

Mapping of municipal Infection Prevention and Control initiatives in Denmark

Summary of the report

Municipal organisation of Infection Prevention and Control (IPC) 2020

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In light of the current covid-19 pandemic, this report aims to strengthen the knowledge on organization and implementation of infection prevention and control (IPC) efforts in Danish municipalities. Based on a questionnaire survey the report aims to investigate to which extent the municipalities have complied with the Danish Health Authority's recommendations on the establishment of IPC organization and other key recommendations. Furthermore, the report compares the municipalities IPC efforts in relation to the size of the municipality, incidence of covid-19 amongst the municipality's citizens including the nursing home residents in the municipalities and sick-leave amongst primary- and secondary school students. Finally, the report aims to identify the factors that should be strengthened to support more municipalities to establish an IPC organization and thus strengthen IPC-efforts.

Results from the questionnaire survey

Background information

At the end of 2020, all 98 Danish municipalities responded to the questionnaire and indicated that the responses were made by people with knowledge of the municipality's IPC efforts on both a strategic level and executive level respectively.

Establishing and building an IPC organization

- Over half (61 municipalities) of the 98 municipalities have established an IPC organization, of which 16 of them have established an IPC organization within the last 12 months.
- Almost all municipalities with an established IPC organization indicates that they partially or fully agree with that an established IPC organization contributes to a useful translation of the National Infection prevention and Control Guidelines (NIR) to local conditions (57 municipalities), that they have effective communication lines, that ensure knowledge sharing from the strategic management level to the executive operating level (55 municipalities), and it supports collaboration between the municipalities key areas (55 municipalities).
- More than a third of the municipalities (36 municipalities) have not established an IPC organization. 31 of those municipalities are planning to establish an IPC organization.
- Majority of the municipalities, regardless of whether they have established an IPC organization or not, prioritized prevention with IPC efforts in the area of elderly-care (86 municipalities) and child – and adolescent care (62 municipalities) at the executive level of the municipality.
- There is great variation in the way the IPC area is organized, including which areas that prioritize IPC between the municipalities.

Competencies and cooperation agreements in the IPC area

- Less than half (41 municipalities) of the 98 municipalities have established a coordination committee at the strategic level of the municipality, which almost always consists of managers (40 municipalities) and to a lesser degree the selected IPC officers (27 municipalities).
- The selected IPC officers often have a nursing background (22 municipalities). In four municipalities the IPC officer has formal education in IPC.
- IPC coordinators at the executive level of the municipality are appointed in the majority of municipalities (70 municipalities). The IPC coordinators are almost always (68 municipalities) people with a healthcare background (primarily nursing). IPC coordinators with a non-healthcare related professional background (teachers, educators, service assistants, academics, etc.) are appointed in 31 municipalities.
- Among the 70 municipalities that have selected IPC coordinators, 44 municipalities state that they have provided IPC training to IPC coordinators within the previous 12 months. Of these, the majority (34 municipalities) state that the training is organized by the region's IPC units and almost all (40 municipalities) assess that the training is organized in accordance with the National IPC guidelines in regards to keypersons/contact persons/coordinators in IPC in the healthcare sector.
- Among the 28 municipalities that have not appointed IPC coordinators, half (13 municipalities) stated that this was not prioritized by the municipality's leaders and/or politicians.
- The majority (79 municipalities) of all 98 municipalities have entered into a joint regional cooperation agreement with the regions' IPC units on IPC advice, of which 15 municipalities have purchased additional services specifically for the municipality as a supplement to the joint regional cooperation agreement.
- Less than half (40 municipalities) of the 98 municipalities have established a cooperation with other municipalities on IPC

Content and use of the municipalities IPC policy

- Majority (78 municipalities) of the 98 municipalities haven't adopted an IPC policy
- The 20 municipalities who have adopted an IPC policy, state that IPC is used to prevent and handle the spread of resistant microorganism and infectious diseases among others.

