *iucABCD-iutA*) | K64 | ST11 | 2021/ 2017 | (Jin et al., 2021) |
| China | 8 | *blaKPC* | *rmpA, rmpA2, iucA, iutA* | - | K14/K64/ non-typeable | ST11 | 2021/ 2017-2019 | (Li et al., 2021a) |
| China | 32 | *blaKPC-2*, *blaNDM-1*, *blaOXA-1* | yersiniabactin, aerobactin, salmonchelin, *rmpA*, *rmpA2* | pLVPK-like plasmid | KL64, KL10, KL25, KL47, KL62, KL2, KL19, KL24 | ST11, ST37, ST15, ST304, ST2237 | 2021/ 2018-2019 | (Chen et al., 2021) |
| China | 1 | *blaKPC-2* | *rmpA2*, *iucABCD-iutA* | pSH12\_Vir | KL47 | ST11 | 2021/ 2015 | (Yang et al., 2021) |
| China | 1 | *blaKPC-2* | *rmpA*, *rmpA2*, *iucABCD* | pVir-C2582 | K64 | ST11 | 2021/ 2017 | (Zhang et al., 2021) |
| China | 39 | *blaKPC-2*, *blaNDM-1* | *rmpA*, *terW*, *silS*, *iutA*, *rmpA2* *kpn*, *entB*, *ytbs*, *repA*, *aerobactin*, *magA*, *kfuBC*, *wcaG* | pLVPK-like plasmid | K1, K2/ non-typeable | ST11, ST23, ST65, ST86 | 2021/ 2017-2018 | (Liao et al., 2021) |
| China | 45 | *blaKPC-2*, *blaNDM-1*, *blaVIM-2* | *rmpA*, *terW*, *silS*, *iutA*, *rmpA2* | pLVPK-like plasmid | - | ST11, ST23 | 2021/ 2018-2019 | (Huang et al., 2021) |
| China | 32 | *blaKPC-2*  | *fimH, iucB, mrkD, rmpA, uge, wabG* | - | K57 | ST11 | 2021/ 2019 | (Shao et al., 2021) |
| China | 1 | *blaNDM-5* | *rmpA*, *iucABCD-iutA*, *iroBCDN* | pVir22937 | K2 | ST65 | 2021/ 2019 | (Zhao et al., 2021) |
| China | 12 | *blaKPC-2*, *blaNDM-1*, *blaVIM-1*, *blaOXA-48* | *rmpA*, *rmpA2* | - | K2, K14/K64 | ST25, ST11 | 2021/ 2019-2020 | (Su et al., 2021) |
| China | 3 | *blaNDM-1, blaOXA-1, blaVIM-1* | *prmpA*, *prmpA2*, *crmpA*, *peg-344*, *iroB*, *ytbS*, *mrkD*,  *entB*, *kfu*,  *allS*, *iutA*,  *K2A,*  *wabG*,  *uge*, *fimH*,  *wcaG*, *kpn*, *ycfM*,  *iroN* | - | K2, K57, K54 | ST29, ST14, ST17, ST37, ST45, ST101, ST234 | 2021/ 2016-2020 | (Li et al., 2021b) |
| China | 51 | *blaKPC-2*  | *rmpA*, *rmpA2*, *peg344*, *iucA*, *iroN* | - | K64, K54/ non-typeable | ST11, ST15, ST198 | 2022/ 2020 | (Wei et al., 2022) |
| China | 60 | *blaKPC-2* | *rmpA*, *rmpA2*, *iutA* | pLVPK-like plasmid | KL64, KL20, KL47, KL16, KL19, KL62, KL3, KL107, KL28, KL36, KL2, KL21 | ST11, ST268, ST595, ST395, ST437, ST86, ST2245-1LV, ST290 | 2022/ 2014-2017 | (Yang et al., 2022a) |
| China | 16 | *blaKPC-2* | *aerobactin* , *entB*, *allS*, *mrkD*, *fimH*, *rmpA* , *rmpA2*,  *iutA*, *iucA* | - | K1, K2, K47, K64 | ST11, ST23, ST86 | 2022/ 2019-2020 | (Zhou et al., 2021) |
