

# A Green Zone Strategy for Ireland

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A Green Zone strategy, one that selectively imposes restrictions within a country, e.g. at county level, is the optimal strategy to rapidly reduce the number of COVID-19 cases and accelerate the return to normal social, health, education, and business activity—as each county, province or state becomes clear—without disease and loss of life.

This approach has already been used effectively, but often not completely, in multiple countries, including Ireland, New Zealand, China, Switzerland, and Argentina. Many European countries are now applying Green Zone style approaches, both to allow for response to localized outbreaks and for selective easing of restrictions on travel to neighbouring countries with similar or lower disease rates. Countries that imposed restrictions on non-essential travel, both internationally and between localities within their borders, have achieved very rapid contraction of their epidemics and local, or even national, elimination of the disease. This enabled them to reopen economic activity in most of the affected area within a few weeks, while the most stringent control measures were selectively maintained only in areas with ongoing community transmission (Red Zones).

Right now, Ireland can achieve safety, with consistently normal local activity in many counties, with perhaps the occasional need for more intensive local responses to local outbreaks. To do this, a key policy is a more consistent Green Zone strategy, using international and inter-county travel restrictions to prevent and control larger outbreaks. This will serve as a foundation for a return to comparatively normal domestic economic activities and social life. Partnering with other Green Zone countries will enable international travel, fostering a broader effort to get to zero.

The current conditions in Ireland remain favourable for adopting such a COVID-19 elimination policy due to the success of the previous strong actions taken. County level conditions on July 12 and Aug 3 are shown in Fig. 1 and Fig. 2. However, it should be noted that the scale of that challenge and length of time required to see it through grows with every day that the existing plan to “live with the virus”—which is already failing and allowing the national epidemic to re-expand at an alarming rate—persists. Looking forward to a COVID-free island, we can learn a lot from the successful way Ireland tackled and progressively shrunk the epidemic all the way up until late June, notably including the earlier county-level travel restrictions that rendered several counties COVID-free for as long as those travel limits lasted. If the ongoing new outbreaks scattered across the country are to be contained and snuffed out, and further outbreaks are to be prevented, it is essential to build upon these experiences of success by restoring and supplementing control measures which allow opening up of the economy in counties that achieve elimination. The key is preventing a new chance for rapid growth in cases, and then unconstrained geographic spread, as has been seen repeatedly in Italy, Japan, Israel, the UK and the USA.

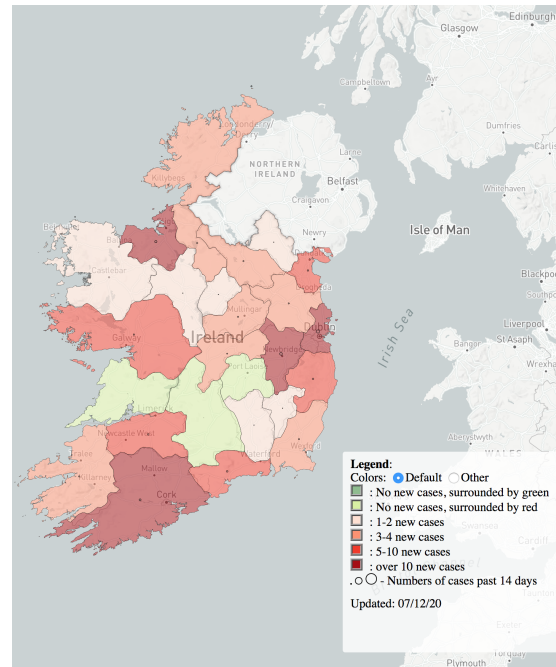


Fig. 1. County status in Ireland including five levels of zone distinction, by number of cases in the past 14 days, on July 12, 2020. Three counties have no cases in the last 14 days but don't qualify for green zone status because of neighboring red zones, i.e. they are yellow zones.