Compliance with national and local IPC guidelines

- Almost all 98 municipalities responded that they strongly agree or partially agree with the recommendations in the IPC national guidelines on standard precautions in the healthcare sector are followed in connection with "use of personal protective equipment" (96 municipalities), "performance of hand hygiene" (95 municipalities) and "storage of personal protective equipment, clothing and linen, clean equipment and cleaning devices" (92 municipalities).
- The majority (87 municipalities) of all 98 municipalities have formulated local IPC guidelines in regards to homebased care and nursing homes while less than half (38 municipalities) of all municipalities have formulated guidelines for schools.

Evaluation of IPC efforts

- The majority of all 98 municipalities strongly or partially agree that they evaluate their IPC efforts primarily by registering sick leave (76 municipalities) and outbreaks of infectious diseases (73 municipalities) in municipal institutions.
- Only 11 municipalities state that they have participated in a systematic nationwide survey of the number of healthcare-associated infections in nursing homes – The HALT study (Healthcare Associated Infections in European Long-Term Care Facilities)
- The municipalities state that factors that will strengthen IPC efforts in the municipality include a political and managerial focus on IPC in all parts of the organization, the preparation of a IPC policy, the establishment of a coordination committee and selection of IPC officers, competence development of IPC officers and IPC coordinators, increased network-based collaboration and exchange of experience internally in the municipality and with the region, systematic data collection and evaluation of IPC efforts.

Results of additional analysis

Demography

- There doesn't seem to be a correlation (Chi-test: $p=0.80$) between municipalities sizes (number of citizens) and whether municipalities established an IPC organization or not.
- There is a statistically significant association (Fisher's exact test: $p=0.01$) between the municipality's regional affiliations and their indications of whether they've established an IPC organization or not. Majority of municipalities in Region Syddanmark (19 municipalities, 86%) and Region Nordjylland (nine municipalities, 82%) have established IPC organization while it's only the case for half (six municipalities, 35%) of them in Region Sjælland.

Covid-19 cases

All citizens

- Based on the available data, it cannot be reliably deduced whether there is a correlation between cumulative of covid-19 incidence in municipalities with an established IPC organization compared to municipalities that have not established a hygiene organization (Wilcoxon rank sum test: $p=0.156$).
- There is only a minimal difference between the amount of days in terms of how quickly municipalities reach an incidence level of 50 or 100 of covid-19 cases among all citizens regardless of whether the municipality has established IPC organization or not.
- However, there seems to be a tendency for municipalities with an established IPC organization to later reach an incidence level of 200 of covid-19 cases among all citizens compared to municipalities without an established IPC organization. The median difference in number of days is 68.5.

Nursing home residents

- There seems to be a clear trend towards a lower cumulative of covid-19 incidence among nursing home residents in municipalities with an established IPC organization compared to municipalities that have not established an IPC organization. However, this trend is not statistically significant (Wilcoxon rank sum test: $p=0.056$).
- The analysis further suggests that municipalities with established IPC organization later reach an incidence level of 100 covid-19 cases among nursing home residents compared to municipalities without an established IPC organization. The median difference in number of days is 54.0.

Sick leave amongst primary school students

- There does not seem to be a difference between (Kruskal-Wallis rank sum test: $p=0.22$) the average amount of sick leave between students in primary and school in the 2018/2019 school year in municipalities with an established IPC organization compared to municipalities without one that has existed for minimum a year.
- There is a clear trend towards a lower average of sick leave (percentage) between school students in early primary school (Kruskal-Wallis rank sum test: $p<0.01$) and late primary school (Kruskal-Wallis rank sum test: $p=0.02$) for the municipalities that have stated that they prioritize IPC in the area of children-and adolescent at the municipality's executive level compared to municipalities who don't prioritize this.
- There is a clear trend towards a lower average sickness absence rate among primary school pupils in early primary school (Kruskal-Wallis rank sum test: $p<0.01$) for the municipalities that have indicated that they have entered into a joint-regional cooperation agreement on IPC advice compared to municipalities that have not entered into such an agreement.