| China | 1 | *blaKPC* | *rmpA*, *iutA* | - | - | - | 2022/ 2021 | (Zhou et al., 2022) |
| India | 3 | *blaOXA-1*, *blaOXA-181*, *blaOXA-232*, *blaNDM-1* | *mrkD, iutA-iucABCD, entADEF, ybtAUT, irp1/2, kfuABC, MviM*, *fyuA*, *rmpA2* | - | - | ST11, ST43, ST231 | 2016/ 2016 | (Shankar et al., 2016) |
| India | 1 | *blaOXA-232* | *mrkABCDFHIJ*, *kfuABC*, *iucABCD-iutA*, *iroBCDEN*, *rmpA*, *rmpA2*, *rcsAB*, *entABCDEFS*, *fepABCDG*, *fes*, *fyuA*, *irp1*, *irp2*, *ybtAEPQSTUX*, *allABCDRS* | - | K1 | ST23 | 2020/ 2016 | (Mukherjee et al., 2020) |
| Iran | 5 | *blaVIM-2* | *rmpA, magA, iucABCD-iutA* | - | K1 | ST23 | 2018/ 2012 | (Mohammad Ali Tabrizi et al., 2018) |
| Iran | 3 | - | *peg344*, *iucA*, *iroB*, *rmpA*, *rmpA2*, *iutA*, *mrkD*, *ybtS* | - | K1, K2 | ST147, ST392 | 2020/ 2015-2016 | (Pajand et al., 2020) |
| Iran | 52 | *blaNDM -1*, *blaNDM-7*, *blaOXA-48* | *iucA*, *iroN*, *rmpA*, *ybtS*, *ycf*, *magA*, *mrkD* | - | K1, K2/ non-typeable | ST11, ST893, ST147, ST15, ST392 | 2020/ 2017-2018 | (Solgi et al., 2020) |
| Iran | 4 | *blaNDM*, *blaOXA-48* | *rmpA/A2，fyuA， kfuB，ybtAEQSU，iroC，* *irp1/2，iucA* | - | - | ST5235 | 2020/2017 | (Banerjee et al., 2021) |
| Iran | 59 | *blaNDM-1*, *blaOXA-48* | *iucA*, *iutA*, *ybt*, *rmpA*, *kfu*, *peg344*, *iro*, *magA*, *allS* | - | K2, K20 | - | 2021/ 2019-2020 | (Sanikhani et al., 2021) |
| Iran | 13 | *blaOXA-1*, *blaOXA-48,* | *iutABCD*, *iucA, ybtAEPQSTUX, fyu， irp1/2* | P35 plasmid 3, P38 plasmid 1 | K15， K17, K20, K107 | ST11, ST101, ST147, ST893 | 2021/2014-2016 | (Bolourchi et al., 2021) |
| Singapore | 32 | *blaKPC-2* | *ybt*, *clb*, *iuc*, *iro*, *rmpA*, *rmpA2* | - | KL1, KL2, KL25, K25, K47, K51, K107, K117, K124, K136 | ST11, ST14, ST23, ST17, ST48, ST65, ST70, ST86, ST231, ST273, ST792, ST1117 | 2019/ 2011-2015 | (Octavia et al., 2019) |
| Singapore | 18 | *blaKPC-2*，*blaOXA-1* | *rmpA*, *rmpA2*, *ybt, clb*, *iuc*, *iro* | - | K1, K2, K20 | ST23, ST65, ST86, ST420, ST893 | 2020/ 2010-2015 | (Chen et al., 2020) |
| Japan | 1 | *blaIMP-6* | *iucABCD-iutA*, *iroBCDEN*, *rmpA*, *rmpA2* | pTHC11-1 | K1 | ST23 | 2019/ 2012 | (Harada et al., 2019) |
| Japan | 41 | *blaIMP* | *rmpA/A2, iroN, iutA* | - | K1, k2 | ST23, ST65, ST86, other ST | 2020/2014-2015 | (Yonekawa et al., 2020) |