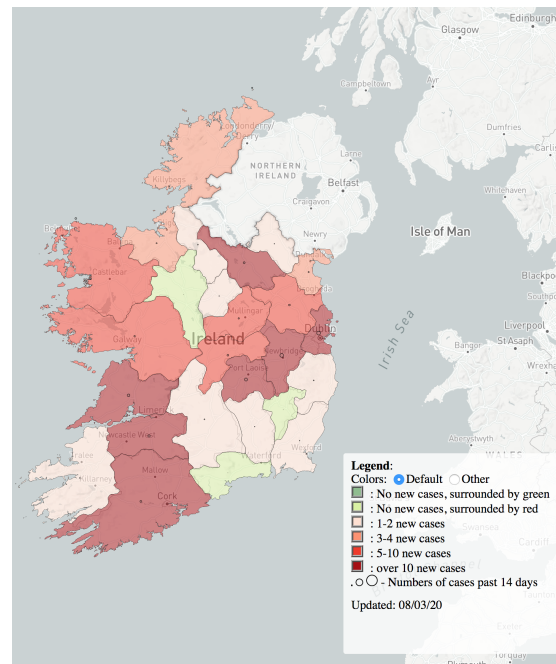


Fig. 2. Similar to Fig. 1 on August 3, 2020. The yellow zones have shifted but there are still three of them. Overall severity is worse.

The way forward is to get to zero new cases in at least the most recent 14 day period county by county. Reinstating the inter-county travel restrictions on non-essential travel (and not

the other restrictions) from phase II of Ireland's national plan is key. The restrictions from phase I may also be useful for selectively clamping down hard and fast on intransigent foci of persistent, uncontrolled transmission in specific localities, with extra caution and patience so as not to open up prematurely. Simultaneously there is a need to develop decentralized, fine-scale routine surveillance systems with sufficient sensitivity to detect any new outbreaks while they are still small enough to contain and extinguish as they arise. This is akin to firefighting. Just as we don't leave an uncontrolled fire burning in a home but prepare for new fires if they occur, so should be our strategy for fighting COVID-19.

Ideally, two levels of geographic zones should be developed. In addition to the county level zones, a second, finer scale set of zones should be developed for towns and rural communities, and neighbourhoods in larger urban centres. Using current infection data Green Zones can be identified and include large parts of the country. If implemented today, this might already include many rural and suburban areas and even some neighbourhoods in big cities. Community members should be alerted to local transmission events so that actions to stop transmission can be focused where it matters most in areas that are not yet green zones, meaning that either they have ongoing community transmission (Red zones) or borders with neighbouring zones that do (Yellow zones). Social distancing, hand hygiene, face masks, limited essential services, and extensive testing should be used to shrink local transmission down to zero.

By taking strong action in those targeted areas, only a month should be needed in counties with only a few new cases per day presently to get to zero. Once the condition of zero new cases is achieved, including a period of vigilance to rule out residual cases, a process of opening up safely can be started. In subsequent weeks, only areas with persisting community transmission will require these actions to be extended until zero incidence is achieved and sustained. Where areas have persistent cases, strong action can be mounted to eliminate it as the resources of the country can be focused there. The reopening of near-full economic activity across all sectors should then be carried out on a locality by locality and county by county basis and rapidly expanded across the country, rather than attempting to do so nationally on a sector-by-sector basis. This decentralized strategy also lays down solid foundations for fine-scale, near-real-time routine surveillance system that enables rapid responses to any new cases that are subsequently discovered or imported from outside these green zones. Any individual case or localized outbreak may be identified early and then tackled decisively with contact tracing and, as necessary, selective re-imposition of local restrictions.

While local travel restrictions are recognized as key to the solution, conversely, the alternative of allowing free mobility to rapidly spreading outbreaks across the country makes containing them impossible without sustaining severe social and economic restrictions until the whole country is virus free.

The Green Zone approach combining local travel restrictions with rapid and decisive but localized reactive measures if local transmission reoccurs, enables one to drive the disease to extinction relatively rapidly. Local extinction has been achieved or at least approached in almost 50 countries, where reproductive numbers of significantly less than one

were achieved, so elimination clearly represents a viable exit strategy. Ireland is also capable of achieving and sustaining its position as a COVID-free green zone, this represents the most positive form of soft power internationally, with advantages for trade and travel.

The first example of a country applying a Green Zone strategy was China, which eliminated the outbreak within 4-5 weeks, and in the epicenter of Wuhan in 5-6 weeks (Fig. 3). Recent comparatively small outbreaks there are examples of firefighting in this context. For as long as Ireland imposed county-level travel restrictions, it consistently achieved a rapid decline in cases (Fig. 4). Missing from its arsenal is the use of CT-scans that could accelerate the decline in cases due to eliminating the false negative rates of RT-PCR tests as widely recognized and recently reported in the *New England Journal of Medicine* [1]. Switzerland achieved a similar geographical contraction but then eased off and has allowed the residual tail of the outbreak to begin growing again (Fig. 5). In contrast, Italy did not use the green-zone geographic strategy except in limited ways, so after 4 months of lockdown cases continued not only in the original epicentres but also across the entire country (Figs. 6, 7). In contrast, Argentina has confined the outbreak to the epicenter in Buenos Aires, and while having difficulties addressing the outbreak there, has otherwise maintained an almost COVID-free country with only a few small outbreaks outside the capital (Fig. 8). Russia, the longest country in the world, allowed the disease to propagate all along the Siberian railway without imposing any travel restrictions (Fig. 9).