Perspectives on the results of the report

Status on implementing the key recommendations from the Danish Health Authority's health promotion package on IPC

The results of the questionnaire survey describe to what extent and how key recommendations in the health promotion package on IPC (SST, 2018) have been organized and implemented in the municipalities. The results show that less than half (45 municipalities) of all 98 municipalities have established IPC organization when the covid-19 pandemic started. Under the covid-19 pandemic the number of municipalities with established IPC organizations increased to 62 municipalities (63 %).

A previous report on municipalities preventative efforts from 2017, based on data from 95 municipalities, showed that 58% of municipalities have established a transversal organization specifically for the IPC area, which was (percentage wise) compared to 2013 (36 %) and 2015 (49%) (Sølvhøj, Cloos, Jarlstrup, Holmberg ,2017).

By comparing the results of the mapping of the municipalities IPC efforts in Denmark in 2020, there is therefore an increase in the number of established IPC organizations from 2013 to 2020.

Influencing the implementation of the key recommendations from the Danish Health Authority's health promotion package in IPC

Based on the results of this reports questionnaire, a number of factors are identified that strengthen the municipalities ability to implement the key recommendations from the Danish Health Authority's health promoting package om IPC (2018).

The results show that some municipalities experience that the covid-19 pandemic highlighted the need for establishing an IPC organization across of the municipalities areas of responsibility as well as on a strategical and executive level. Likewise, it highlights the importance of having a political- and managerial focus on IPC.

There is a lot of awareness of IPC within the areas of eldercare and children-and adolescents and thus prevention is prioritized in the municipalities that have established IPC organizations on both a strategical- and executive level. It is supported by a recent publication from the Danish Health Authority on IPC in eldercare (SST,2021), based on interviews with 16 employees in 14 different municipalities and selected experiences from municipalities before and under the covid-19 pandemic. In summery the 16 interviews point out that it is crucial that there is managerial attention in the operational units and on the strategical level if the IPC efforts intend to be successful.

The results of the survey also show that several municipalities have not adopted an IPC policy and/or set up a coordination committee at the strategic level of the municipality. At the same time, municipalities want to hire nurses with a formal education in IPC

These factors promote a structured IPC organization and are important for establishing transparent decision-making paths, maintaining a continuous focus on IPC, achieving set goals and providing effective ways to evaluate municipalities' IPC efforts. This is supported by IPC in eldercare (SST, 2021), which emphasizes the importance of having a municipal coordinator, such as an IPC nurse, available to ensure the development of the municipality's IPC efforts.

The results from the questionnaire also shows that IPC coordinators are present in most of the municipalities and thereby can support the work within IPC on an executive level in municipalities. This includes the importance of maintaining and developing competencies in IPC, which is why it is necessary to strengthen the educational offerings for IPC coordinators.

At the same time, it is important that municipalities participate in regional and municipal networks to support effective IPC efforts. In this report it appears that majority of municipalities indicated they've entered into a regional cooperation agreement on IPC guidelines, which was only the case for a little over half in 2013 (Friis-Holmberg et al, 2013). It is a positive that an increasing number of municipalities consider it relevant to enter a joint regional cooperation agreement, whereby the municipalities get access to relevant expertise on IPC. The results from the questionnaire shows that only 37 municipalities are cooperating with other municipalities on IPC, e.g. in the form of knowledge sharing about IPC efforts, IPC training for employees and specific joint IPC initiatives. This form of cooperation needs to be strengthened, as there may be resource gain, as it is assumed that they often have the same type of local issues.

Based on the questionnaire survey, the following factors are identified that inhibits municipalities ability to implement the key recommendations from the Danish Health authority's health promotion package on IPC to municipalities (2018):

- Lack of continuous support from the municipality's leaders and politicians
- Lack of IPC competencies and inspiration, including lack of hiring of IPC officers
- Lack of recognition of the need for continuous prevention in the area of IPC, including a need to set up a coordination committee, adopt an IPC policy, cooperate with other municipalities in the area of IPC, and select IPC coordinators at the executive level.