| Europe | Russia | 20 | *blaOXA-48*, *blaOXA-244,  blaNDM-1* | *rmpA, aerobactin, uge2, wabG, kfu, fimH, allR* | pLVPK-like plasmid | K1, K2, K57, *wzi420c* | ST23, ST147, ST218, ST395, ST833, ST20 | 2018/ 2012-2016 | (Lev et al., 2018) |
| Russia | 1 | *blaOXA-48*, *blaOXA-1* | *mrkABCDFHIJ*, *allABCDRS*, *mceABCDEGHIJ*, *ybtAEPQSUX*, *fyuA*, *irp1*, *kfuABC*, *iucABCD*, *iroBCDN*, *rmpA*, *rmpA2* | IncHI1B/ FIB plasmid | K1 | ST23 | 2020/ 2014 | (Shaidullina et al., 2020) |
| Russia | 9 | *blaNDM-1*, *blaNDM-29*, *blaOXA-**1*, *blaOXA-9* | *entABES*, *fepBCDG*, *ecpABCDER*, *fimABCEH*, *ybtAEPQSTUX*, *fyuA*, *irp1/2*, *kdsA*, *prmpA, prmpA2*, *iucABCD*, *iutA*, *terABCDEWXYZ*, *peg-344*, *pagO*, *shiF*, *ydjA*, *cobW*, *luxR*, *arsABCDR*, *pcoABCDERS*, *silABCEF* | IncFI/ IncHI1B/ ColRNAI plasmid | KL2, KL19, KL20, KL45 | ST15, ST147, ST395, ST874 | 2021/ 2017-2019 | (Starkova et al., 2021) |
| Italy | 1 | *blaNDM-5*, *blaOXA-48*, *blaOXA-9* | *iucABCD-iutA*, *iroEN*, *rmpA*, *rmpA2*, *fimABCDEFGHIK*, *mrkABCDFIJ*, *pilW*, *entABCEDEFS*, *fepABCDG*, *fes*, *rcsAB*, *stbABCD* | pLVPK-like plasmid | KL30 | ST383 | 2020/ 2019 | (Scaltriti et al., 2020) |
| Italy | 4 | *blaNDM-1*, *blaNDM-5*, *blaOXA-48*, *blaOXA-1*, *blaNDM-1* | *iucABCD-iutA*, *rmpA*, *rmpA2*, *terABCDEWXYZ*, *mrkABCDF*, *irp*, *fyuA*, *kfuA* | IncFIB(pNDM-Mar)/ IncHIB (pNDM-MAR) \_NDM5 (Integrated plasmid carrying *blaNDM-5* and *iucABCD-iutA*, *qnrS*, *rmpA*, *rmpA2*, *terABCDEWXYZ*) | KL51, KL64, KL112 | ST147, ST15, ST383 | 2022/ 2019 | (Lorenzin et al., 2022) |
| United Kingdom | 1 | *blaNDM* | *wcaG, allS, iucABCD-iutA, kfuABC, ybtAEUPQRSTX, clbABCDEFGHIJKLMNOPQR, iroBCDN, terABCDEWXZ, rmpA2* | - | K1 | ST23 | 2018/ 2015 | (Roulston et al., 2018) |
| United Kingdom | 16 | *blaNDM-1, blaNDM-5,* *blaOXA-48* | *rmpA, rmpA2,* *ybtS, mrkD, iutA*, *allS*, *terWXY, clbA-R,* , *iroBCDN, kfuABC*, *mrkABCDF*, *ybtAEPQSTUX*, *terABCDEWXY*, *silCERS*, *mceABCDEGHIJ*, *pbrABCR* | KpvST147, KpvST23L | K1/ non-typeable | ST23 | 2018/ 2016 | (Turton et al., 2018) |
| France | 1 | *blaOXA-48* | *rmpA*, *rmpA2*, *iucABCD-iutA*, *iroBCDN*, *ybt* | pVIR-Kpn154 | K2 | ST86 | 2020/ 2017 | (Beyrouthy et al., 2020) |