Islands have a tremendous advantage in achieving a COVID-free exit from the pandemic. This is apparent from New Zealand, Iceland, and elsewhere. The Republic of Ireland, in collaboration with North Ireland, can also deploy this strategy to exceptional effect. We note that even for countries with widespread cases, it is possible to achieve outbreak control in a few weeks using a Green Zone strategy. To rapidly gain control of the outbreak, the first step is to apply a brief but stringent restrictions of at least 2 weeks to prevent most transmissions and to properly identify the locations where outbreaks are ongoing. This has already been shown to be both possible and successful in Ireland. During this initial highly restricted containment phase, sub-county-level boundaries should be established for restricting travel between towns and neighborhoods in urban areas. These restrictions will then enable the most rapid relaxation of restrictions according to the green zone process. Where there is persisting transmission directed efforts that engage the affected community will be effective. Community members will better recognize the consequences of their own actions for stopping their outbreak. Thus, the last embers of the epidemic can be stamped out with vigour.

A few brief weeks ago, Ireland was closer to zero COVID than it is today, and things are now headed rapidly in the wrong direction. However, there is no inevitability to a second wave, or all the associated costs that come with it. The main drivers of both health and economic harm are new cases of infection and the responses required to stop them from spiraling out of control. Decisiveness is key to minimizing the damage caused by COVID-19. If a second wave is allowed to develop on the island of Ireland, all those avoidable additional costs, not to mention deaths and disabilities, will be borne.

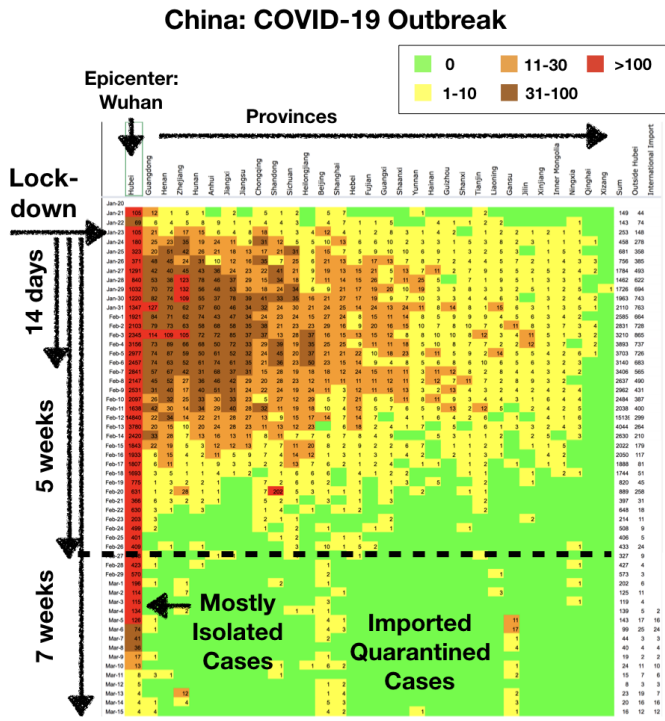


Fig. 3. Outbreak control in China. Horizontal axis is the provinces, higher number of cases are on the left and are closer to the epicenter in Wuhan. Outside of the epicenter provinces had no more than 21 identified cases per day at the time of lockdown. The trajectory of growth and decline led to a 4-5 week elimination. In Wuhan 5-6 weeks were needed, not including a period in which essentially all cases that arose were already quarantined due to contact tracing of close contacts, often of housemates.

