The severe acute respiratory syndrome (SARS) 2002–2004 epidemic could have served us better had we attended carefully to the lessons of that time. The evidence that presaged our current reality was recklessly and inexcusably overlooked. For more than a decade, the world disregarded evidence showing that wildlife markets in China, along with the high genetic recombination rates of coronaviruses, comprised an environment ripe for another zoonotic outbreak.[1] We also missed a chance to achieve the only definitive solution to the pandemic when several promising SARS vaccines, which had undergone preclinical trials, were thwarted by a lack of further funding.[2] Although SARS and SARS-CoV-2 are different viruses, their genetic closeness and similarity in the molecular mechanism of infection would have saved valuable time in the proper development of a SARS-CoV-2 vaccine. Instead, we are now rushing phase 1 clinical trials without preclinical or animal models.[2]

This pattern of scattered research might be a trademark of the way in which science has operated in contemporary society, but the vulnerability derived from allowing it to persist this way is unreasonable. Newton's exceptionally hackneyed quote, "If I have seen further it is by standing on the shoulders of giants," superbly conveys the notion of science being a cooperative effort, and we must always remember that these shoulders are often broadly spread across time. Public funding, as well as the overall mentality underlying research, cannot be steered toward achieving results in the short term or, otherwise, not achieving any results at all. Some processes, such as new PPE technologies and vaccines, must be understood and acknowledged as intrinsically time-consuming and must be continuously supported outside times of critical necessity. As evidence during the COVID-19 crisis shows, the real-time capacity to find solutions is insufficient and the price that we must pay for missed opportunities it is too high.

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Occupational exposure to varicella zoster in a tertiary-care healthcare setting

Zachary A. Yetmar MD[1], Debra K. Apenhorst MAN, RN[2], Melanie D. Swift MD, MPH[3], Priya Sampathkumar MD[1] and Elena Beam MD[1]

[1]Division of Infectious Diseases, Mayo Clinic, Rochester, Minnesota, [2]Infection Prevention and Control, Mayo Clinic, Rochester, Minnesota and [3]Division of Preventive, Occupational and Aerospace Medicine, Mayo Clinic, Rochester, Minnesota

To The Editor—Varicella zoster virus (VZV) reactivation is a common complication of a weakened immune system, which can occur due to advanced age or various immunocompromising conditions. The VZV incidence in the general population is 4.82 cases per 1,000 person years,[1] but this rate increases in populations with predisposing conditions. Solid-organ transplant recipients are estimated to have a VZV incidence of 22.2 cases per 1,000 patient years, with heart transplant recipients having the highest organ-specific incidence of 40.0 per 1,000 patient years.[2] Hematopoietic stem cell transplant recipients have reported incidence rates of 43–60 cases per 1,000 person years.[1,3] With high incidence and subsequent healthcare utilization in these populations, there is an important need to prevent occupational exposure to VZV.

Recommendations for isolation precautions differ by extent of VZV involvement and immunocompromised status. For immunocompetent patients, the Centers for Disease Control and Prevention recommend contact isolation for localized VZV and concurrent airborne and contact isolation for disseminated VZV.[4] In immunocompromised patients with apparent localized disease, contact and airborne isolation are recommended until disseminated disease has been ruled out. However, it is not known whether instituting airborne isolation in this population reduces occupational exposure to VZV. At our facility, we only institute contact isolation in cases of localized VZV, regardless of immunocompromised status. We reviewed cases of disseminated VZV to evaluate whether this change in policy increased the likelihood of occupational exposure.

We performed a retrospective, descriptive review of occupational exposure investigations related to VZV. We included patients from January 2016 through December 2018 and excluded those with primary chicken pox. Demographic and clinical data were abstracted from the electronic medical record. Records were evaluated to determine whether the exposure was due to a delay in airborne precaution initiation or a progression of localized disease at presentation to disseminated VZV.