| Germany | 107 | *blaOXA-48, blaKPC-3,* *blaKPC-2*, *blaNDM-1* | *mrkABCDFHIJ*, yersiniabactin, aerobactin, *kfu* | - | K1 | ST11, ST15, ST16, ST17, ST23, ST37, ST48, ST101, ST147, ST258, ST307, ST340, ST347, ST391, ST395, ST512, ST629, ST784, ST906, ST1399, ST2254 | 2018/ 2008-2014 | (Becker et al., 2018) |
| Portugal | 1 | *blaKPC-70, blaOXA-9* | *fimA-K**, mrkA-J, iutA, iroN, iroE, fyuA–ybtX, clb-c* | - | KL3 | ST13 | 2022/ 2019 | (Mendes et al., 2022) |
| America | United States | 4 | *blaOXA-9, blaKPC-3,* *blaKPC-2* | *entABCDEF*, *iutA*, *iroN*, *kfuABC*, *fyuA*, *clbA-R*, *ybt*, *irp* complex, *mrkD*, *fimH* | - | K2, K51/ non-typeable | ST14, ST258, ST1082 | 2017/ 2012-2016 | (Krapp et al., 2017) |
| United States | 1 | *blaKPC-2*, *blaOXA-9* | *rmpA*, *rmpA2*, *iutA-iucABCD*, *iroBCDN*, *peg*-344, *allS*, *kfu, magA, mrkD, wcaG, ybtS* | pDHQP1701672\_hv | K1 | ST23 | 2019/ 2016 | (Karlsson et al., 2019) |
| Canada | 2 | *blaKPC-2* | *rmpA*, *rmpA2*, *iroBCDN*, *iucABCD-iutA*, *ybtAEPQSTUX*, *fyuA*, *irp1*/*2* | phvKP060 | KL2 | ST86 | 2019/ 2018 | (Mataseje et al., 2019) |
| Colombia | 1 | *blaKPC-2* | *ybt*, *iuc*, *iro*, *rmpA* | - | KL2 | ST380 | 2021/ 2013 | (Saavedra et al., 2021) |
| Afica | Egypt | 1 | *blaKPC-2*, *blaNDM-1* | *fimABCDEFGHIK,* *mrkABCDFHIJ, rcsAB, galF, cpsACP, wzi, wza, gnd, ugd, ,sciN/tssJ, impA/tssA, tssGF, icmF/tssM, KPHS\_23120, tle1, tli1, vgrG/tssI, clpV/tssD, dotU/tssL, vase/tssK, vipB/tssC, vipA/tssB, fepABCDG, fes, yagV/ecpE, yagW/ecpD, yagX/ecpC, yagY/ecpB, yagZ/ecpA, yagK/ecpR, fyuA, ybtAETUQXS, irp1/2, iroE, rmpA, rmpA2, iucABCD-iutA, entABCDEF,* | pEBSI036-1-NDM-VIR(Integrated plasmid carrying *blaNDM-1* and *iucABCD-iutA*, *rmpA*, *rmpA2*) | KL47 | ST11 | 2021/ 2017-2018 | (Ahmed et al., 2021) |
| Egypt | 1 | *blaKPC-2*, *blaOXA-48* | *iucABCD-iutA*, *rmpA*, *rmpA2* | pEBSI041-1 | - | ST11 | 2022/ 2012 | (Yang et al., 2022b) |
| Sudan | 10 | *blaNDM*, *blaOXA-48* | *mrkD*, *entB*, *rmpA*, *kfu*, *magA* | - | K2 | - | 2020/ 2017 | (Albasha et al., 2020) |

a All strains came from the CR-hvKP-related articles reported from June 2015 to April 2022. The inclusion criteria for strains were: carried at least one carbapenem resistance gene, having two or more virulence genes or the string test was positive;

b/c Carbapenem resistance genes and virulence genes carried by CR-hvKP strains were reported in the study.

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