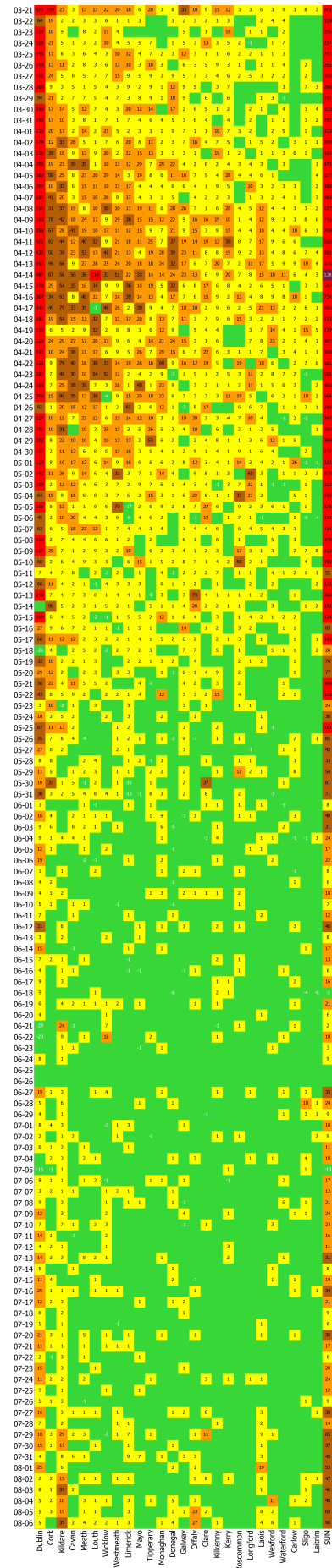


Fig. 4. Outbreak control in Ireland showing significant geographical contraction and recent increases (compare Switzerland and Italy below).





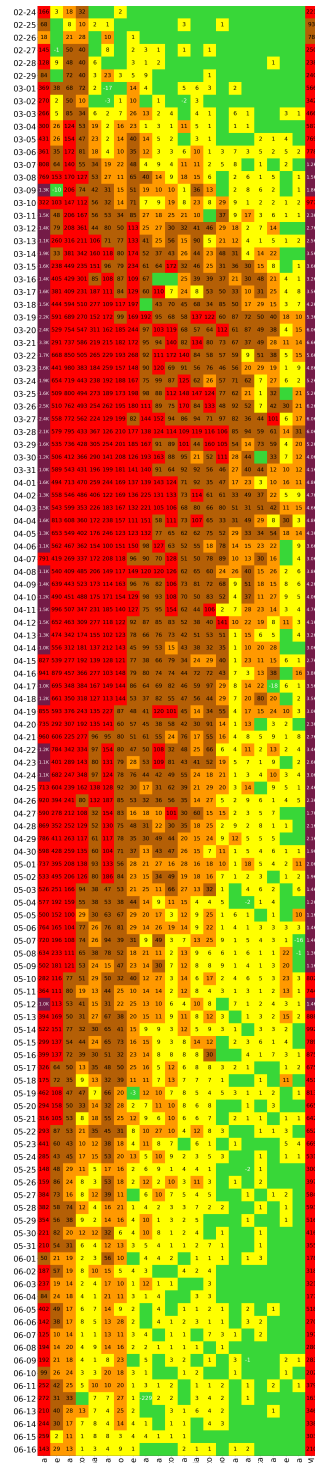


Fig. 7. Outbreak control in Italy including expanded view showing that the control of the outbreak took over 3 months and has not been completed even after 4 months (see also Fig. 6).

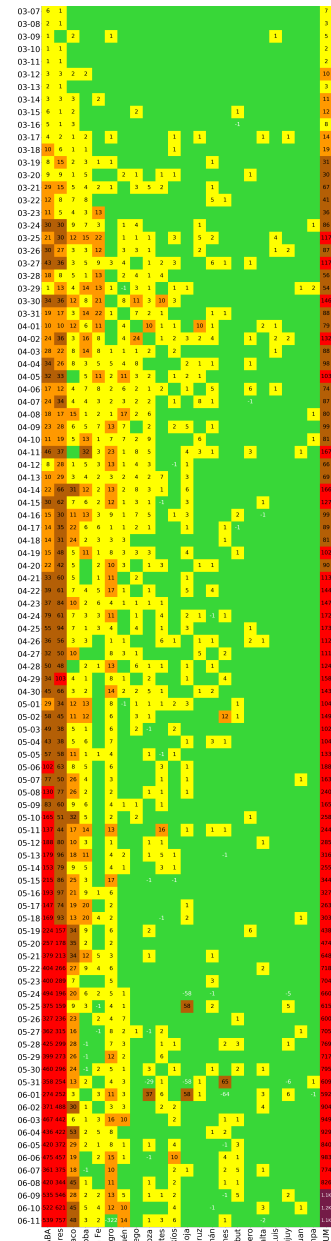


Fig. 8. Outbreak control in Argentina showing that the outbreak was restricted to the epicenter in Buenos Aires early on, but the effort to contain it there has not yet been successful due to high population density and other factors. The solution is to use a more local model for travel restrictions between neighborhoods and to refine other aspects of the response efforts.