In total, 23 patients met our inclusion and exclusion criteria; 12 patients (52.2%) were female, with a median age of 64 years (interquartile range, 57–70.5 years). Also, 20 patients (87.0%) had an immunocompromising condition. This cohort included 8 patients (34.8%) with a hematologic disorder or malignancy, 4 patients (17.4%) with a solid-organ malignancy, 3 patients (13.0%) with a bone marrow transplant, 3 patients (13.0%) receiving immunosuppressing medication, and 1 patient (4.3%) with a solid-organ

Author for correspondence: Zachary A. Yetmar, E-mail: yetmar.zachary@mayo.edu
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Table 1. Patient List

Patient	Age, y	Sex	Immunocompromising Condition	Inpatient	Secondary Dissemination
1	64	M	Follicular lymphoma on chemotherapy	Yes	No
2	89	M	Diffuse large B-cell lymphoma	No	No
3	71	F	Chronic lymphocytic leukemia on venetoclax	Yes	No
4	77	M	None	No	Yes
5	36	F	Pancreas transplant recipient	Yes	No
6	67	F	Breast cancer on chemotherapy	No	No
7	71	M	Tonsillar squamous cell carcinoma on chemoradiation	Yes	No
8	70	M	Systemic lupus erythematosus on mycophenolate	Yes	No
9	56	F	AL amyloidosis on chemotherapy	Yes	No
10	61	M	Prostate cancer	Yes	No
11	63	M	None	Yes	Yes
12	57	F	Peripheral T-cell lymphoma	Yes	No
13	59	F	Autologous stem-cell transplant	Yes	No
14	50	F	Autologous stem-cell transplant	Yes	No
15	67	F	Breast cancer	No	No
16	59	M	Autologous stem-cell transplant	Yes	No
17	35	M	Rheumatoid arthritis on etanercept	Yes	No
18	64	M	Ulcerative colitis on azathioprine; renal cell carcinoma	No	No
19	71	F	None	Yes	No
20	77	M	Chronic lymphocytic leukemia on ibrutinib	Yes	No
21	66	F	Chronic lymphocytic leukemia	Yes	No
22	57	F	Peripheral T-cell lymphoma	Yes	No
23	39	F	Systemic lupus erythematosus on azathioprine and prednisone	Yes	No

transplant. One patient had a solid-organ malignancy and was receiving an immunosuppressing medication. Other comorbidities included 4 (17.4%) with diabetes mellitus, and 1 patient (4.3%) had end-stage renal disease. 78.3% of cases were managed in the inpatient setting. Cases are further detailed in Table 1.

Occupational exposure occurred due to delayed diagnosis or institution of proper precautions in 21 patients (91.3%) and secondary dissemination in 2 patients (8.7%). Both patients with secondary dissemination were considered immunocompetent. Dissemination took place 2 days after healthcare presentation in both cases.

In our population, no immunocompromised patients experienced secondary dissemination after presenting with localized zoster. Instead, the exposures from immunocompromised patients were the result of delayed recognition of zoster, or failure to institute airborne isolation in recognized disseminated infection. Pre-emptive airborne isolation for immunocompromised patients with localized VZV appears unlikely to reduce occupational exposures.

Isolation precautions have been associated with numerous adverse effects. Isolated patients have increased feelings of depression, anxiety, anger, fear, and loneliness in addition to a perceived decrease in attention from healthcare staff. Furthermore, these patients have an increased risk of medical errors and preventable adverse events.[5] Patients admitted for respiratory infections with associated isolation precautions have increased length of stay, expected length of stay, and hospital cost compared to nonisolated patients.[6] Airborne isolation also imposes an institutional burden with potential adverse consequences; many healthcare facilities have few or no airborne infection isolation rooms (AIIRs). The current COVID-19 pandemic has further strained the availability of AIIRs. Presumptive airborne isolation of immunocompromised patients with localized VZV could lead to misuse of a finite resource or even unnecessary transfer to another institution.

Several alternatives to routine airborne precautions in localized disease could potentially reduce healthcare exposure. A longer time from symptom onset to antiviral treatment has been associated with dissemination of VZV.[7] This finding suggests that interventions to recognize VZV early in its course, such as patient and provider education, may promote early treatment, prevent dissemination, and reduce healthcare exposures. More information is needed regarding the best strategies to reduce occupational exposure to VZV. Finally, ensuring that healthcare workers are vaccinated against varicella would minimize the impact of exposures in the healthcare setting.

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