A survey of the implementation of the health promotion packages (KL og Center for Forebyggelse i praksis, 2016) showed that the promotion packages have given legitimacy to the cross-sectorial prevention tasks, but that municipalities also considered the following conditions important to promote successful implementation:

- Cross-sectorial organization ensures coordination and promotes dialogue on common goals
- Political support is a prerequisite for all administration to deliver on the desired targets
- Management support provides direction and help to deal with overcoming challenges
- Coordinators with the right skills drive the process forward
- Early employee involvement and ensuring the right skills are central to the process
- Personal relationships and networks between municipalities have provided an overview and facilitated collaboration
- Implementation is very much about making the best use of existing resources

It should be noted that the Danish Health Authority's health promotion package on IPC was not part of Local Government Denmark (KL) coverage in 2016 (KL og Center for Forebyggelse i praksis, 2016). Nevertheless, the points listed above supports the results from the mapping of municipal IPC efforts in Denmark 2020 (Jakobsen, Nielsen Sølvhøj, Holmberg, 2020).

Connection between IPC organization and targets to reduce infections-related illness

Covid-19 cases

In a previous epidemiological surveillance report focusing on nursing homes (SSI, April 2020) it appeared that there were many confirmed cases of covid-19 among nursing home residents. The positive rate was thus generally higher amongst nursing home residences than for the average of all tested in Denmark.

The results from the mapping of municipal IPC efforts in Denmark shows that municipalities with an established IPC organization are more likely to respond to the initial spread of covid-19 amongst citizens in 2020. However, there seems to be a tendency for municipalities with an established IPC organization to reach an incidence level of 200 covid-19 cases pr. 100.000 citizens 68,5 median days later compared to municipalities without an established IPC organization.

Sick-leave/illness amongst school students

The reports show that there doesn't seem to be a difference between the average amount of sick-leave between students in the early, middle or late stages of primary school in the school-year 2018/2019 in municipalities with and without established IPC organization that has existed for at least one year.

However, there is a clear tendency for a lower average sick-leave rate between students in the early and middle stages of primary school in the municipalities that have indicated that they prioritize IPC prevention in the area of children and adolescents at the municipality's executive level compared to municipalities that do not prioritize it. Furthermore, a clear tendency for lower level of sick-leave in students in the entry- and medium stages of primary school in municipalities who are part of joint-regional cooperation agreements on IPC guidance compared to those who haven't joined a regional cooperation agreement.

In summary, the results emphasize a need to strengthen the municipalities establishment of IPC organization, prioritization of IPC in the area of children- and adolescents, as well as joint-regional cooperation agreement on IPC guidance. Therefore, it is desirable, among other things, to strengthen the collaboration between the IPC units and the municipalities in region Sjælland (region) and Hovedstaden (region), where only six municipalities (35%) and 17 municipalities (59%) have established an IPC organization respectively.

Strengths and weaknesses of the report

One of the strengths of the mapping of Municipal IPC initiatives in Denmark in 2020 is that the questionnaire has an response rate of 100 % as well as a high validity:

- The questions in the questionnaire are formulated based on the Danish Health Authority's health promotion package on IPC (2018), which is widely known in the municipalities.
- Partners and several municipal actors have contributed to pilot testing the questionnaire survey
- The questionnaire has been sent to the official electronic main mailboxes in the municipalities, i.e. the email inquiry has followed the normal procedure.
- The questionnaire was promoted via CEI's newsletter CEI-NEWS, via contact with municipal employees who are members of the Professional Association of IPC Nurses and in connection with various relevant events facilitated by Local Government Denmark (KL).
- Municipalities that had not responded to the questionnaire within two working days received reminder emails every second or third day, and were offered to complete the questionnaire electronically as well as manually and by phone.
- Municipalities had a large and increased focus on IPC due to the of covid-19 pandemic.

The respondents stated that they are aware of the municipalities IPC efforts, and in several cases more than one person contributed to the questionnaire. The results of the survey are therefore considered to be representative of the municipality's IPC efforts at the time of answering.