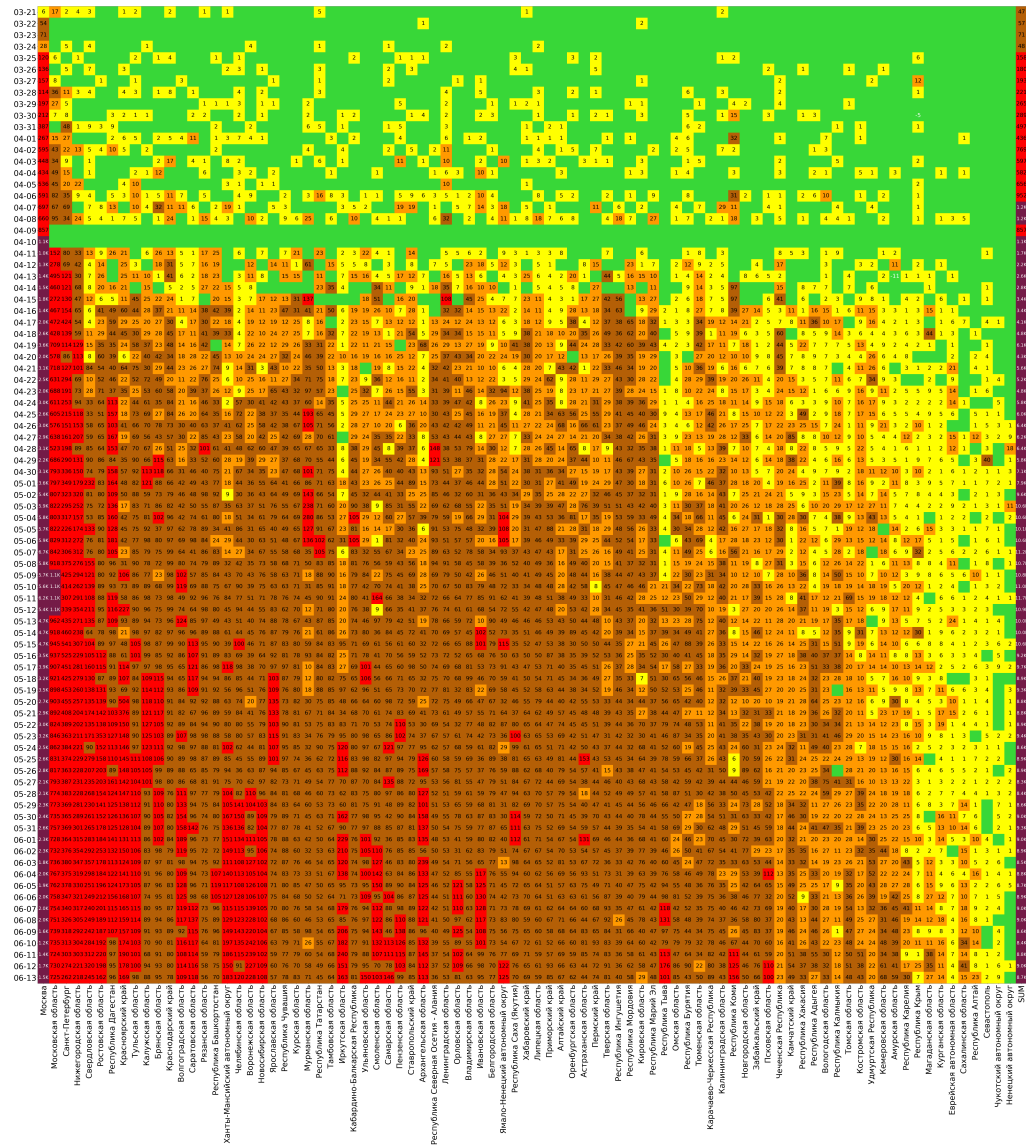


Fig. 9. Outbreak control in Russia showing that without travel restrictions the outbreak propagated from end to end of the longest country in the world and led to major outbreaks and dramatically extended the time to control the outbreak. While the outbreak is being reduced in the epicenter in Moscow by end of this period, it continues to grow in other areas.

REFERENCES

[1] S. Woloshin, N. Patel, A.S. Kesselheim, False Negative Tests for SARS-CoV-2 Infection—Challenges and Implications, N Engl J Med 2020; 383:e38, DOI: 10.1056/NEJMp2015897 <https://www.nejm.org/doi/full/10.1056/NEJMp2015897>