Furthermore, it is a strength that the report includes supplementary statistical analyses where selected measures of IPC organization based on the questionnaire survey data are compared with goals related to reducing infections-related disease measures at the municipal level based on Danish registry data. It is seen as a great strength that the report has been able to benefit from the unique opportunity to link these data.

One of the weaknesses of the survey is that the respondents have many different educational backgrounds and job titles, as well as different levels of seniority in the IPC area in the municipality's organization. A potential weakness of the survey is that the questionnaire survey is primarily based on statements and tick boxes.

As mentioned, the analyses include municipalities whose organization of IPC work has been established within the last year, prompted by of covid-19. In the analyses regarding the correlation between sick-leave among primary school students in the 2018/2019 school year and whether or not the municipalities have established an IPC organization, this parameter has been considered. However, when analyzing the correlation between of covid-19 cases and whether or not the municipalities have established an IPC organization, we have not considered whether the result is affected by how long the IPC organization has existed.

It would have been desirable if more complex correlations between IPC organization measures from the questionnaire survey and the externally obtained infection-related illness targets measures at the municipality level had been investigated. Such further studies could have usefully included multivariate analyses, where the influence of several simultaneous factors on infection-related disease measures would have been elucidated. This was not possible due to time constraints, but could be considered in any subsequent processing of the data collected for this report.

Conclusion

The survey of municipal IPC efforts shows that 62 of Denmark's municipalities have established an IPC organization, while 36 municipalities have not yet established an IPC organization. However, many municipalities have an IPC initiative without having an established IPC organization. However, establishing a formal, interdisciplinary and management-anchored IPC organization provides far better opportunities to carry out IPC work that is not only triggered by acute needs. An established IPC organization will ensure a continuous focus on solving municipal IPC challenges, but not least to be able to respond optimally to periodic challenges such as of covid-19, seasonal influenza and stomach infections.

Municipalities with an IPC organization are more likely to involve a number of different backgrounds in their IPC work - both at the strategic and executive level. Especially in the areas of children and adolescents and the elderly, a greater degree of prioritization of IPC is seen in municipalities with an established IPC organization.

Additional analyses show a clear trend towards a lower average sick-leave rate among early and middle level primary school students in the municipalities that prioritize IPC in the area of children and adolescents compared to the municipalities that do not prioritize it. At the same time, there is a clear trend towards a lower average sick-leave rate among primary school students in the municipalities that have entered into a formal joint-regional cooperation agreement on IPC guidance with the regions' IPC units compared to the municipalities that have not.

Furthermore, the report seems to indicate a tendency that it takes longer to reach a specific incidence level among all citizens and nursing home residents in municipalities with an established IPC organization compared to municipalities that have not established an IPC organization. At the same time, there is a tendency for a lower incidence of covid-19.

Recommendations

Based on this report, the following recommendations are made to municipal stakeholders and health authorities in order to prevent the spread of pathogenic and resistant microorganisms in municipal institutions and in society in general.

IPC measures will also have an impact on the need for the use of antibiotics and thus reduce the risk of developing antibiotic resistance. It is recommended:

- That all municipalities as soon as possible establish a formal, interdisciplinary and management-anchored IPC organization with IPC officers with special competencies who can continuously support the municipal IPC efforts at both the strategic and the executive level.
- That a formal joint-regional cooperation agreement is established with the IPC units at the regions' hospitals on IPC guidance at least at a basic level.
- That all municipalities ensure a continuous prioritization of IPC, especially in the areas of children and adolescents and the elderly, adapted to the municipality's demographics, both at the strategic and executive level.
- That the municipalities appoint IPC coordinators representing all disciplines, and that the IPC coordinators are trained and given continuous access to further competence development.
- That the municipalities participate in network-based collaboration and exchange of experience with relevant IPC partners.
- At political and managerial level, there is a continuous focus on defining a municipal IPC policy and a visible IPC organizational structure.